

# **Growing and Processing Tobacco at Home A Guide for Gardeners**

## **By Jim Johnson**

*A message from Jim Johnson, President Seedman.com*

Dear friend,

I hope that you find the enclosed information useful. I came up with this guide because I sensed a need for our general population to become more informed about the Tobacco plant. For too long, most of us have only heard the negative side. I hope that after reading this material, you will be able to form an opinion based on the plants merits rather than its clouded reputation.

I also wanted to present an option to those who are tired of the ever increasing taxes placed on tobacco products and to those who are worried about the chemical additives that are now present in most forms of commercially raised tobacco. By raising your own tobacco products at home, you can alleviate these concerns.

The most important benefit from raising your own tobacco is the quality of tobacco that you will have to enjoy. Today's commercial tobacco products are loaded with chemicals and fillers and non-tobacco products. Your first all natural cigar or cigarette will be a pleasure you will not forget.

I also wanted to point out other uses for the plant. It makes a very attractive ornamental plant that often has fragrant flowers. It should be raised in every garden for its ornamental appeal. It also makes one of the best natural biodegradable pesticides that can be found. By using a pesticide made of tobacco juice or dust, you can prevent the use of harsh synthetic chemicals in our environment.

All tobacco plants can be raised inside in containers. Most will flower when only a foot tall. Tobacco plants also make stunning border plants for flower beds and gardens. I hope you enjoy this guide and wish you good luck with your tobacco growing.

## **A Little Tobacco History**

How old is tobacco? No one really knows, but scientists speculate that the tobacco plant began growing in the Americas somewhere around 5000-6000 BCE.

The first ever recorded proof of tobacco smoking comes from a piece of pottery dated before the 11th century. On it a Maya is depicted smoking a roll of tobacco leaves tied with a string. In 1492, Christopher Columbus set foot on the New World for the first time in the Bahamas. The native Arawak Indians offered the white men gifts of fruits, wooden spears and "certain dried leaves which gave off a distinct fragrance". Columbus accepted the gifts and brought them back to his ship. The fruit was eaten, but the strange leaves were thrown away. However, during his second voyage to the New World in 1493, he documents the use of tobacco by the natives.

When Cortez conquers the Aztec capital in 1519, he reports on the Mexican natives smoking cigarettes.

It is commonly believed that the first tobacco plants are introduced to Cuba and Santo Domingo in the early 1530's.

By 1548, Brazil is cultivating tobacco for commercial export.

In 1560, Jean Nicot de Villemain, France's ambassador to Portugal, writes of tobacco's many uses and medicinal properties, and sends the first plants to France ( later the botanical labeling of nictotinia would result from this ).

It is believed that tobacco first reached England in 1565, and is introduced by Sir John Hawkins.

The use of tobacco by his crew and other sailing crews was becoming quite common at this time.

But history seems to credit Sir Francis Drake with introducing *Nicotina tobacum* in 1573.

German Doctor Michael Bernhard Valentini wrote a book of exotic remedies in 1571, listing tobacco as being a treatment for dysentery, hysteria, colic and hernia. The same year, a Spanish doctor in Seville reports that tobacco is the newest health craze among Spanish doctors, citing 36 ailments that could be cured by tobacco. Tobacco is soon grown everywhere in Spain. English doctors soon follow suit and recommend tobacco for a number of ailments.

The first book in the English language devoted to the subject of tobacco was anonymously published in 1595, by Anthony Chute. It has the simple title "Tabacco," and contains an illustration of an Englishman smoking a clay pipe. In this little work for laymen, the author earnestly urged smokers not to abuse the kindly weed, upheld its medicinal uses, and suggested that physicians were trying to keep smoking a secret among themselves. The reason was, he said, that a moderate use of the pipe was of such value in preserving health that it was likely to make physicians unnecessary!  
from Early Literature of TOBACCO by  
George Arents

In 1603, England Physicians are upset that tobacco is freely available without a prescription.

1604: "A Counterblaste to Tobacco"

"Smoking is a custom loathsome to the eye, hateful to the nose, harmful to the brain, dangerous to the lungs, and in the black, stinking fume thereof nearest resembling the horrible Stygian smoke of the pit that is bottomless." --

James I of England, "A Counterblaste to Tobacco."

In his treatise, James also noted that autopsies found smokers' "inward parts" were "infected with an oily kind of soot." James also said if he ever had the Devil to dinner, he'd offer him a pipe. With regards to second-hand smoke, James said, " "The wife must either take up smoking or resolve to live in a perpetual stinking torment.

On the other hand, James' was the first government to find taxes on tobacco to be enormously profitable. Trying to stamp out smoking, he first increased taxes on tobacco 4,000%, from 2 pence/pound to six shillings, 8 pence/pound. That stopped people from buying tobacco, but dried up the funds that had been coming into the Treasury. James then slashed taxes down to 2 shillings/pound and watched the money pour in. Other governments were quick to learn the same lesson.

The first know commerical crop of tobacco is grown in Virginia by John Rolfe in 1612. Two years later, the first sale of native Virginia tobacco is sold in England. This allows the young Virginia colony to enter the world tobacco market, which is now dominated by Spain. King Philip III of Spain, in order to control tobacco, requires that tobacco only be grown in certain regions ( i.e. Cuba, Santo Domingo, Venezuela and Puerto Rico ) and shipped to a central location in Seville. This causes Seville to become the world center for production of cigars.

Tobacco use is widely spread in England at this time and it said that there were over 7,000 shops in England that carried tobacco in and about London. King James I, who opposes tobacco, realizes the potential in controlling this market and makes the import of tobacco a Royal monopoly, available for a yearly fee of 14,000.

( Boy, talk about history repeating itself, our modern day politicians rant and rave against tobacco, but are quite happy to accept the tax money gained from it and would never dare destroy the tobacco market ).

This is not to say that some countries did not take a different stance during this period. The Mongolian Emperor places a death penalty on using tobacco in 1617 and Japan prohibited tobacco entirely in 1621. In 1633 Turkey Sultan Murad IV orders tobacco users executed as infidels, and as many as 18 a day were

executed. Also, around this time, Russian Czar Alexis

creates penalties for smoking. The 1st offense is whipping, a slit nose, and transportation to Siberia. 2nd offense is execution. In China, the use or distribution of tobacco is made a crime punishable by decapitation. Heavy restrictions are placed on tobacco in France, but in 1637 King Louis XIII decides that he actually enjoys snuff and repeals restrictions on its use.

In 1619, The first shipment of women, meant to become wives for the settlers of Jamestown, arrives. A prospective husband must pay for his chosen mate's passage with 120 lbs. of tobacco. This same year, the first representative legislative assembly in America is held. The Virginia Colony's General Assembly's ( the beginning of self-government in North America ) first law is passed concerning the economics of the tobacco trade: tobacco shall not be sold for under 3 shillings per pound. However, by the following year, tobacco is in such heavy production in the colonies, and quality has decreased to such levels that the colonists were barely able to get this much per pound. Luckily for the colonists, a trade agreement was worked out with the Royal Crown that bans the commercial growing of Tobacco in England in return for a one shilling per pound duty on Virginia grown tobacco.

In 1624 Pope Urban VIII threatens excommunication for snuff users; as sneezing is thought to be too close to sexual ecstasy.

Around 1632, tobacco regulation begins in North America, as Massachusetts forbids public smoking. Fifteen years later, the Colony of Connecticut bans public smoking: citizens may smoke only once a day, "and then not in company with any other."

In 1650, the same Colony of Connecticut General Court orders that there will be no smoking by any person under the age of 21, and no smoking period, except with physicians order.

In 1666 Maryland faces a severe oversupply of tobacco and bans production of tobacco for one year.

The tobacco ban is lifted in Russia by in 1676 and Peter the Great later Advocates smoking and establishes a trade monopoly with England.

By the early 1700's, tobacco use is in wide use throughout the trading countries of the world.

By 1727, Tobacco had become such an important part of the Virginia economy that "Tobacco notes" Become Legal Tender in Virginia. Tobacco Notes attested to the quality and quantity of tobacco kept in specific public warehouses were authorized as legal tender in Virginia. They were used as units of monetary exchange throughout 18th Century. The notes were more convenient than the actual leaf, which had been in use as money for over a century.

In an effort to control quality and safeguard pricing, the Virginia Inspection Acts come into effect in 1730, standardizing and regulating tobacco sales and exports to prevent the export of unsuitable tobacco. Inspection warehouses were empowered to verify weight and kind and kind of tobacco. 17 years later, Maryland followed suit and passed the Maryland Inspection Act to monitor quality of exports.

In 1753, Swedish Botanist Carolus Linnaeus names the plant genus, *nicotiana*. and describes two species, *nicotiana rustica*, and *nicotiana tabacum*, these two classification remain in effect today.

In 1759, George Washington, having gained 17,000 acres of farmland and 286 slaves from his new wife, Martha Custis, (these added to his own 30 slaves), harvests his first tobacco crop. The quality was deemed quite poor however, and by 1761, Washington is deeply in debt.

The Revolutionary War ( 1776 ) is financed by a loan from France engineered by Ben Franklin. The collateral? 5 million pounds of Virginia Tobacco.

In 1794, the U.S Congress passes the first federal excise tax on tobacco products. The tax of 8 cents applies only to snuff ( the tax is roughly 60% of snuff's usual selling price ), not to chewing or smoking tobacco.

At the beginning of the 19th century, tobacco is being grown in Canada for the first time as well as the southern states of the US. Lewis and Clark consider tobacco one of their most important trade tools during their famous expedition.

Cigars begin catching on in the early 1800's. Cigar rolling becomes big business in Connecticut. England begins to catch the cigar craze. In 1826, England is importing only 26 pounds of cigars a year, but by 1830, the cigar is so popular, that England is importing over a quarter of a million pounds of cigars each year!

The "yellow cure" method of using charcoal becomes widely used in North Carolina. Using charcoal is not only cheaper, its intense heat turns the thinner, low-nicotine Piedmont leaf a brilliant golden color. This results in the classic American "Bright leaf" variety, which is especially mild.

In 1847, Philip Morris begins business selling hand-rolled Turkish Cigarettes.

In 1852, the first practical matches are introduced, making smoking more convenient. Now anyone could have a smoke anytime they desired. Three years later, the Safety Match is invented by J.E. Lundstrom and smoking will never be the same. Around 1860, chewing is still the preferred way of consuming tobacco in the US, but interests start to turn to smoking. Manufactured cigarettes appear. A popular early brand is Bull Durham.



In 1862, the first federal USA tax on tobacco; instituted to help pay for the Civil War, yields about three million dollars. In 1863, the first federal cigarette tax is imposed to help pay for the war. Also in 1863, Congress passes a law that requires cigars be sold in boxes that IRS can attach Civil War excise stamps to.

In 1864, the 1st American cigarette factory opens and produces almost 20 million cigarettes. White burley becomes popular, as it produces a sweet chewing tobacco.

In 1871, R.A. Patterson founds the "Lucky Strike" company.

In 1873 Philip Morris dies, but he has established a legacy that will live on for generations.

In 1875, Allen and Ginter offer a reward of \$75,000 for cigarette rolling machine. Also, R. J. Reynolds founds R.J. Reynolds Tobacco Company to produce chewing tobacco, soon producing brands like Brown's Mule, Golden Rain, Dixie's Delight, Yellow Rose, Purity.

In 1876, Benson & Hedges receives its first royal warrant from Edward VII, Prince of Wales.

In 1878, J.E. Liggett & Brother incorporates as Liggett & Myers Company. By 1885 Liggett is world's largest plug tobacco manufacturer, but doesn't make cigarettes until the 1890's

In 1880, Bonsack machine granted first cigarette machine patent. In 1881, James Buchanan ("Buck") Duke enters the manufactured cigarette business in Durham, NC. Duke's factory produces 9.8 million cigarettes, 1.5 % of the total market.

In 1883, Oscar Hammerstien receives patent on cigar rolling machine.

In 1883, the US ends the 1862 Civil War excise tax on cigars, helping to usher in a 40-year Golden Age of cigar smoking.

IN 1884, Duke heads to New York City to take his tobacco business national and form a cartel that eventually becomes the American Tobacco Co. Eventually, Duke buys 2 Bonsack machines., getting one of them to produce 120,000 cigarettes in 10 hours by the end of the year. In this year Duke produces 744 million cigarettes, more than the national total in 1883. Duke's airtight contracts with Bonsack allow him to undersell all competitors.

In 1886, Patent received for machine to manufacture plug tobacco. Also, JB Duke targets women with "Cameo" brand.

In 1889, Lung cancer is an extremely rare disease, there are only 140 documented cases worldwide

1890 is the height of chewing tobacco consumption in U. S., with consumption estimated at three pounds per capita.

In 1893, the state of Washington bans the sale and use of cigarettes. However, the law is overturned on constitutional grounds as a restraint of free trade.

In 1894, Brown & Williamson formed as a partnership in Winston-Salem, NC, making mostly plug, snuff and pipe tobacco.

In 1895, the Thomas A. Edison Company produces the first known motion picture commercial, an ad for Admiral cigarettes.

In 1898: Because of the Spanish-American War, Congress raises taxes on cigarettes 200%, but is rolled back a year later.

In 1899, the Pall Mall brand is introduced by Butler & Butler Tobacco Co. in New York.

By 1900, Washington, Iowa, Tennessee and North Dakota have outlawed the sale of cigarettes and it is estimated that over 4.4 billion cigarettes are sold this year. The anti-cigarette movement has begun and has soon destroyed many smaller companies. Buck Duke is now selling 9 out of 10 cigarettes in the US.

In 1901, over 3.5 billion cigarettes and 6 billion cigars are sold. Four in five American men smoke at least one cigar a day.

In 1902, Philip Morris sets up a corporation in New York to sell its British brands, including one named "Marlboro."

By 1909, 15 states have passed legislation banning the sale of cigarettes. Also in 1909, Baseball great Honus Wagner orders American Tobacco Company take his picture off their "Sweet Caporal" cigarette packs, fearing they would lead children to smoke. The shortage makes the Honus Wagner card the most valuable of all time, worth close to \$500,000.

In 1910, Per capita cigarette consumption is 94 per year and per capita cigar consumption is 77 per year. Federal tax revenues from tobacco products are \$58 million, 13% from cigarettes.

In early 1911, Duke's American Tobacco Co. controls 92% of the world's tobacco business. The leading national brand is Fatima, it is the first popular brand to be sold in 20-unit packs, the average cost: 15 cents a pack. Fatima was made by Liggett & Myers from a Turkish/domestic blend.

In 1911, tobacco growing is allowed in England for the first time in more than 250 years.

Later in 1911, "Trustbusters" break up American Tobacco Co. US Supreme Court dissolves Duke's trust as a monopoly and in violation of the Sherman Anti-Trust Act (1890). The major companies to emerge are: American Tobacco Co., R.J. Reynolds, Liggett & Myers Tobacco Company (Durham, NC), Lorillard and BAT.



The result of the breakup was that Liggett & Myers was given about 28 per cent of the cigarette market including the brand names: Piedmont, Fatima, American Beauty, Home Run, Imperiales, Coupon, King Bee and the cheap straight domestic brands that did not include turkish blends. A year later, Liggett & Myers introduce the popular "Chesterfield" brand.

P. Lorillard received 15 per cent of the nation's business which included the brands: Helmar, Egyptian Deities, Turkish Trophies, Murad, Mogul, and all straight Turkish brands.

American Tobacco retained 37 per cent of the market with brands: Pall Mall, its expensive all-Turkish brand, named for a fashionable London street in the 18th century where "pall-mall" a croquet type game was played.

It also received the brands: Sweet Caporal, Hassan and Mecca R. J. Reynolds received no cigarette line but was awarded 20 per cent of the plug trade.

In 1912, Book matches are finally perfected by Diamond Co. This makes cigarette smoking much easier.

In 1913, the American Society for the Control of Cancer is formed to inform the public about the disease. It will later become the American Cancer Society. Also, this is the year that R.J. Reynolds introduces the "Camel" Brand.

1914 is the peak of the cigar industry, it is estimated that there are 24,000 cigar factories in the US. Th lung cancer death rate is 0.6 per 100,000 (US Census Bureau) there are 371 cases reported in the US in 1914.

In 1916, in order to compete with the phenomenal success of RJR's Camel, American introduces Lucky Strike, the name revived from an 1871 pipe tobacco brand that referenced the Gold Rush days. It's selling logo was "It's Toasted!" (like all other cigarettes).

In 1917, there are now 3 standard brands of cigarettes on the US market: Lucky Strike, Camel and Chesterfield. R.J. Reynolds suspects American Tobacco of disseminating rumors of salt petre in tobacco, and factor workers with leprosy and syphilis. Claims that agents would enter streetcars, one from the front and one from the rear, and hold a loud conversation about these...and then exit to repeat again and again. R.J. Reynolds posts \$500 reward notices.

Due to World War I, Turkish leaf is unavailable and American tobacco farmers get up to 70 cents per pound. General John J. Pershing makes his famous comment: "You ask me what we need to win this war. I answer tobacco as much as bullets. Tobacco is as indispensable as the daily ration; we must have thousands of tons without delay" The War Department buys the entire output of Bull Durham tobacco, and Bull Durham advertises, "When our boys light up, the Huns will light out."

In 1920, per capita cigarette consumption is 419 per year. Per capita cigar consumption is 80 per year.

In 1921, RJR spends \$8 million in advertising, mostly on Camel and inaugurates the "I'd Walk a Mile for a Camel" slogan. 1921 is the year that state tobacco taxation begins. Iowa becomes the first state to add its own cigarette tax (2 cents a pack) onto federal excise levy (6 cents).

In 1923, the Camel brand has 45% of the US market. In 1924, over 73 billion cigarettes are sold in the US. Also in this year, James B. Duke creates Duke University. Duke gives an endowment to Trinity College. Under provisions of the fund, Trinity becomes Duke University. He dies a year later.

In 1925, tobacco companies are experiment with different blends, flavorings and additives, the lung cancer death rate is now 1.7 per 100,000 (US Census Bureau)

In 1926, Lloyd (Spud) Hughes' menthol Spud Brand and recipe sold to Axton-Fisher Tobacco Co., which markets it nationally, making menthol flavor a new player in the market

In 1927, the British American Tobacco acquires Brown & Williamson, and introduces the 15-cent-pack Raleigh. Raleigh soon reintroduces the concept of coupons for merchandise.

In the early 1930s, due the Great Depression, cigar prices fall so low most hand-rolling cigar businesses fail.

In 1930, there are 2,357 cases of lung cancer reported in the US. The lung cancer death rate in white males is 3.8 per 100,000. This year, Federal tax revenues from tobacco products are over \$500 million, 80% from cigarettes.

In 1931, Benson & Hedges introduces Parliament, which came in a hard box. It featured a mouthpiece, and the first commercial filter tip: a wad of cotton, meant mostly to keep bits of tobacco out of the smoker's mouth.

In 1932, the Zippo lighter invented by George G. Blaisdell.

In 1933, The Agricultural Adjustment Act of 1933 institutes price supports, saves tobacco farmers from ruin and B&W introduces Kool, a menthol cigarette to compete with Axton-Fisher's Spud, the only other mentholated brand.

In 1936, B&W introduces Viceroy, the first serious brand to feature a filter of cellulose acetate.

In 1938, Consumer Reports rates 36 cigarette brands for nicotine content, finding:

Chesterfield and Marlboro: 2.3 mg nicotine

Philip Morris: 2.2 mg nicotine

Old Gold: 2.0 mg nicotine

Camel: 1.9 mg nicotine

Lucky Strike: 1.4 mg nicotine(RK)

In 1940, 7,121 cases of lung cancer reported in the US. Adult Americans smoke 2,558 cigarettes per capita a year, nearly twice the consumption of 1930.

In 1945, in Germany, cigarettes are the unofficial currency.  
Value: 50 cents each

In 1948, The Journal of the American Medical Association argues, "more can be said in behalf of smoking as a form of escape from tension than against it . . . there does not seem to be any preponderance of evidence that would indicate the abolition of the use of tobacco as a substance contrary to the public health."

In 1949, 44-47% of all adult Americans smoke; over 50% of men, and about 33% of women.

In 1950, only 2% of cigarettes are filter tipped, but by the end of the 50s, 50% of all cigarettes sold in the US will be filter tipped. In 1950, Camel outsold all other brands with 98.2 billion cigarettes sold, followed by Lucky Strike (82.5 billion), hesterfield (66.1 billion), Commander (39.9 billion) and Old Gold Regulars (19.5 billion). American cigarette consumption is 10 cigarettes per capita, which equals over a pack a day for smokers..

In 1951, RJR introduces its Winston filter tip brand, emphasizing taste.

In 1952, P. Lorillard introduces Kent cigarettes, with the "Micronite" filter. At the press conference at the Waldorf-Astoria Hotel, Lorillard boasted that the "Micronite" filter offered "the greatest health protection in cigarette history." Its secret: asbestos.

In 1954, The Marlboro Cowboy is created for Philip Morris by Chicago ad agency Leo Burnett. At the time Marlboro had one quarter of 1% of the American market.

In 1956, lung cancer death rate among white males is 31.0 in 100,000, resulting in 29,000 deaths. P. Lorillard discontinues use of "Micronite" filter in its Kent cigarettes. Also, in 1956 RJR's Salem, the first filter-tipped menthol cigarette is introduced

In 1960, Pall Mall becomes the nation's top-selling brand. It's reign runs from 1960 to 1966.

In 1961, the FTC tells cigarette manufacturers to stop "tar derby" advertising and cease referring to improved health effects of filters.

In 1962, US imposes economic embargo on Cuba.

In 1964, there are 70 million smokers in the US, and tobacco is an \$8 Billion a year industry. Pall Mall, the nation's top-selling brand, captures nearly 15 percent of the market.

This is the year of the 1st Surgeon General's Report linking smoking and lung cancer.

Sen. Maurine Neuberger (D-OR) introduces bill giving FTC authority to regulate cigarette advertising and labeling. Also, the FTC begins rule-making to require health warning on cigarette packs and in advertising.

The Marlboro Country ad campaign is launched. "Come to where the flavor is. Come to Marlboro Country." Marlboro sales begin growing at 10% a year.

In 1965, the UK Government bans cigarette advertisements on TV.

American's share of the cigarette market sank from 35% in 1965 to 17.8% in 1971. By 1978 they were down to 12%.

Congress passes the Federal Cigarette Labeling and Advertising Act requiring the following Surgeon General's Warning on the side of cigarette packs: "Caution: Cigarette Smoking May Be Hazardous to Your Health."

In 1966, Health warnings on cigarette packs begin. RJR's filter-tip Winston becomes top-selling cigarette in the US

In 1967, the Federal Trade Commission releases the first tar and nicotine report.

In 1968, 'Bravo', the attempt to create a non-tobacco based (lettuce based) cigarette, fails. Product would have been taxed same as tobacco products.

In 1969, Congress enacts the Public Health Cigarette Smoking Act of 1969, which amends the 1965 Federal Cigarette Labeling and Advertising Act to require the following warning: "The Surgeon General Has Determined That Cigarette Smoking is Dangerous to Your Health."

Also, WINSTON CUP racing is born when NASCAR driver Junior Johnson suggests to RJR they sponsor not just a car, but the whole show.

In 1970, Winston brand leads the way with 81.86 billion cigarettes sold followed by Pall Mall (57.96 billion), Marlboro (51.37 billion), Salem (44.1 billion) and Kool (40.14 billion) American cigar consumption peaks at about 9 billion a year. President Nixon signs a measure banning cigarette advertising on radio and television, to take effect after Jan. 1, 1971

In 1971, Virginia Slims Tennis begins.

Cigarette manufacturers agree to put health warnings on advertisements. This agreement is later made into law.

In the UK, Cigarette Smoking and Health--Report by an Interdepartmental Group of Officials finds that, all things considered, tobacco use brings in more money than it costs in health and disability. Report is unknown to the public until the Guardian publishes an account on May 6, 1980.

In 1972, Marlboro becomes the best-selling cigarette in the world. Marlboro Lights introduced, promising lower tar and nicotine.

In 1973, Arizona becomes the first state (in modern times) to pass a comprehensive law restricting smoking in public places.

In 1979, Filter cigarettes account for 90% of U.S. cigarette sales. The top 10 brands sold in 1979: ( Numbers in billions )

1. MARLBORO (Philip Morris) 103.6
2. WINSTON (R. J. Reynolds) 81.0
3. KOOL (Brown & Williamson) 56.7
4. SALEM (R.J. Reynolds) 53.2
5. PALL MALL (American) 33.9
6. BENSON & HEDGES (Philip Morris) 27.8
7. CAMEL (R.J. Reynolds) 26.3
8. MERIT (Philip Morris) 22.4
9. VANTAGE (R. J. Reynolds) 20.7
10. KENT (Lorillard) 19.3

In 1980, In the movie "Superman II" Lois Lane lights up. In fifty years of comic book appearances, Lois Lane never smoked. For a reported payment of \$42,000, Philip Morris purchases 22 exposures of the Marlboro logo in the movie; Lois Lane, strong role model for teenage girls, gets a Marlboro pack on her desk and begins chain smoking Marlboro Lights. At one point in the film, a character is tossed into a van with a large Marlboro sign on its side, and in the climactic scene the superhero battles amid a maze of Marlboro billboards before zooming off in triumph, leaving in his wake a solitary taxi with a Marlboro sign on top.

In 1981, annual consumption peaks at 640 billion cigarettes, 60% of which are low-tar brands. .

In 1983, Philip Morris overtakes RJR to become the #1 tobacco co. in the US in sales.

In 1985 Lung cancer surpasses breast cancer as #1 killer of women.

A tobacco trade journal reports on the job of the tobacco "flavourist" and chemist. One job of the flavourist is to "ensure high satisfaction from an adequate level of nicotine per puff". One job of the chemist is "to ensure adequate levels of nicotine and tar in the smoke". (World Tobacco, March 1987, pp. 97-103).

In 1986 Fidel Castro stops smoking cigars for health reasons.

In 1987, 44 percent of people who had ever smoked had quit as of 1987.

In 1989, RJR releases Premier, its smokeless cigarette, for test-marketing.

During the same year, PM spends \$300,000 test-marketing a version of its Next brand called "De-Nic," which contained only .1mg nicotine. The Kansas City Star reported that apparently the major market for Philip Morris De-Nic cigarettes was tobacco researchers, who ran out and bought them for use in studies in which it was found that though they tasted very similar to regular cigarettes, and were smoked in much the same way, smokers brain waves did not change as they do with nicotine cigarettes.

Also: Marlboro has 25% of the American market.

RJR abandons Premier, its smokeless cigarette, after unsuccessful test-marketing in Arizona and Missouri.

In Canada, The government requires cigarette manufacturers to list the additives and amounts for each brand. RJ Reynolds temporarily withdraws its brands, and reformulates them so they are different from their US versions.

Philip Morris withdraws its cigarettes from the Canadian market entirely.

In 1990, Marlboro led the way in sales with 134.43 billion cigarettes sold, followed by: Winston (45.81 billion), Salem (32.01 billion), Kool (25.67 billion) and Newport ( 24.09 billion) Americans are now smoking fewer than 3 billion cigars annually.



In 1991, Joe Camel's own line of merchandise is touted by RJR as bringing in \$40 Million/year in advertising billings.  
JAMA publishes 2 noted studies of Joe Camel and kids: One finds that 91% of 6 year olds can match Joe Camel to his product (cigarettes), and is as recognized by preschoolers as Mickey Mouse. The other study, by Joe DiFranza, finds that since the inception of the Joe Camel campaign in 1987, Camel's share of the under-18 market had risen from 0.5% to 32.8%.

In 1992, Among smokers age 12 to 17 years, a 1992 Gallup survey found that 70% said if they had to do it over again, they would not start smoking, and 66% said that they want to quit. Fifty-one percent of the teen smokers surveyed had made a serious effort to stop smoking--but had failed.

Also this year:

Nicotine patch is introduced.

Financial World ranks Marlboro the world's No. 1 most valuable brand (value: \$31.2 billion)

Also in 1992, Jim Johnson puts together the first "SBE Home Tobacco Kit" for home gardeners, the kit is an instant success and is used by gardeners around the world to grow their own tobacco at home.

In 1993, about 3 million Americans smoke cigars.

US Tobacco introduces Cherry-flavored Skoal long-cut.

Vermont is the first state in the nation to ban indoor smoking.

US Post Office bans smoking in its facilities.

In 1994, McDonald's bans smoking in all 11,000 of its restaurants

Dept. of Defense imposes restrictions on smoking at all US military bases worldwide

Tobacco Industry releases "The List" of 599 cigarette additives

In 1995, seedman.com begins offering an extended line of tobacco seeds, and info on growing additive free, tax free

tobacco at home. This line of products quickly becomes a major selling line, prompting the company to develop growing videos, cutting machines, kilns and other necessities for home tobacco growers.

In 1997, Forty-eight million Americans have quit in the 21 years since the first Smokeout in 1976; 48 million still smoke; about 34 million say they want to quit. Between 1965 and 1990, adult smoking declined from 42 percent to 25 percent. The average age of a first-time smoker is 13. More than 3 million American adolescents smoke cigarettes.

Americans spent an estimated \$51.9 billion on tobacco products in 1997, or just under 1% of their disposable income. Of this amount, \$48.7 billion (or 94%) was spent on cigarettes, \$2.2 billion on smokeless and smoking tobacco, and \$0.9 billion on cigars. (CRS)

China is by far the largest producer of cigarettes in the world; the second largest producer is the United States. In 1997 China produced an estimated 1.7 trillion pieces, almost two and one half times the 720 billion pieces produced in the United States. The United States is by far the largest cigarette exporting nation in the world, with exports in 1997 estimated about 217 billion pieces, or 21% of the world total. China is the largest consumer market in the world, with over 300 million smokers consuming 1.7 trillion cigarettes in 1997.

In 1998, Flue-cured tobacco gets an 18 percent quota cut, shocking industry analysts.

In 1999, about 10 million Americans smoke cigars.

"Phase II" farmer payments established. The four largest U.S. cigarette-makers agree to establish a \$5.15 billion trust fund to help compensate farmers and allotment holders for the expected drop in production resulting from the AG nationwide settlement

In 2000, the world's largest tobacco companies:

1. China National Tobacco Company 31% [China has 385 million smokers]
2. Philip Morris 17%
3. British American Tobacco (BAT) 13%
4. RJR Reynolds 6%
5. Rothmans International 4%

US Market Share:

Philip Morris Inc.: 50 percent  
R.J. Reynolds Tobacco Co. : 24 percent.  
Brown & Williamson Tobacco Corp.:13 percent  
Lorillard Tobacco Co.: 10 percent  
Liggett Group Inc.: 1 percent

The Top 10 Brands: ( % of market )

1. Marlboro, Philip Morris, 35.4
2. Doral, R.J. Reynolds, 6.3
3. Newport, Lorillard, 6.2
4. Camel, R.J. Reynolds, 5.3
5. Winston, R.J. Reynolds, 5.2
6. Basic, Philip Morris, 4.9
7. GPC, Brown & Williamson, 4.7
8. Kool, Brown & Williamson, 3.3
9. Salem, R.J. Reynolds, 3.2
10. Virginia Slims, Philip Morris, 2.6

In 2001, Canada mandates large, graphic cigarette pack labels.  
B&W re-launches Pall Mall nationally as the New Filtered  
PALL MALL

( If you have interesting tobacco facts or trivia you would like added to future upgrades to this guide, E-mail them to us at [support@seedman.com](mailto:support@seedman.com) )

## **The Tobacco Plant**

Tobacco is a member of the nightshade family Solanaceae that includes tobacco, tomatoes, potatoes, belladonna and more. Tobacco belongs to the genus *Nicotiana*, which is named for Jean Nicot, who was the French ambassador to Portugal from 1559 to 1561. It was he who first sent tobacco to the king of France. From France its use spread to the rest of Europe.

There are about 70 species of tobacco plants. Most are native to North America, but about 20 can be found in Australia and 1 in South Africa. Today, tobacco is grown in over 120 countries throughout the world.

The plants are valued for showy, usually fragrant, trumpet shaped flowers. They make excellent border plants and the fragrant ones are often raised inside in pots. The different species of tobacco plants range in size from three to nine ft. tall. The full grown plant has large leaves that droop from a central stem. Short hairs cover the green part and give off a sticky secretion. Large sweet scented flowers appear at the top of the plant in large clusters. They range from deep pink and red to almost pure white.

Tobacco plants also make a great biodegradable insecticide that is nicotine based. Tobacco seeds are long lived with a half life of 5-10 years (meaning that after 5-10 years, half of the seeds will still germinate). The seeds are very tiny. One teaspoon can grow into enough plants for 6 acres. More than 350,000 seeds can be in a single ounce and a mature plant can yield up to a million seeds.

Tobacco cross pollinates very easily however, you should only let one species of tobacco flower each year if you are saving for seeds, or isolated different species by at least 500 feet apart.

## **How much you can and need to Grow**

Growing tobacco for personal consumption is limited to 1/10th of an acre per homeowner in the USA. This may not sound like much, but this amount of space is usually sufficient to grow all the tobacco you will need in a years time.

If space is limited, you can grow tobacco in tubs inside with good results. Tobacco makes an attractive plant for patios and well lit rooms. You should figure on raising tobacco in at least 3 gallon tubs and preferably 5 gallon tubs. ( One plant per tub )

Commercial growers usually plant between 4,000 and 7,000 plants per acre. This means you could easily grow 400 to five hundred plants for your personal use. A healthy mature plant can yield up to five oz. of cured tobacco. A pound of cured tobacco can make up to 400 regular sized cigarettes.

Generally, we prefer to space our tobacco out at about 3 feet apart, in rows 4 feet apart. This allows for plenty of growing room and you can still walk between the rows to inspect the crop during the growing season.

Let's say you raised the maximum number of plants and received maximum yield from them. This would translate into five hundred plants with a yield of twenty-five hundred oz..., or one hundred and fifty six pounds of tobacco.

Let's assume you rolled all of this tobacco into cigarettes. The result, 62,400 cigarettes equaling 312 cartons of cigarettes! It is easy to see from these results that even a small planting of tobacco and a poor crop should provide with sufficient quantities of tobacco.

## **The Tobacco Program**

Prior to 1933, tobacco was grown anywhere that it had value as a crop. The Tobacco grown in the US at this time was of such high quality that it served as a standard for other tobaccos from around the world to be compared to. It was a crop that was responsive to supply and demand. Then a funny thing happened, the US government stepped in and decided to control where tobacco would be raised and how much would be raised for market.

This came about as a result of The Great Depression. The government wanted to improve farm incomes by manipulating prices with supply controls. The most shocking control came with the Agricultural Adjustment Act of 1933, or what has become known as " The Tobacco Program". The Secretary of Agriculture limited tobacco crops only to farms that were growing tobacco before 1933 and decided how much tobacco could be grown on these farms.

Each farm that had tobacco as a crop prior to 1933 was given an allotment. These allotments remained in the families possession from generation to generation. Only if you had an allotment, could you raise and sell tobacco commercially. Through the years, many have "rented" their allotments to raise cash. Now allotments can even be rented and transferred to other states. In effect, if your family happened to raise tobacco on a farm to some extent prior to 1933 your family would own an allotment. If your family did not own an allotment, you would have to "rent" one in order to raise tobacco. Of all the strange laws our government have passed, this one would have to rank at the top.

Then in 1940, the program shifted to acreage limits, meaning that the farmers could raise as much tobacco as their acreage allotment allowed. This made yield the most important factor in obtaining the maximum amount of profit. All of the latest technology was applied with stunning results. The average yield per acre doubled from under 1,000 pounds per acre in 1940 to over 2,000 pounds in the late 1960's.

Unfortunately, a severe price was paid as the quality of the product plummeted. In my opinion, the quality has never returned and is not likely to in commercial production.

### **A PERSONAL HEALTH NOTE**

One of the great leaps in tobacco production resulted from the advent of flue curing tobacco. This heat process quickly "cured" the tobacco for consumption.

However, research is now beginning to show that this process causes certain chemical changes in the tobacco that may increase the risk of cancer. Smokers in countries that use the "flue cure" process have a much higher incidence of lung cancer among smokers than countries that do not use this process. Certainly this is something that you might want to consider when deciding on how to cure your tobacco products.

### *TOBACCO TRIVIA*

- \* In the early 1900's, cigarette consumption per capita was less than fifty cigarettes. By the 1920's, it had risen to more than twelve hundred. By the early 1960s consumption was a staggering four thousand plus.
  
- \* Before the advent of the cigarette rolling machine, all cigarettes were rolled by hand using only the finest leaf. The machine allowed the use of scraps and stems thus furthering depleting the quality of the product.
  
- \* Studies by the tobacco industry have indicated that many smokers who switch to a low tar and nicotine brand of cigarette often wind up smoking much more as they try to subconsciously make up for the reduced nicotine intake.
  
- \* In the United Kingdom, millions of dollars have been invested in trying to develop a tobacco-less cigarette. The tobacco replacement would be a man made substitute devoid of nicotine and with low levels of tar. In the US, non tobacco fillers are already used to the extent that little true tobacco flavor remains.

### **Planting and Raising**

Growing tobacco is very easy. The seeds you received should be started inside in flats. In northern states, start the seeds 4-6 weeks before the last frost. Tobacco can be ready to harvest for curing about 60 days after transplanting, therefore it can be raised in almost any state. If raising more than one variety of tobacco, use separate flats. A mixture of peat humus and potting soil should be used. Potting soil only can be used if you select a high grade of commercial potting soil. Place the mixture into the flats, soak the soil with water and allow the excess water to drain off. The next day, sprinkle the tobacco seeds onto the surface of the damp soil. Do not cover the seeds as they need light for germination. Tobacco seeds are very tiny, so be careful to spread the seeds evenly. Keep the soil damp being careful not to wash the seeds around when you water. You will begin to notice sprouts in about two weeks. Transplant outside after all danger of frost is past.

If you have a moderate growing season and can start the seeds outside, try to sow the seeds where leaves or wood has been burned. The plants will thrive in these spots. Tobacco requires a lot of nitrogen and potash which is supplied by wood ashes. The ashes from charcoal grills are also beneficial. I recommend applying a good brand of garden fertilizer to the area where the plants will be grown. Working in rotted manure is very good for the plants. Never raise tobacco plants in the same spot in the garden for over a few years at a time as tobacco plants will totally deplete the nutrients in the soil.

You should space the tobacco plants about 2 ft. apart in rows 3 ft. apart when practical. The plants are large enough to transplant when the largest leaves are 2" or larger. Always transplant outside in late evening or when it is cloudy and overcast. Water plants thoroughly after transplanting and water daily each day until plants have become established. When growing in tubs, limit the number of plants grown. Tobacco plants need to be exposed to full sun while growing.

Tobacco roots grow quickly and often close to the surface. Be careful around plants when hoeing or cultivating around them. Try not to disturb the soil anymore than necessary. As the plant begins growing, remove all suckers as they will sap the plants growth.

Feed the plants often with a good water soluble fertilizer such as Miracle Grow. When growing in containers inside, give plants lots of bright light and keep the soil slightly moist.

Tobacco plants suffer from several diseases and are attacked by several leaf chewers. I recommend using sevin dust to control insects. Be cautious not to use any form of systemic insecticide that will penetrate the leaf. Remember, you may be chewing or smoking this plant and you do not want to be ingesting chemical residues. For a truly natural pesticide, purchase an ounce of tobacco dust from us and make your own supply by mixing one teaspoon tobacco dust, one teaspoon of black pepper and 1/2 teaspoon liquid soap to one gallon of water.

#### **PRUNING AND TOPPING**

When the plant has developed a flower stalk at the top, it is time for pruning and topping. Remove the bottom leaves carefully with a sharp blade. Remove all lower leaves within 8 inches of the ground. Remove the flower stalk and upper leaves until their are only 12-24 leaves left on the plant. On the plants you will use for cigarettes, snuff and tobacco you can leave up to 24 leaves. They will be small thin leaves that are desirable for this type of tobacco. On the plants you will use for cigar binders and wrappers, leave 12-16 leaves. These leaves will be larger and darker. Removing the flower bud and lower leaves allows the plant to divert all nutrients to these leaves, making them larger and improving flavor.

#### **HARVESTING AND CURING**

It is the curing process that gives tobacco its desired color and flavor. After curing, other flavors can be added if so desired. The three common ways of curing tobacco are fire curing , air curing and flue curing. To cure your tobacco at home, you will

be employing a process called sun curing and then finish with air curing. Also, you may want to try Alan Daly's "3 Week Tobacco Processing Recipe" found later in this book.

To cure tobacco as it is done commercially is impractical for the home grower and is unnecessary. The process described below will produce the same high quality tobacco leaf.

About six weeks after topping, the plant will have fully obtained its growth. The leaves will have become thick and brittle and will have changed color from green to a pale yellowish green. These conditions indicate that the plant is ready to be harvested.

With a thin sharp knife, the plant is split from the top to within a few inches of the bottom leaves. Never split the plant too close to the bottom leaves. The plant is then cut off just below the bottom leaves. The plants are placed astride sticks that are mounted on scaffolds so that they are suspended in the air to dry ( I have found that a clothesline does just fine ). Be sure that the plants do not touch each other while on the line as this will impede drying.

Leave the plants outside to dry for 5 to 10 days. When rain threatens, I drape a plastic film over the plants to keep them from becoming soaked. After 5 to 10 days on the line, the plants should be removed and placed inside until cured. The plants can be tied into small bundles and suspended from the ceiling. A workshop, garage or carport will work fine. The curing area should be warm and dry.

From the moment tobacco is cut, it begins undergoing chemical changes inside the plant. These changes are what gives the finished tobacco its flavor and identity. It is important to remember that cured tobacco and aged tobacco are two different products entirely.

The plants are completely cured when the leaves are dry, brittle and break easily when touched. The tobacco is now ready to be processed or aged.

## **KEEPING YOUR TOBACCO IN STORAGE**

If you are raising a years supply of tobacco to carry you over until next year, you will have to store a fair amount of it some where. The longer tobacco is stored, the more it goes through the fermenting process and the better the flavor becomes. Tobacco is easily stored as long as it is protected from moisture. It can be stored in cloth or paperbags or any type of material that allows it to "breathe". Every two months or so, you should remove the tobacco from storage, re-distribute the leaves that are on the outside to the center of the pack and vice versa. This allows the leaves to cure and age evenly. If after opening your container that has been stored for a while you find the tobacco too dry, you can remoisten it by adding a few drops of water and resealing the tobacco in an air-tight container for a few days. Always protect your tobacco from sunlight.

### **A.N. Daly's "3 WEEK TOBACCO PROCESSING RECIPE" METHOD NUMBER 1**

The processing of tobacco at home can be a relatively easy task following the method set out below. I have used the method with great success,

### **NICOTINE CAN BE REMOVED BY THIS METHOD**

I will skip the growing and drying part of the operation as this aspect is well documented The first thing that you will need to do is make or get 6 boxes and 6x3" G clamps (12 would be even better if you want to put 2 to a box for more pressure).

The boxes need to be made of hard wood and the fixing must be done by using screws, using nails etc. will make it easy for the joints to come apart when the tobacco is compressed.

The boxes need to have an internal diameter of 6" wide x 1" depth x 3" height, all the wood needs to be 1/2" thick. The base is fitted inside the box and screwed from the back, front and sides. The top of the box is left loose as this will be pressed down inside the box to compress the tobacco.

Before assembling the boxes it would be a good idea to rub the inside faces with candle wax to help protect the wood. Now we are ready to start.

Once the leaves have dried out enough, or too dry, the next step is the processing of the leaves. Normally they are hung on canes and put through a steam process etc., but this time can be reduced by a very big margin as follows.

Collect together the following items, large saucepan with lid (12 to 14 pint capacity), strainer, dark or light brown Sugar, (demerara etc.), jar of honey, tin of golden syrup/black treacle/molasses, glycerin.

Proceed as follows, strip the leaves from the spine, do enough to fill the saucepan.

Put 4 pints of water into the pan and add: 2-3 tablespoons of brown sugar, 2 tablespoons of glycerin/glycerol 3-4 tablespoons honey, and 3-4 tablespoons of syrup/treacle/molasses.

Bring to boiling and then add your leaves. once the leaves are in the pan replace the lid and wait for 10-15 minutes.

Turn down the heat and let the pan simmer for a further 45 minutes, check often to make sure that the pan does not boil dry.

Do not add leaves once you have been boiling for ten minutes as this will be counter productive to the removal of nicotine. When the boiling has finished turn the pan contents into the strainer and leave to cool down. you can apply some pressure to the leaves to help get rid of the juices, but please don't be in a hurry to handle at this point as the center of the pile takes a long time to cool down.

The next step is to make the boiled leaves into blocks for shredding. Line the box with a sheet of polyethene and push it down inside, leaving enough to fold over the top. Add leaves until the press is full and then squeeze out as much juice as possible by tightening up the clamps, add more leaves and repeat until you have about an 1" or so of compressed tobacco, turn upside down so that the liquid can drain off. Leave like this for a couple of hours or so then remove.

This is where the extra length of polyethene is handy as you can use it to pull the tobacco block out of the press. Once removed the block should be left for a day or so till dry enough to shred. There are various ways of shredding, the easiest would be to use a Stanley knife or you may have access to a liquidating machine. There may possibly be a shredding machine on the market if there are enough people interested in having one, (more about this later).

Once the tobacco has been shredded you will need to roast it or toast it.

(A comment from Jim, "I recommend using a cookie pan, placing in the oven and setting the over to 350 degrees".) However you do it you must keep a careful watch on it as there is a very fine line between roasting/toasting and burning.

But keep looking and turning till you have your tobacco with just a small amount of moisture left in it. It must not crumble when squeezed between finger and thumb, if it does you will have to get a bit of moisture back into it, this could be done by leaving it in a damp place for a few hours, or maybe put a slice of potato or apple in with it, you could even use a perfume atomizer and give it a couple of squirts of water, maybe your favorite wine(Spirits would evaporate too quickly).

Once you have completed your processing it would be better to let your tobacco stand for as long as you possibly can before you using it, Months would be better than weeks. That's it,

## Method 2

I just want to add a variation to this recipe. Above, we processed the leaves by boiling them and removed a very large quantity of nicotine, this may have been too much for some smokers, all is not lost. If you have any leaves left that are dry enough to process just strip the leaves from the spine and proceed as follows:-

Place a couple of layers of leaves into one of your boxes (after you have lined it with polythene), next make yourself a mixture to coat the layers with.

The mixture can be one of many different combinations of ingredients:- honey, wine, honey, whisky, Black treacle, rum. use one of the former to two of the latter.

paste this on to the leaves or better still borrow the wife's perfume atomizer (the mixture should be of a thin enough consistency to pass through the nozzle), when your box is full enough use the clamps to compress the leaves, add more leaves if you need to. turn boxes to allow excess juices to drain off.

Leave for a couple of days but keep on adjusting the clamps to keep pressure on the leaves. After removing the blocks put in a small tin and place in a source of heat to dry out a bit more. when dry enough the blocks can be shredded and toasted, when this is done store the tobacco in jars, Do not compress the tobacco, just drop into your container and leave it loose, allowing air to get to it for the first few days to make sure that there is no condensation building up. This should complete the process and now you can mix the two different types together to make your own blend.

good smoking

A.N.

Listsersvs

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Deciding on which tobacco to grow for personal consumption is a matter of deciding on the way the tobacco will be consumed. Cigarettes require a light, thin, and mild tobacco leaf. Cigars require basically the same for filler with a heavier leaf for wrapping, depending on choice. The darker, heavier the leaf, the stronger the product. Snuff and chewing tobaccos really depend on personal preference. An air dried burley is probably the choice for most smokers.

### **CIGARS**

What is a cigar? Basically, it is a cylindrical roll of tobacco consisting of cut and chopped filler tobacco formed in a binder leaf with a wrapper leaf rolled spirally around the bunch. The filler tobacco can be made from many different types of tobacco, although I personally recommend the Tennessee Burley. The leaves of the binder tobacco should be large enough to envelop the filler and elastic enough to be rolled. I recommend the Havana Tobacco for this. The most important part of the cigar is the wrapper leaf. The wrapper leaf must be strong, elastic, free of defects, have good color and be flavorful. I recommend the Black Mammoth tobacco for this.

Learning to make a cigar is simply a matter of trial and error. It is important that the tobacco have the correct amount of moisture in order to be formed. The filler should be well chopped so that it will burn smoothly. The binder leaf should be rolled tightly around the filler. This may take several attempts before getting the hang of it. Then the wrapper leaf should be rolled tightly around the binder leaf.

The leaf, particularly the edges must be moistened enough to bond to the binder leaf. Typically, the roll will terminate into a point at the top. This excess can be snipped off later after the wrapper leaf has dried sufficiently to maintain its form. I recommend keeping a misting solution of water and apple juice handy for your first attempts. The apple juice not only adds flavor to the finished cigar, but also helps the leaves to bond to each other.



Cigars should be kept in a fairly dry and warm atmosphere between 62 to 68 degrees Fahrenheit. Relative humidity should be maintained at between 50 to 60 percent. For keeping the moisture rate of your cigars constant and perfect, you should consider purchasing a good humidor. We offer an excellent one with built in humistats.

Although cigars can be made from freshly cured tobacco, they are of far better quality when made from tobacco that has been petuned and aged. Petuning is the process of adding flavor to tobacco and letting it ferment. Flavoring is sprayed onto the tobacco leaves, the leaves are wrapped in cheese cloth and set up to ferment. The leaves are turned on occasion to allow the fermentation process to be equal and to prevent the leaves from sticking. After the fermentation is completed, the tobacco is stored in ventilated containers for up to a year. This produces some of the most flavorful tobacco possible.

### **CIGARETTES**

Making cigarettes from tobacco is a very simple process. Once the tobacco has cured, moisture must be added by misting it. The moisture makes the tobacco handle better and smoke evenly. Enough moisture should be added to make the leaves slightly pliable. The tobacco is then shredded ( a meat grinder works well for this ) and rolled into cigarettes. We recommend using our cigarette rolling machine. The machine will make plain or filter cigarettes depending on your preference. We supply filters and papers for our machine. Any type of commercial cigarette tobacco purchased in stores will also work well in our machine.

You can add flavor to your cigarettes by adding flavorings such as apple cider, brandy, honey, etc. to your misting water. We offer a line of commercial flavorings for tobacco as well. Different flavors can also be obtained by mixing different species of tobacco together. You should experiment until you find a mixture that is suitable for you.

Obtaining the correct moisture for cigarette tobacco is a rather tricky process that involves trial and error. Too dry and the tobacco burns too fast and has a sharp taste, too moist and the tobacco burns very slowly and is hard to draw.

Fortunately, both conditions can be fixed rather easily. If the tobacco is too dry, simply add moisture by misting the tobacco or by sealing the tobacco in a plastic zip lock bag along with a few drops of moisture. Some like to add a piece of apple for flavoring, this is fine as long as you allow a couple of extra days for the tobacco to absorb the flavoring.

If the tobacco is too moist, you can either dry the tobacco in a microwave oven for quick results ( and this is something you will need to practice in order to do it correctly ) or mix the over moist tobacco with dry tobacco and seal together in a plastic zip lock bag for a few days.

### **CHEWING TOBACCO**

Chewing tobacco is the easiest form of tobacco to create. Simply remove stems from cured tobacco leaves, moisten ( if you wish to add flavor, mix flavoring with the water you use to mist with ) and roll in rope or plug form. Chewing tobacco can be carried in a small zip lock plastic pouch for convenience.

### **SNUFF**

Snuff is a pulverized form of tobacco that is either inhaled through the nose or chewed. The most commonly used tobaccos are dark, fire-cured varieties. Snuff is manufactured in two ways, moist and dry. To make moist snuff, the tobacco has to go through two fermentation processes. The tobacco is moistened with salt water and pressed into cakes. The cakes are sliced and allowed to ferment in open containers for up six months. Then the tobacco is ground in mills ( preferably in the absence of air ), dampened and placed in wooden casks to ferment for another 10 months. It is then collected and allowed to cure for one more month before being used.

The process of producing and curing moist snuff removes about two thirds of the nicotine from the tobacco. Malic and citric acid are also removed by this process.

It is unlikely you would have the resources to make moist snuff. However, Dry Snuff is relatively simple to make. Dry snuffs are made by grinding the tobacco, ( a food blender could be used for this purpose ) moistening the tobacco and mixing in a slight bit of quicklime and flavoring such as lavender, mint, orange flowers, bergamont etc.

### *Tobacco Trivia*

\* In 1969, RJ Reynolds developed "puffed tobacco". This was done using a process where moisture was added to the leaf to the extent that the collapsed leaf cells returned to their "green" size. The moisture was then removed in a way that did not re-collapse the cells. This process expanded the filling capacity of tobacco by 40 to 50 percent. This type of tobacco was then blended into cigarettes, reducing the amount of tobacco used. It is estimated that "puffed tobacco" results in 31 percent less tobacco being used in the production of cigarettes.

\* The amount of nicotine in cigarettes can be controlled. Some types of tobacco have lower nicotine levels and usually the stem part of the plant has low levels of nicotine. Tar on the other hand, can only be reduced by means of filtering.

\* The advent of the filter meant that poorer quality tobacco such as the stems and scraps could be used as the filter would mask out some of the undesirable traits.

\* Tobacco was used medicinally by the Indians long before the white man knew about it. Yet the medicinal quantities of the tobacco plant seem to be long forgotten.

\* Cigarettes were first introduced in the United States in the early 19th century. Before this, tobacco was used primarily in pipes and cigars, by chewing, and in snuff.

## **Tobacco Diseases**

Tobacco is subject to many pests and diseases, as all garden crops are. The most common garden pests can be dealt with in the same manner as vegetables, i.e, sevin dust and other controls. However, tobacco also has some diseases that unique to itself, we have listed 3 below that you may encounter. These are diseases that greatly affects commercial production growers each year. Our thanks to N.C. State for providing this information.

### **The Blue Mold Disease of Tobacco**

The following information is from N.C. State University, C. E. Main, Department of Plant Pathology, N.C. State University, Raleigh, NC 27695

Blue mold of tobacco (also known as 'mildiou du tabac' in Europe), caused by *Peronospora tabacina* Adam, is a classical compound-interest plant disease that develops into local as well as macroscale epidemics. The fungus is highly weather-sensitive. During periods of cool, wet, and overcast weather the disease develops and spreads rapidly because of the polycyclic multiplication of the pathogen. The rapid rate of development is determined by potentially high levels of initial source inoculum, short latent period, and large numbers of effective dispersal units or spores. When the weather becomes clear, hot, and dry, the epidemic usually slows or stops completely.

Commercial tobacco is a seasonal crop in the temperate, warm and cool, humid farming zones of the Southeastern and Eastern United States, Canada, and countries bordering the Caribbean basin. Following a crop-free period (winter) each year, the tobacco in the U.S. is exposed to asexual, windborne sporangiospores originating from inoculum sources on commercial winter tobacco and wild *Nicotiana* species in the tropical zones south of the 30th parallel of latitude. The fungus is not known to overwinter in the more temperate zones, so inoculum is introduced anew each year into the U.S.

### Signs and Symptoms

Tobacco blue mold is fairly easy to diagnose. The symptoms vary with plant age. On seed beds of small seedlings with leaves less than 2 cm in diameter, small patches of dead or dying seedlings with erect leaves provide evidence of the disease. Among older plants with leaves up to 4 cm in diameter, blue mold is first seen as circular, yellow areas of diseased seedlings. Plants in the center of the affected area may have distinctly cupped leaves. Some of the cupped leaves exhibit a gray or bluish downy mold on the lower surface; hence the name blue mold. The upper surfaces of infected leaves can remain almost normal in appearance for 1-2 days before the plants begin to die and turn light brown. Diseased leaves can become so twisted that the lower surfaces turn upward. In such cases, the bluish color of the diseased plants becomes quite conspicuous, especially under wet conditions when sporulation is abundant.

The blue mold progresses slowly at first. After 7-10 days, however, when sufficient secondary inoculum has been produced, a general epidemic occurs and the entire seedbed becomes affected almost overnight. When the weather is cloudy and cool, the fungus can kill plants in large areas of the bed. A characteristic foul odor of rapidly decaying vegetative matter develops. When the weather turns sunny and warm, plants with few symptoms sometimes recover as the fungus stops sporulating and plants begin to put out new leaves. However, seedlings with any type of symptoms should never be transplanted to the field. When purchasing seedlings from a commercial producer, make sure the plants have been certified as disease free. Use locally grown seedlings if possible. In its early stages blue mold can easily be confused with cold injury, malnutrition, or damping-off. However, the presence of the characteristic downy fungus spores on the bottom of leaves quickly identifies the disease as blue mold and distinguishes it from other problems.

Blue mold may affect plants in the field throughout the growing season. Single or groups of yellow spots (lesions) appear on the

older, shaded leaves. Often the spots coalesce to form light brown, necrotic areas. Leaves become puckered and distorted, large portions disintegrate, and the entire leaf may become unusable. Under continued favorable weather conditions the fungus can destroy all leaves at any growth stage. Lesions may occur on buds, flowers, and capsules; sporangiospores occasionally form on the calyx and capsules but have not been found on the stems. Plants sometimes exhibit wilt symptoms with narrow, stunted, mottled leaves.

Systemic stem infection, resulting in partial or overall stunting of the plant, is common in some regions. Leaves may become twisted or distorted. Vascular discoloration occurs inside the stems, and lesions are visible as brown streaks. If this occurs near the base of weakened stems, the plants often snap off. Blue Mold is a local, regional, and continental problem. Inoculum produced in one zone of the North American continent can quickly be transported via the atmosphere to our production areas far distant. The fungus is not known to overwinter in the Southeastern U.S. north of 30N latitude. Tobacco is a seasonal crop in the temperate agricultural areas, and following a crop-free period each year (winter), the tobacco is exposed to windborne spores. The epidemics are usually cyclic (yearly) and progressive; once established, they advance as a more or less definable front via windborne spores. In some years and areas, however, new outbreaks appear hundreds of kilometers beyond the perceptible epidemic front as isolated, local epidemics. In such cases, long-distance transport of inoculum has been documented. It is not uncommon to experience no blue mold in a given year, or to have local areas that periodically escape the disease. The difference between continuous and discontinuous epidemic fronts is related to inoculum dispersal patterns, localized weather, density and spatial aggregation of tobacco fields within a production region, and planting schedules. The occurrence, intensity, and distribution pattern of blue mold can be greatly affected by coordinated efforts to manage the disease with chemical fungicides.

## **Tobacco Mosaic Virus**

Control of Tobacco Mosaic Virus on Flue-Cured Tobacco  
By, T. A. Melton, Philip Morris Professor and Department  
Extension Leader ( N.C. State University )

Tobacco mosaic virus (TMV) results in losses in North Carolina of about 1 to 2 percent of the crop by reducing the yield and quality of flue-cured tobacco. The ideal way to control mosaic is by the use of resistant varieties, and several new hybrids, which have acceptable yield and quality, are now available. Strict sanitation procedures are necessary to prevent the virus from becoming established in the crop and to prevent spread of the virus if efforts to keep it out of the crop are unsuccessful. Crop rotation helps to keep losses minimal in fields where mosaic has occurred.

Mosaic is so common that most tobacco growers know the symptoms of the disease in the field. The most characteristic symptom is a "mottled" appearance of the leaf (alternate areas of light and dark green tissue). The tissue may be rough, and will burn on hot, sunny days. We know several other viruses that cause symptoms on flue-cured tobacco that look like mosaic. Symptoms on seedlings are much milder and easily overlooked. Stunting and mild mottling may be observed. The first step in controlling mosaic, therefore, is to be sure that the virus causing the mosaic symptoms is TMV. Growers who have a mosaic problem should get assistance from their County Extension Center if there is any doubt as to the identity of the causal virus.

### Properties of the Virus

Tobacco mosaic virus, like other viruses, is a very small chemical particle that can multiply only in a living host and only

can be seen with an electron microscope. It differs from other viruses that infect tobacco in two ways that are important in its control. First, TMV is very resistant to destruction. It will survive for at least 50 years in dead, dried tissue while other viruses become inactive when their host plant dies. Second, TMV is primarily transmitted mechanically while insects primarily transmit the other viruses.

### Transmission

Tobacco mosaic virus is transmitted mechanically by any means that results in the virus coming in contact with injured cells of a host plant. The primary mechanism for this is contaminated worker's hands or equipment that comes into contact with a healthy plant. Contaminated hands can be freed of the virus by washing with a detergent. The virus can be inactivated on equipment by scrubbing it with a brush using detergent or by steaming. Although the virus is transmitted primarily on worker's hands and equipment, anything that mechanically moves the virus from a source to a healthy plant can transmit it. Chewing insects, such as flea beetles and grasshoppers, are capable of transmitting the virus, but such transmission is very rare in nature. Seed may be infested with the virus, but seed transmission has not been proven.

### Source of the Virus

Tobacco mosaic virus overwinters in a number of ways, and these must be understood for successful control through sanitation practices. Infection of tobacco from overwintering sources of the virus is known as "primary infection."

A. Tobacco Products - All forms of tobacco may carry TMV so it is advisable that these products not be used by workers, especially around greenhouses and during transplanting. Spraying plants with milk prior to pulling and transplanting will reduce the number of plants that become infected. It should

always be used during transplanting in situations where tobacco use by workers cannot be prevented. Transplants should be sprayed until runoff with one pound of dried milk in a gallon of water immediately prior to pulling.

B. Tobacco Trash - Tobacco mosaic virus will survive for years in dried tobacco tissue, so anything that may be contaminated with pieces of leaf, stem, or root tissue should be cleaned prior to use in the crop. This includes float trays that may have infected roots in the walls of the tray.

C. Soil-Borne Virus - tobacco mosaic virus overwinters in infected stalk and root. Experimental data in North Carolina indicates that infection occurs at transplanting when a plant is pushed against a piece of virus-infected tissue. The number of transplants that become infected in this way will depend on quantity of overwintering tissue surviving. The virus will overwinter in dead as well as living plant tissue, but dead tissue contains less active virus than living tissue. Numerous studies during the past 40 years in North Carolina has shown that from 0.1 to 5.5% of the plants planted to a field that contained mosaic the previous year will become infected with TMV.

The problem of TMV carry-over in stalks and roots can be reduced by crop rotation or by using a mosaic resistant variety. Crop rotation for mosaic control consists of planting a crop that is not susceptible to mosaic in alternate years. Crops planted in North Carolina that are susceptible to TMV are tobacco, tomato, pepper, and eggplant. Tobacco varieties carrying mosaic resistance are essentially non-hosts of the virus and can be used as a rotation crop. Growers who do not want to plant their entire crop to mosaic resistant varieties might at least consider planting them in fields where a mosaic problem occurred the previous year.

Growers who find rotation unfeasible and who do not want to plant any of their crop to a mosaic resistant variety can reduce

virus carry-over by doing a thorough job of stalk and root destruction. This will significantly reduce, and may in some situations eliminate, infection during transplanting from infested old crop debris. Plants that do become infected should be removed prior to the first cultivation to prevent spread of the virus.

D. Other Crops - Tomato, pepper, and eggplant are hosts of the TMV and in addition to not being used in rotation should not be handled prior to working in tobacco. Fruit from these crops also contain active virus and should not be handled while working in tobacco. There is, for example, enough active TMV in one infected tomato to infect every tobacco plant grown in North Carolina.

E. Weeds - A number of weeds are known to be hosts of TMV, but horsenettle is the only one found thus far to be infected in North Carolina. This weed is common where flue-cured tobacco is grown and frequently is found infected with TMV. The virus can be transmitted from infected horsenettle to tobacco mechanically, and this weed is suspected to be the source of TMV found in many tobacco fields. The only way horsenettle can be eliminated as a source of TMV is to eradicate it. Growers should consult with their County Extension Center for eradication procedures.

### Secondary Spread

Most of the mosaic plants in heavily diseased fields were infected by virus that was spread from a few tobacco plants infected from overwintering sources of the virus. Secondary spread can be reduced by removing primarily infected plants from the field or by cultivating in a manner to prevent spread of the virus. In seedling production, clipping is a very effective means of spreading TMV. Seedlings should be scouted closely for TMV at each clipping.

There are a number of factors that must be considered when deciding if roguing in the field is feasible, so the final decision must be based on each situation. As a general guideline, however, the two most important factors are the time that primary infection occurred and the number of infected plants.

Although primary infection can occur anytime during the growing season, the most critical time is during transplanting. Plants infected at this time from any of the overwintering sources will show mosaic symptoms in 2 to 4 weeks. Generally, if fewer than 100 plants per acre are showing symptoms at this time it is feasible to remove them. Roguing should, of course, be done prior to cultivation. Plants used to replant rogued plants frequently become infected from virus in the roots left in the soil when plants are removed so replanting is not recommended. If too many plants are infected to make roguing feasible, secondary spread can be reduced by carrying out cultivation operations so that equipment does not touch the plants. Where this is possible, cultivation should be done when the plants are dry and preferably partially wilted because less virus transmission occurs under these conditions.

It is seldom feasible or of value to rogue plants after layby because most secondary spread occurs during or before this operation. Losses can be reduced by keeping a good supply of water to the crop because mosaic burn, the most damaging form of the disease, usually occurs only when infected plants come under water stress. Irrigation of a field containing a significant amount of mosaic may be worthwhile under conditions of moisture stress that would not be of value to rogue after layby if fewer than 10-20 plants are showing symptoms by the time the crop is knee-high. This will reduce losses on the current year's crop somewhat, and perhaps more importantly, prevent extensive spread to the remainder of the crop and thus overwintering of virus in stalks and roots.

## Crop Rotation

Because TMV infects few crops other than tobacco and because the virus survives poorly in the absence of living tissue, crop rotation is a highly effective part of disease management.

Virtually any crop grown in North Carolina, except tomatoes and peppers, can be used in a rotation to help control mosaic.

Growers who have chronic problems with this disease should consider this principle carefully.

## **Granville Wilt**

By, T. A. Melton, Philip Morris Professor and Department Extension Leader N.C. State and H. D. Shew, Professor of Plant Pathology

### Introduction

Year after year Granville wilt continues to be one of the most destructive diseases of tobacco in North Carolina. It causes losses from over 1 to 2% of the entire tobacco crop, costing growers from \$10 to \$15 million annually. Granville wilt was first observed in 1880 on a few farms in the Northern areas of North Carolina's Middle Belt. During the next 30 years losses from this disease increased on farms in Granville, Vance, Wake and Durham counties to the point where it was causing 25 to 100% field losses. During that period this disease caused banks to close, farms to be sold, and towns to decline. Today it not only plaques the Middle Belt but is the most chronic disease problem in eastern North Carolina and in the Border Belt. Its more recent extension into the Old Belt also has made Granville wilt a statewide problem.

Granville wilt is most damaging in fields where tobacco was grown the previous year, in wet areas in a field, and in years where soil temperatures are normal to above normal. Other plants the bacteria can infect include tomatoes, Irish potatoes, pepper, eggplant, peanuts, and weeds.

## Symptoms

The first symptom is a wilting on one side of the plant. As the disease progresses, the entire plant wilts and death generally follows. When death does not occur, plants are usually stunted and leaves may be twisted and otherwise distorted. The stalk usually turns black, especially at the ground level. At this stage, Granville wilt may be easily confused with other diseases such as black shank. Dark streaks can be seen extending up the plant just beneath the outer bark. Infection may not be noticed immediately because wilting symptoms may not appear until the plant undergoes moisture stress. It is not unusual to observe symptoms several weeks after initial infection. A simple diagnostic test for Granville wilt can be done on-farm. When an infected stem segment is suspended in a glass of clear water for a few minutes, bacterial streaming occurs. The bacterial streaming appears as white ooze or a smokey stream, which originates from the cut end of the stem, where the dark streaks are observed under the bark, and slowly moves out into the water.

## Causal Agent

Granville wilt is caused by microscopic bacteria (*Ralstonia solanacearum*). The bacterium is spread by anything that moves infested soil or water. Major means of spread include water, infected transplants and farm vehicles moving from field to field. The motile bacteria gain entry into the plant through natural openings or wounds. Since roots often "wound themselves" as they grow, or are wounded during transplanting, the Granville wilt bacteria have no difficulty in gaining entry into the plant. More extensive root wounding caused by nematodes or root pruning during cultivation provide more paths of entry for the bacteria. Increased disease levels in the resistant varieties have been noted where root-knot nematodes are present. High populations (greater than 250,000 bacteria per gm of soil) are usually necessary for infection to occur. The bacteria may also be spread during mechanical topping and harvesting. These

bacteria are favored by relatively high soil temperatures and adequate to high moisture levels in the soil. Poor soil drainage and wet, warm growing seasons favor Granville wilt.

## Management

**Crop Rotation** - Crop rotation must be the basis on which Granville wilt management programs are established. This practice is perhaps the most essential thing that growers can do to minimize losses due to Granville wilt. In fact, without appropriate crop rotation it is not possible to manage this disease successfully where the infestation level is moderate to high. Therefore, crop rotation must be the basis on which Granville wilt management programs are established. Crop rotation is effective because the Granville wilt bacteria live in the soil and are not well adapted to survival in the absence of susceptible plant tissue. Thus, their populations decline if a suitable plant such as tobacco is absent for even one year. As is true with any other soil-borne pathogen, the longer the rotation, the more efficient the control. However, planting a non-host crop (soybeans, fescue, corn, cotton, milo) just one year will usually significantly reduce the disease loss in the following tobacco crop. Integrating other management practices, such as improved drainage, avoiding late or deep cultivations, stalk and root destruction, and the use of multi-purpose fumigants where disease occurred in past years, is better than relying on any one or two practices.

**Stalk and Root Destruction (R-9-P)** - Roots and stalks from the previous crop should be destroyed as soon as possible after harvest. The decay of old plant residue through stalk and root destruction soon after harvest decreases the number of bacteria present in the soil.

**Resistant Varieties** - Varieties are available which carry varying levels of resistance to Granville wilt. None of these varieties is immune to this disease and some losses might be expected in

severely infested areas with the use of any variety. Nevertheless, growers have an opportunity to select those varieties which will afford them, in most cases, good protection when used in combination with other disease control practices such as stalk and root destruction and crop rotation. Consult the most recent issue of the Tobacco Information bulletin, available in local county extension centers, for resistance ratings of currently available varieties.

Chemical Control - The fumigants Chlor-O-Pic 100, Telone C-17, and Terr-O-Gas 67 may help control Granville wilt if used in combination with other cultural control practices. All require a 3-week waiting period between time of application and transplanting. Always read and follow label instructions. Consult the most recent issue of the Flue-Cured Tobacco Information, available in local county extension centers, for more information

### **Brown Spot**

By T. A. Melton, Philip Morris Professor and Department Extension Leader and H. D. Shew, Professor of Plant Pathology

#### **Introduction**

Brown spot, one of the most destructive leafspot diseases on tobacco, was only a minor problem in North Carolina until the mid-1950's. From that time until the mid- 1970's, disease losses averaged about 0.5% per year in North Carolina. Losses increased during the 1980's but have decreased back to 0.5% or less. Because brown spot populations build up higher and higher throughout the growing season, and because aging tissue is more susceptible to the brown spot fungus, plants that remain in the field longer than normal are most damaged by the brown spot disease. Other important conditions that lead to brown spot are continuous tobacco culture, frequent rains, and very sensitive varieties.

## Symptoms

The leafspots caused by this fungus appear as circular spots, ranging from 1/4 inch to 1 1/4 inches in diameter, and are found primarily on the lower leaves of the plant. Initially, these target-like spots have a yellow or yellowish-green halo around them. The fungus causes the leaf tissue in the area of the spot to age prematurely, which results in a yellow halo around the lesion. Each of the dark rings in the target are made of thousands of tiny spores (seed-like structures) that may be splashed or blown up into the upper leaves where additional spots will occur. As spots enlarge and coalesce, dead tissue often tears and falls out of the leaf making the entire leaf ragged and worthless. Late in the season, on very sensitive varieties, spots may occur on suckers, petioles and even on the stalk. When stalks and suckers are infected, girdling of the plant can occur and the plant dies. The pathogen can also act systemically and affect the overall plant metabolism resulting in premature death. Brown spot may continue to develop in the curing barn at low temperatures.

## Causal Organism

Brown spot is caused by an air-borne fungus, *Alternaria alternata*. This fungus overwinters primarily in tobacco stalks. When spring-time brings warm weather, spore production begins on old stalks that are still exposed on top of the soil. These spores are then blown and/or splashed up onto the lower leaves of the new plants where they germinate and penetrate the leaves directly. Spots produced on the lower leaves form new generations of spores that are splashed and blown onto other leaves. Each of the spores requires moisture to germinate on a tobacco leaf. Therefore, the leaves must be wet. If dry conditions exist, spores cannot germinate and new spots cannot develop. *Alternaria alternata* is a common fungus associated with at least 56 different species of plants. However, under natural conditions it rarely, if ever, causes disease in plants other than tobacco. It has been found to be a wound pathogen of closely related plants such as peppers and tomatoes. In other words, it can only attack

those plants after the plants have been wounded and one of the spores of the fungus lands in the wound.

## Management

Brown spot management should fit into the overall disease management program. The goal is to delay disease build-up. Rotation with another crop will allow time for the tobacco debris to decay therefore, leaving little or no food for the brown spot fungus. Stalk and root destruction helps prevent early infection by reducing availability of inoculum. Early infection means faster build-up and greater disease severity by the end of the season. High nematode levels also lead to increased brown spot damage. Therefore, nematodes should be controlled. Proper levels of potassium also should be available to the plant to insure vigorous growth. Infected leaves should be pruned as soon as possible to reduce the number of spores available for pathogen spread. Proper plant spacing will decrease humidities around the plant, thus decreasing the incidence of brown spot. Efficient sucker control also aids in reducing losses. Excessive fertilization, especially with nitrogen, may lead to greater losses to brown spot and should be avoided. In areas with a history of severe brown spot, brown spot sensitive varieties should be avoided.

## **Black Shank**

T. A. Melton, Philip Morris Professor and Department Extension Leader and H. D. Shew, Professor of Plant Pathology

## Introduction

Black shank is among the most destructive and widespread of all tobacco diseases in North Carolina. Black shank first appeared in the United States in 1915 and was first reported in North Carolina in Forsyth County in 1931. Later, it was found in Pitt County in 1938. Currently, black shank, causing state-wide losses of approximately 1 to 2.5 % each year, can be found in

every North Carolina county that grows flue-cured tobacco. This disease is most prevalent in poorly-drained areas where tobacco was planted the previous year. Black shank is a warm-weather disease, which is favored by temperatures ranging from about 84 to 90 F. Once soil in a field becomes infested with the black shank fungus, it cannot be eliminated, therefore, the disease must be managed every year on a continuing basis.

### Symptoms

The disease is characterized by a rapid yellowing and wilting followed by death of the entire plant. A dark brown to black, somewhat sunken, lesion usually appears on the stalk at or near the ground level. This lesion often extends up the stalk or shank of the plant causing it to turn black. Stalks, when split, usually reveal the blackened pith separated into discrete disks. This feature is of diagnostic value only when used in conjunction with other observations because disking may occur due to other factors. Infected plants may be scattered or uniformly distributed in a given field. Roots and crowns are usually decayed. Only root and crown symptoms may be observed in very dry years or on resistant varieties.

### Causal Agent

Black shank is caused by the fungus *Phytophthora parasitica* var. *nicotiana* which lives in the soil. This pathogen belongs to a group of fungi that occurs commonly in areas of high soil moisture. The fungus produces microscopic spores which swim in water surrounding roots and/or soil particles. These swimming spores are attracted to tobacco, their only natural host, by root exudates produced primarily at growing points and wounds. Whereas wounds are not required for penetration, they do favor more rapid disease build-up.

When the soil environment is not suitable for protection and survival of the motile spores, the fungus forms thick-walled,

resistant spores some of which may survive for years during conditions unfavorable for the fungus. Once conditions are favorable, the resistant spores germinate and motile spores are produced. During favorable conditions for the fungus, a new generation of motile spores is produced every 72 hours.

The black shank fungus is spread when infested soil is moved from one place to another. Contaminated irrigation or runoff water may also aid in its movement within a field or from one field to another.

Although roots are the most commonly affected plant parts, occasionally the fungus infects leaves and forms circular, yellowish-to-brown lesions up to 3 inches in diameter. Leaf infection may occur as a result of zoospores in splashing water or contact with infested soil.

#### Control

**Crop Rotation** - Rotation should be the foundation of any black shank management program because the fungus attacks only tobacco. Leaving the field out of tobacco for one or more years will reduce, but not eliminate, this fungus. Any crop can be grown between tobacco crops to reduce the population level of the pathogen.

**Resistant Varieties** - Varieties possessing various levels of resistance to black shank are available; however, they should be used as part of an integrated approach including crop rotation and other appropriate cultural practices. The latest issue of the Flue-Cured Tobacco Information bulletin lists varieties and their resistance levels. This bulletin is available in all county extension centers.

**Chemical Control** - Several soil-applied chemicals are labeled for black shank control. Included are the multi-purpose fumigants Telone C-17, Chlor-O-Pic 100, and Terr-O-Gas 67.

However, the systemic fungicides Ridomil Gold or Ultraflourish are the most effective materials against black shank. Additional information on chemical control can be obtained from the most recent Flue-Cured Tobacco Information bulletin.

Drainage - Improving drainage in poorly drained areas reduces black shank losses by making the soil environment less favorable for infection.

Sanitation - Elimination of the host by destroying stalks and roots immediately following harvest will help reduce populations of the fungus and nematodes, resulting in less damage in the next crop.

Nematode Control - Control of root-knot nematodes helps to ensure the effectiveness of resistant varieties and fungicides. In fields infested with both the black shank fungus and root-knot nematodes, the effectiveness of black shank resistant varieties and fungicides is reduced if the nematodes are not controlled.

#### **On-line Photos of Tobacco Diseases and Pests**

The University of Kentucky has a wonderful website with actual pictures of Tobacco suffering from various Diseases.

Visit <http://www.uky.edu/Ag/Tobacco/Photos-Disease.htm> for photos of plants suffering from: Black Leg, Sore Shin, Angular Leaf Spot, Black Shank, Foliar Black Shank, Blue Mold New Lesion, Blue Mold Spores (under leaf), Blue Mold Damage, Target Spot, Fusarium Wilt, Frogeye Leaf Spot, Alfalfa Mosaic Virus, TSWV, Ring Spot Virus

Visit <http://www.uky.edu/Ag/Tobacco/Photos-Nutrition.htm> for a view of plants suffering from Nutritional Problems including: Calcium Deficiency, Potassium Deficiency, and Nitrogen Burn

## PESTS OF TOBACCO

We wish to thank the North Carolina Cooperative Extension for this detailed information dealing with tobacco pest.

Extracted from **INSECT and related PESTS of FIELD CROPS** (AG-271)

Dated 5/82

Placed on the Web 11/96 by the Center for Integrated Pest Management, NCSU

They also have a wonderful on-line site detailing:

Agricultural Chemicals Manual located at  
<http://ipm.ncsu.edu/agchem/agchem.html>

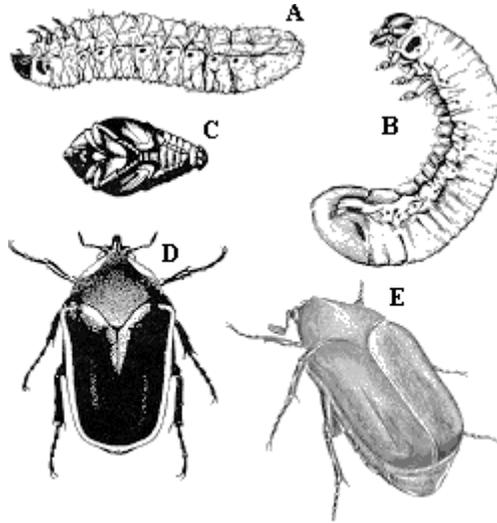
INSECT and related PESTS of VEGETABLES  
located at: <http://ipm.ncsu.edu/AG295/html/>

The Center for Integrated Pest Management was established in 1991 to serve a lead role in technology development, program implementation, training, and public awareness for IPM at the state, regional, and national level. The CIPM is an organizational unit within the College of Agriculture and Life Sciences at North Carolina State University. It is composed of faculty members from all academic departments in the College and involves all relevant disciplines impacting on IPM. The CIPM also involves scientists from other universities across the nation through grants, contracts, or other formal working relationships.

To learn more about CIPM, please visit their on-line website at <http://cipm.ncsu.edu/about.html>.

# Green June Beetle

*Cotinis nitida* (Linnaeus, Scarabaeidae, COLEOPTERA)



Green June beetle. A-B, Larvae. C, Pupa. D-E, Adults.

## DESCRIPTION

**Adult** - Adults are large, thick-bodied, somewhat flattened, green beetles. Almost 25 mm long and about half as wide, they have bronze-to-yellow body margins.

**Egg** - Eggs are white, spherical and small (2 mm).

**Larva** - Larvae are large, full-bodied, dirty-white grubs with blackish-brown heads. They reach a length of about 48 mm when fully developed.

**Pupa** - Pupae more or less resemble the adult beetles in size and shape. Although white when first formed, pupae gradually darken to green before adult emergence.

## **BIOLOGY**

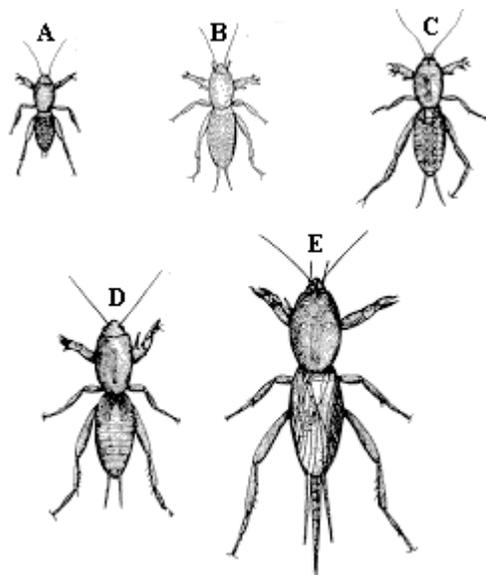
**Distribution** - The green June beetle is generally confined to the southern U.S., extending northward into New York and southern Illinois. **Host Plants** - Adult green June beetles feed on the foliage of a number of trees and shrubs and a variety of fruits such as grapes and peaches. By burrowing, tunneling, and some actual feeding, grubs injure the roots of grasses, vegetable and ornamental plants, and tobacco seedlings in plant beds.

**Damage** - Grubs of the green June beetles are often serious pests of tobacco seedlings in plant beds. Becoming active when plants are in the 2- to 4-leaf stage, the grubs feed on organic matter in the soil, burrow through the soil (crawling on their backs) and injure tobacco seedlings by loosening the soil and uprooting plants. Due to this type of injury, damage is more severe during dry seasons. Injury rarely results from actual larval feeding.

**Life History** - The green June beetle overwinters as a grub 20 to 60 cm (8 to 24 inches) deep in the soil. In spring the grubs burrow close to the surface where they tunnel on their backs and feed on decaying matter. Following a heavy rain or at night, they may come out of the soil, piling soil around the burrowing opening. There are three instars and in mid-spring the grubs pupate in earthen cells in the ground about 20 cm (8 inches) below the surface. Adults begin to emerge in June and are most abundant in July and August. Adult beetles feed on foliage and fruit of trees, shrubs, and fruit crops. Adults lay eggs about 7 or 8 cm (3 inches) deep in soils high in decaying organic matter. After 8 to 20 days, the eggs hatch and the young grubs burrow and feed on the decaying matter until cold weather. There is one generation per year. **CONTROL** Green June beetle grubs may be controlled in tobacco seedbeds by applying an insecticide drench to infested areas.

# Southern Mole Cricket

*Scapteriscus acletus* Rehn & Hebard, Gryllotalpidae,  
ORTHOPTERA



Southern mole cricket. A-D, Nymphs. E, Adult.

## DESCRIPTION

**Adult** - The Beady-eyed adults are about 32 mm long, brown, and covered with fine, short hairs. They have short front wings, long and membranous hind wings which fold under the forewings and short, broad, shovel-like front legs for digging.

**Egg** - Eggs are oval and about 3.3 mm long.

**Nymph** - Nymphs are similar in appearance to adults but are smaller and wingless.

## **BIOLOGY**

**Distribution** - The mole cricket occurs from North Carolina to Texas. In North Carolina it is more prevalent in the Coastal Plain.

**Host Plants** - The nymphs and adults tunnel in the soil and feed on decomposing organic matter and roots. By tunneling, mole crickets injure tobacco seedlings, garden vegetables, peanuts, strawberries, and grasses.

**Damage** - The southern mole cricket is one of several species of mole crickets which injure plant bed tobacco. Tobacco seedlings are uprooted by the tunneling activity of these insects. Mole crickets may also cause damage by drying out the soil and feeding on roots.

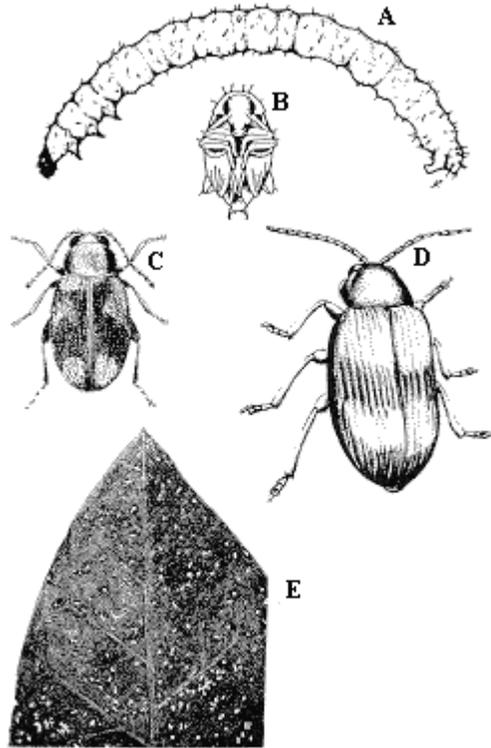
**Life History** - The southern mole cricket overwinters as a nymph or adult, migrating downward in cold weather. In the spring eggs are laid in the soil in cells constructed by the females. About 35 eggs are placed in each cell. Hatch occurs in 10 to 40 days depending on temperature. Nymphs develop through six or seven molts and either become adults by winter or overwinter as immatures. One generation occurs per year.

## **CONTROL**

Mole crickets may be controlled in tobacco plant beds by using an insecticide bait or drench. Baits should be scattered by gloved hand at dusk in the infested areas.

# Tobacco Flea Beetle

*Epitrix hirtipennis* (Melsheimer), Chrysomelidae,  
COLEOPTERA



**Tobacco flea beetle. A, Larva. B, Pupa. C-D, Adults.  
E, Beetle injury to leaves.**

## DESCRIPTION

**Adult** - The adult is a hard-shelled, black, very active beetle about 1.5 mm long. Wing covers have rows of fine distinct punctures. The eyes are black and the antennae 12- segmented. The eggs is very small (smaller than a pinhead), white when first laid, elongate and pointed at one end. **Larva** - The larva is 4.3 to 4.8 mm long when fully developed with a slender, white, 12- segmented body and brownish head. It has three pairs of short, jointed legs on thorax and a proleg on the last segment.

**Pupa** - The pupa is whitish with the head bent downward which is typical of pupae of the Chrysomelidae family (leaf-feeding beetles).

**BIOLOGY Distribution** - The tobacco flea beetle is present wherever tobacco is grown from Connecticut to Florida. **Host Plants** - The tobacco flea beetle is a pest of tobacco, tomato, and potato and will also attack jimsonweed, horsenettle, and ground cherry.

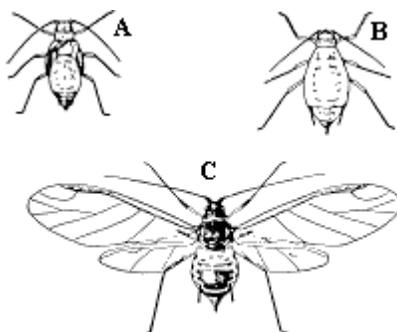
**Damage** - The tobacco flea beetle is a major pest of tobacco seedlings in plant beds and of tobacco plants in the field. Adult flea beetles damage tobacco plants from the time the plants begin growing in plant beds until harvest by chewing small, rounded holes through the leaves resulting in a "shot hole" appearance. Larvae feed on the roots of the tobacco plant and may tunnel into stalks. Large numbers of larvae may kill seedlings or severely damage newly set plants.

**Life History** - Adults generally overwinter in litter and trash around tobacco fields. Some may hibernate in tobacco fields if stalks were not destroyed after harvest. In early spring adults migrate into plant beds. They attack seedling and lay eggs on the soil surface beneath tobacco plants. Eggs hatch in about a week and the small, slender, white larvae feed on and tunnel in the roots and stems of tobacco plants for 4 to 5 weeks. There are three instars. After 4 to 7 days as pupae in the soil, adults emerge. With three to four generations per year, tobacco flea beetles continue to attack field tobacco until after harvest when they migrate to litter and trash surrounding the fields for hibernation.

**CONTROL** A braconid wasp, *Microtonus epitricis* (Viereck), is a natural enemy of the adult tobacco flea beetle. A number of insecticides are available to control the flea beetle in both plant beds and in the field.

# Green Peach Aphid

*Myzus persicae* (Sulzer), Aphididae, HEMPITERA



**Green peach aphid. A, Nymph. B-C, Adults.**

## DESCRIPTION

**Adult** - Adults are about 2.0 mm long, soft-bodied, pear-shaped, and either winged or wingless. They may be green, pink or black in color and have a pair of dark cornicles (tailpipe-like appendages) at the end of the abdomen.

**Egg** - Eggs are first green but later turn shiny black. However, the egg stage is not known in North Carolina.

**Nymph** - Nymphs are green and resemble adults but lack wings.

## BIOLOGY

**Distribution** - Occurring in nearly all countries where tobacco is grown, the green peach aphid has a worldwide distribution.

**Host Plants** - The green peach aphid is a pest of a wide range of plants, including tobacco, vegetables, deciduous fruits, flowering plants, and ornamental shrubs.

**Damage** - The green peach aphid is an important pest of tobacco in most of the tobacco-growing regions of the U.S. It is a particularly important pest in the Georgia and Florida shade-grown tobacco belt and in Connecticut. In the southern U.S., the green peach aphid attacks tobacco throughout the growing season, but in Maryland and Kentucky, aphid attacks usually occur in late-season tobacco. Although the green peach aphid occurred on tobacco in

North Carolina for many years, it was not reported to be a serious pest until 1946. Severe infestations also occurred in 1947, 1948, and again in 1976 through 1979.

In North Carolina, the green peach aphid attacks tobacco in both plant beds and in the field. Aphids damage tobacco plants by sucking the sap from the leaves. Such feeding weakens plants, causing curled, stunted, distorted leaves. They also contaminate the leaves with cast skins and honeydew in which a black sooty mold fungus develops. Such leaves cure poorly and are low in quality. The green peach aphid also transmits viral plant diseases such as tobacco etch and potato virus Y (PVY).

**Life History** - In southern states the aphids are nearly all females. These adult females give birth to living nymphs. Most of the nymphs develop into green, wingless adults which in turn produce another generation of wingless females. The adults and nymphs of the wingless form look alike. Other nymphs develop into blackish, winged adults. There is no egg stage in North Carolina. Successive generations of females, mainly wingless, are produced throughout the year. This pattern of development occurs as far north as Tennessee and Maryland. In fall, winter, and early spring, host plants include cabbage, collard, turnip, wild mustard, and dock. In spring, winged aphids fly to tobacco.

In cold northern climates, a generation of males and egg-laying females develop in the fall. Eggs are laid on certain fruit trees where they overwinter. Eggs hatch in spring, and the second or third generation of aphids infests tobacco. Aphids first appear in the plant beds. Once in the field, aphid populations may increase rapidly and cause serious damage before growers are aware of a problem. Numbers generally decline after plants have flowered, but can remain high on sucker growth.

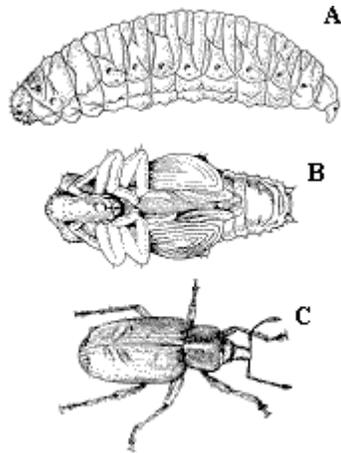
## **CONTROL**

Lady beetles, lacewing larvae, syrphid fly larvae and stilt bugs all feed on aphids. Fungus diseases and high temperatures also reduce aphid populations. Winter hosts (collards, mustard, dock, etc.) should be destroyed in the vicinity of plant beds before tobacco plants begin to come up.

A number of insecticides are available to control aphids on tobacco. When 25 percent or more of the plants are moderately infested (100 or so aphids on each of two or more leaves), chemical control is warranted. Repeated applications of certain carbamate insecticides within intervals of a week or less are frequently conducive to aphid buildups

# Vegetable Weevil

*Listroderes costirostris obliquus* (Klug), Curculionidae,  
COLEOPTERA



Vegetable weevil. A, Larva. B, Pupa. C, Adult.

## DESCRIPTION

**Adult** - The female adult weevil is about 6.4 mm long with a short, stout snout. It is a dull grayish-brown with a light V-shaped mark on the wing covers.

**Egg** - The egg is elliptical, 0.5 mm in diameter, and creamy white when first laid. It becomes black before hatch. **Larva** - The pale green, legless larva has a dark mottled head, and is about 1 cm long when fully developed. **Pupa** - The pupa is pale yellow at first and later turns brown. It is similar in shape to the adult, with snout, legs and wing pads folded around the body. It is about 7.9 mm long.

## **BIOLOGY**

**Distribution** - The vegetable weevil, originally from South America, was first reported in this country in 1922. It now occurs in the Gulf and southern states and in Oklahoma, Arizona, and California. In North Carolina the vegetable weevil occurs throughout the state but is generally more common in the southern Coastal Plain.

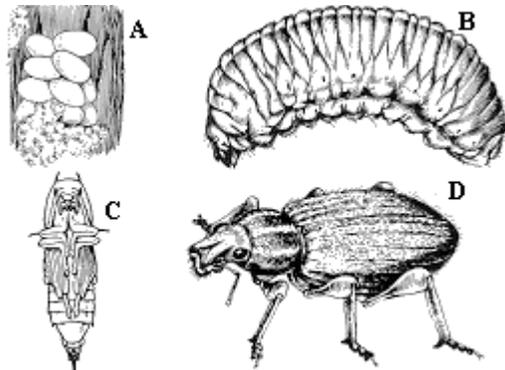
**Host Plants** - The vegetable weevil feeds on a wide range of cultivated crops: turnip, carrot, collard, mustard, tomato, potato, tobacco, and also a number of weeds. **Damage** - Larval and adult vegetable weevils attack the foliage and roots of a number of vegetable crops. Larvae feed both on the buds, stunting growth, and the leaves of seedlings. Their feeding causes irregularly shaped holes in the leaves.

**Life History** - The adult vegetable weevil is active during fall, winter, and spring and aestivates (enters dormancy) during the summer in trash, leaves or grass at the edges of fields. Reproduction is parthenogenetic (no males, females lay eggs which develop into females) and some individuals may live two years. After coming out of aestivation, adults feed for several days to a month before depositing eggs on turnips or collards. Larvae feed on tobacco seedlings (and other vegetable crops) and become fully grown in 23 to 45 days. Pupation occurs in earthen cells in the soil in spring or in fall and late winter and will last from a few days to two weeks depending on the temperature. Adults emerge from January to June. The length of time from egg hatch to adult emergence may vary from 1 to 4 months. There is one generation per year.

**CONTROL** Cultivation in fall and winter is important in reducing populations. Insecticides are also available for control of the vegetable weevil. Treatment should begin when 5 percent or more of small, newly set plants (within 3 weeks after transplanting) are killed or injured

# Whitefringed Beetle

*Graphognathus* spp., Curculionidae, COLEOPTERA



Whitefringed beetle. A, Eggs. B-C, Larvae. D, Adult. **DESCRIPTION**

**Adult** - About 11 mm long, these black beetles are covered with dark gray and grayish- brown scales. They have two longitudinal stripes and a marginal band of white hairs. All whitefringed beetles are females and are incapable of flight.

**Egg** - The white, oval eggs are slightly less than 1 mm long and become pale yellow before hatching. They are covered with a sticky secretion which soon hardens. **Larva** - The slightly curved, yellowish-white larvae are legless, have a light brown head, and measure up to 13 mm long. **Pupa** - Approximately 13 mm long, the white pupae gradually darken as they mature.

## BIOLOGY

**Distribution** - Native to South America, whitefringed beetles were first reported in this country in 1936 as pests of peanuts in Florida. They now occur from Florida to New jersey and westward to Missouri and eastern Texas.

**Host Plants** - Whitefringed beetles infest at least 385 plant species. However, plants with taproots and smooth, broad leaves are most commonly damaged. Some important host plants include tobacco, peanut, corn, Irish potato, soybean, velvet bean, strawberry, okra, cowpea, sweet potato, bean, cotton, cauliflower, cabbage, cocklebur, and aster. Small grains can also be infested but their fibrous root systems are more tolerant to damage. **Damage** - Whitefringed beetles are relatively innocuous foliage feeders which leave sawtooth cuts on outer edges of leaves. The larvae, however, are particularly destructive to taproots and underground stems. Infested plants turn yellow and, if severely injured, wilt and die.

**Life History** - Whitefringed beetles usually overwinter as grubs although eggs may survive the winter in protected locations. After feeding on roots of tobacco throughout March, April, and May, the grubs burrow 5 to 15 cm into the soil and pupate for 13 days. By early July, most larvae have matured and entered the pupal stage. Adults emerge mainly in June or July. There are no males, and females produce eggs without mating. Eggs are usually deposited in clusters of 15 to 20 in the soil around the base of host plants. Unless they overwinter, the eggs hatch 17 days after oviposition. The newly emerged larvae infest the roots of host plants until the onset of cold weather. One generation occurs each year.

**CONTROL** Summer legumes are favorable to high beetle populations. Grasses, including corn and small grains are poor food for adults. Therefore, in known problem fields, tobacco should be rotated with grass crops to reduce pest populations. In the past, quarantines were used to prevent the movement of infested soil and plant materials. At the present time, there is no insecticide registered for control of whitefringed beetles on tobacco.

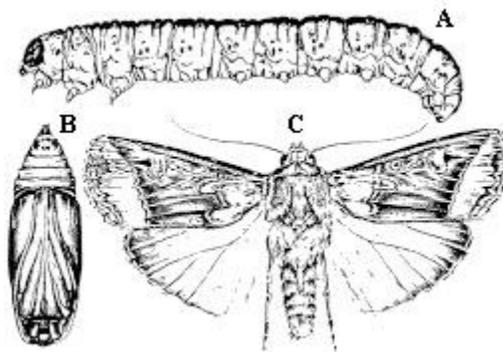
# Cutworms

Black cutworm, *Agrotis ipsilon* (Hufnagel)

Granulate cutworm, *Feltia subterranea* (Fabricius)

Variegated cutworm, *Peridroma saucia* (Hubner)

Noctuidae, LEPIDOPTERA



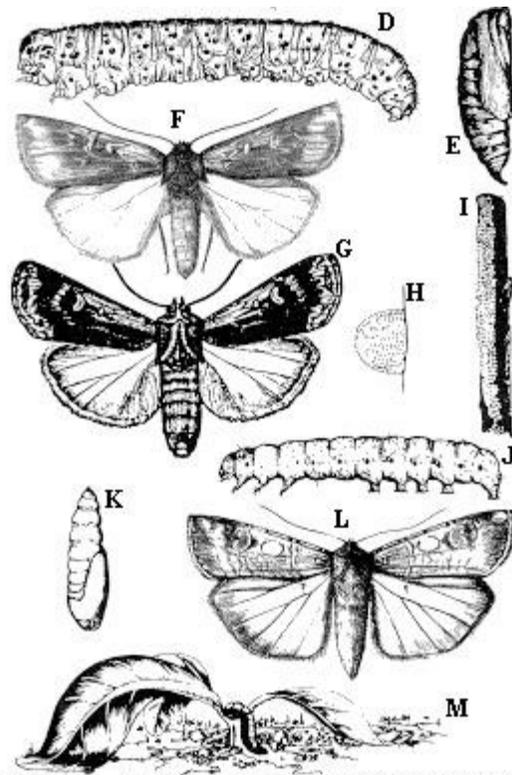
## DESCRIPTION

**Adult** - Adult black cutworm moths have dark brown forewings, white hind wings, and a wing expanse of 38 to 51 mm. Adult granulate cutworm moths have yellowish-brown forewings and a wingspan of 38 to 45 mm. The variegated cutworm moths may be yellowish or brownish with a wingspan of 38 to 50 mm.

**Egg** - Cutworm eggs are white -- laid singly or in small clusters. Variegated cutworm eggs are generally laid in elongate patches.

**Larva** - Black cutworm larvae are dark greasy-gray to black, with a pale yellow line down the center of the back and three yellow lines along each side. Sometimes, however, these yellow lines are not distinct. The larvae are 38 to 45 mm long when





**Cutworms. A-C, Black cutworm larva, pupa, adult. D-G, Granulate cutworm larva, pupa, and adults. H-L, Variegated cutworm egg, egg mass, larva, pupa, and adult. M, Cutworm damage to tobacco.**

fully developed and the skin is covered with convex, black granules. Granulate cutworm larvae are dusty brown with rough, granulated skin and up to 38 mm in length. Variegated cutworm larvae have a distinct, pale yellow dot on the mid-dorsal line of at least the first four abdominal segments. About 50 mm long when fully developed, they are a pale, dirty brown in color.

**Pupa** - Cutworm pupae are about 20 mm in length and dark brown or mahogany in color.

**BIOLOGY Distribution** - Cutworms are cosmopolitan in their distribution and are common in Canada and the United States. The black cutworm is more abundant in the northern portions of its range, while the granulate cutworm is more abundant southward. In North Carolina, cutworms are generally more of a problem in the Coastal Plain.

**Host Plants** - Cutworms attack many vegetable crops, grasses, and field crops such as tobacco, cotton, corn, and peanuts.

**Damage** - Several species of cutworms may injure tobacco in plant beds and newly set plants in the field. Larvae hide curled up in the soil by day and at night cut off young plants near the ground and feed on the foliage. The black cutworm is one of the most destructive cutworms. One larva cuts off a plant, moves to other plants and repeats the damage. Small populations can cause considerable injury, resulting in the need to replant. Granulate and variegated cutworms also sever seedlings, but the variegated cutworm may also climb tobacco plants and feed on the leaves. In North Carolina, granulate and black cutworms are the most common cutworms in tobacco plant beds.

**Life History** - Cutworms overwinter as larvae or pupae. In early spring, the overwintering larvae of some species become active and feed. In other cases, moths emerge from overwintering pupae and lay eggs on host plants or other vegetation. Therefore, depending on the species, damaging cutworms found in spring may be overwintered larvae or new generation cutworms.

Cutworms develop through five to eight larval instars. Pupation occurs in the soil. The number of generations depends on latitude. Generally there are two generations per year in Canada, four generations per year in North Carolina, and five to six generations per year in Florida.

## **CONTROL**

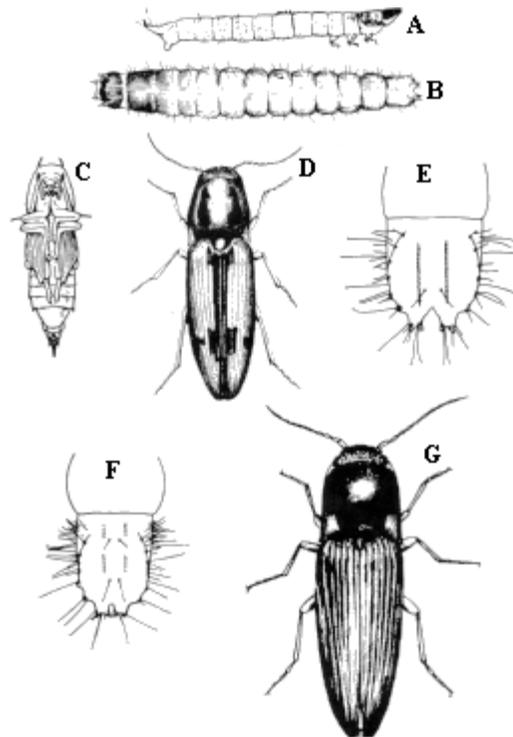
Since extensive damage may occur in a short period of time, plant beds and newly set plants should be inspected frequently. An economic threshold of 5 percent injured plants has been established for cutworms infesting newly set or young plants (within 3 weeks after transplanting). A bait may be used in infested plant beds or in newly set fields.

# Wireworms

Tobacco wireworm, *Conoderus vespertinus* (Fabricius)

Southern potato wireworm, *Conoderus falli* Lane

Elateridae, COLEOPTERA



**Wireworms. A-E, Tobacco wireworm larvae, pupa, adult, and last abdominal segment. F-G, Southern potato wireworm last abdominal segment and adult.**

## DESCRIPTION

**Adult** - Adult wireworms are the familiar click beetles. The body of the tobacco wireworm is flattened, somewhat tapered, hard, 7 to 11 mm in length, and reddish-brown with yellow markings. The southern potato wireworm adult is brownish (some are black) with tan legs and 6.0 to 8.5 mm long.

**Egg** - Eggs of tobacco wireworm are white, spherical, and about 0.5 mm in diameter. Eggs of the southern potato wireworm are similar.

**Larva** - Newly hatched tobacco wireworm larvae are 1.5 mm long and white. Fully developed larvae are yellowish-brown and 14 to 19 mm long. Tobacco wireworm larvae can be distinguished from southern potato wireworm larvae because the tobacco wireworm's last segment terminates in a V-shaped notch rather than in the almost closed, oval notch of the southern potato wireworm.

**Pupa** - Tobacco wireworm pupae are first white, but later change to reddish-brown. They are slightly larger than the adults (about 12.7 mm in length). Southern potato wireworm pupae are also slightly larger than adults and change from white to creamy yellow.

## **BIOLOGY**

**Distribution** - The tobacco wireworm is common in the southeastern states. It is very common throughout the Coastal Plain of North Carolina. The southern potato wireworm, introduced from South America, now occurs from North Carolina to Louisiana. It is widely distributed in South Carolina and in the Border Belt counties of North Carolina. However, economic injury also occurs in the other belts.

**Host Plants** - Tobacco, corn, cotton, potatoes, and other crops are hosts of the tobacco wireworm. Irish potatoes are the preferred host of the southern potato wireworm; however, newly set tobacco seedlings, roots of sweet potato, corn seedlings, and carrot are also infested. Less frequently attacked are melons, beet roots, and strawberry fruits that touch the soil surface.

**Damge** - The tobacco wireworm and the southern potato wireworm are the most common of several wireworm species that attack the stems of newly set tobacco. Wireworms damage newly set tobacco plants by boring into and tunneling in the stalks. Some plants may be killed or stunted which results in the need to replant. The resulting irregular stand has plants of varying size and maturity. More management problems occur with topping, suckering, and harvesting. The amount of damage varies from year to year and from field to field depending on weather, transplants, soil type, crop rotation, etc. Wireworms are more commonly a problem in Coastal Plain soils, especially if the field has not been plowed during fall and winter, or if the field was planted to a winter cover crop. However, the use of a cover crop is usually warranted in terms of erosion control.

**Life History** - The tobacco wireworm overwinters in the larval stage in North Carolina. Most larvae begin to pupate in mid-May and adult beetles emerge in June and July. Eggs (average 240/female) are laid on or slightly beneath the soil surface. After hatch, larvae bore into and tunnel in the stalks of tobacco plants. In North Carolina, the life cycle requires about 348 days (egg, 10 days; larva, 315 days; pupa, 10 days; and adult preoviposition period, 13 days). One generation occurs each year, though a very small number of larvae may survive a second winter.

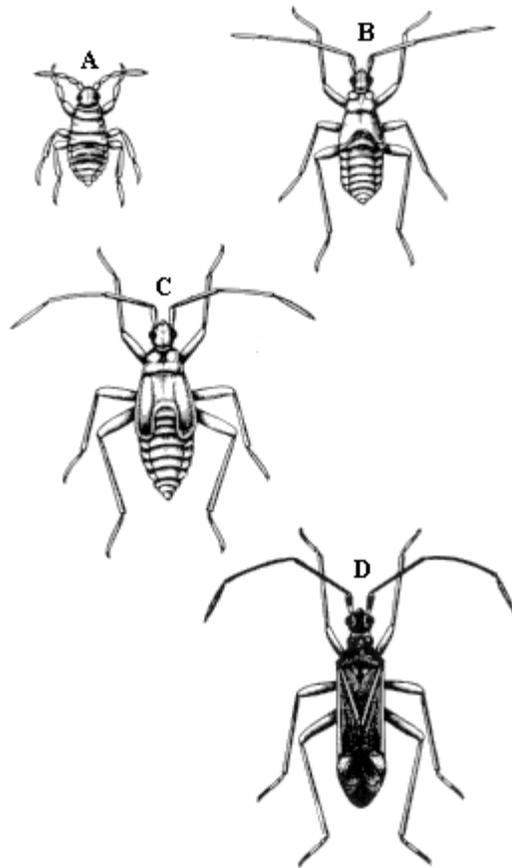
The souther potato wireworm also overwinters in the larval stage. Two generations of the southern potato wireworm occur per year in coastal South Carolina: a short cycle summer brood and a long cycle winter brood. Adult beetles emerge in May and June and again in late August and September. Summer-brood larvae infest plants throughout summer; whereas, winter-brood larvae are a problem in early fall and again in early spring.

## **CONTROL**

Wireworms may be controlled by a number of insecticides which should be applied and incorporated during or into the soil prior to setting tobacco plants.

# Suckfly

*Cyrtopeltis notatus* Distant, Miridae, HEMIPTERA



Suckfly. A-C, Nymphs. D, Adult female.

## DESCRIPTION

**Adult** - Adults are green-black, slender, plant bugs about 3.3 mm long. They have long slender legs and antennae.

**Nymph** - Nymphs are greenish with reddish eyes. They have two pairs of wing pads which reach to the middle of the second abdominal segment.

## **BIOLOGY**

**Distribution** - The suckfly has been reported to occur in North Carolina, Georgia, Florida, and Texas and probably occurs in other tobacco-growing regions.

**Host Plants** - Tobacco is the principal host plant of the suckfly, although tomato and horsenettle are also fed upon.

**Damage** - The suckfly, a minor pest, may periodically become abundant and damage late- season flue-cured tobacco. By sucking plant juices, it may reduce coloration, weight and thickness of cured leaves. Quality may also be reduced due to specks of black, gummy excrement on the undersides of the leaves.

**Life History** - The suckfly apparently overwinters in wooded areas near tobacco fields and usually appears in tobacco about a month or 6 weeks prior to harvest. Eggs are laid singly in leaf tissue and hatch in about 4 days. Nymphs feed on the underside of leaves and molt five times before becoming adults.

## **CONTROL**

If necessary, suckflies may be controlled with insecticides on late-planted tobacco. Treatment should begin when 25 percent or more of the plants show readily visible signs of infestation (e.g., excrement and suckfly nymphs on underside of leaves).

## Budworms

Tobacco budworm, *Heliothis virescens* (Fabricius)

Corn earworm, *Heliothis zea* (Boddie)

Noctuidae, LEPIDOPTERA

**DESCRIPTION Adult** - Tobacco budworm moths are light olive to brownish-olive, with a wingspan of about 32 mm. Each forewing bears three slanted, dark olive or brown bands. Hind wings are white with dark margins. The corn earworm is usually a light yellowish-olive with a single, dark spot near the center of each forewing and a wingspan of about 38 mm.

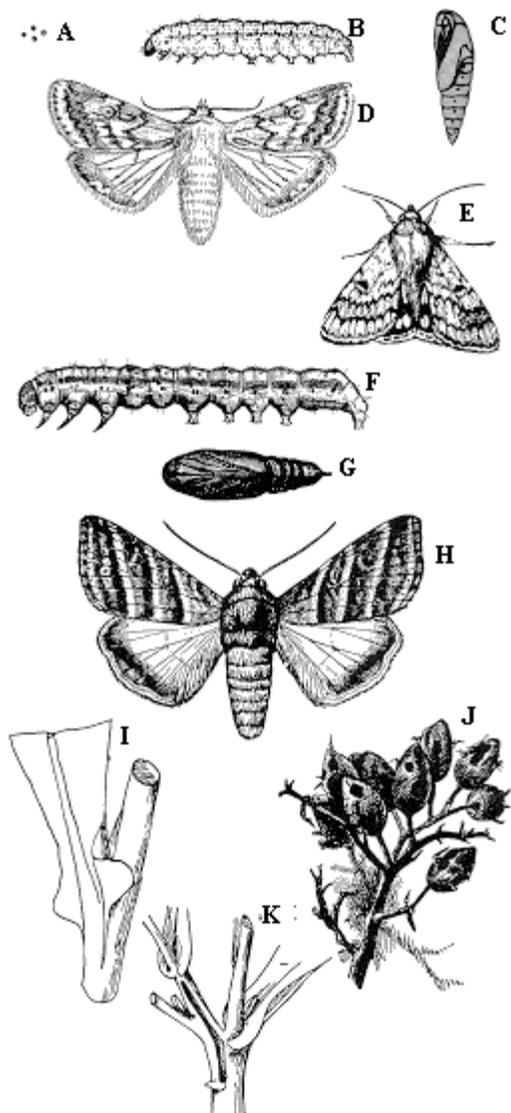
**Egg** - Eggs of both species are very similar in appearance -- subspherical with a flattened base, about 0.6 mm in diameter, and white or cream in color. They develop a reddish-brown band just prior to hatching.

**Larva** - Both species are similar in appearance. About 1.5 mm long, newly emerged larvae are yellowish-white with brown heads. With pale stripes running lengthwise on the body, fully developed larvae may be basically greenish-yellow, reddish-brown, or even black. Such larvae may be up to 44 mm long.

**Pupa** - Shiny and reddish-brown at first, the pupae become dark brown before adult emergence.

### BIOLOGY

**Distribution** - The tobacco budworm occurs throughout the Western Hemisphere ranging as far north as Canada and as far south as Argentina. The corn earworm has a similar distribution but is more abundant in cooler regions, whereas the tobacco budworm is more abundant in warmer, southern regions. A recent North Carolina study indicates that 90 percent of the budworms found on tobacco are *Heliothis virescens*



**Budworms. A-E** Corn earworm eggs, larva, pupa, and adults. **F-H**, Tobacco budworm larva, pupa, and adult. **I-K**, Damage to Tobacco.

In North Carolina, budworms occur throughout the state but are generally more severe in the southern Coastal Plain. Some early transplanted fields in heavily infested areas have had as many as 100 percent of plants infested.

**Host Plants** - Tobacco, cotton, and soybeans are the only cultivated crop hosts of the tobacco budworm in North Carolina. The corn earworm feeds on at least 16 cultivated plants. Tobacco is the most important host of the tobacco budworm; whereas, corn is the most important host of the corn earworm. The tobacco budworm does not infest corn, but both species are found on cotton and soybeans. Wild hosts of the tobacco budworm include deergrass and toadflax.

**Damage** - Budworms, primarily the tobacco budworm, are important pests of flue-cured tobacco in North Carolina. Both species feed on tobacco leaves, but such feeding causes little appreciable damage. Damage is most serious when feeding is in the vegetative bud of the plant. The larvae often cause distorted leaves by feeding upon the tips of the leaves in the developing bud. Large holes develop from earlier feeding as the leaf tissue expands. Plants prematurely topped by budworm feeding produce profuse sucker growth. Both species of caterpillars may also bore in stalks or midribs.

**Life History** - Budworms overwinter as pupae in the top 5-10 cm (2-4 in) of soil. Tobacco budworm adults emerge in North Carolina from late April to mid-May. Corn earworm adults emerge from early May to early June. Females generally emerge earlier than males.

Eggs are deposited on the leaves or buds of the tobacco plant. After hatching, larvae may first feed on the leaf and then move to the bud region. Tobacco budworm larvae have five or six instars with the development period varying from 21 to 25 days. Corn earworm development is similar.

Pupation occurs in the soil. Tobacco budworm pupae enter diapause in September in North Carolina and corn earworms begin diapause in August. Both species have four generations in North Carolina.

## **CONTROL**

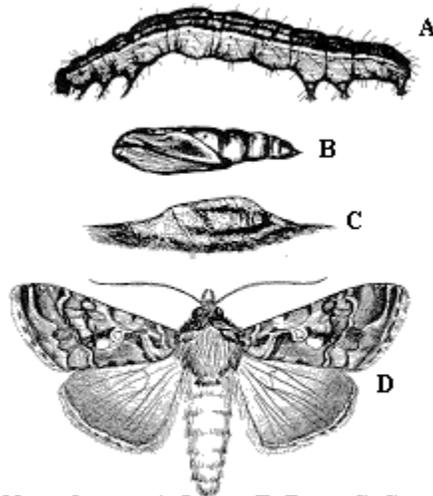
The parasitic wasp *Campoletis sonorensis* (Cameron) (Ichneumonidae) kills small budworms while another parasitic wasp *Cardiochiles nigriceps* Viereck (Braconidae) kills large budworms near pupation. Predators include several *Polistes* spp. paper wasps. Several diseases, including the microsporidian *Nosema heliothidis* Lutz and Spendor, also reduce budworm populations.

Topping plants, good sucker control, stalk destruction after harvest, and fall and winter plowing are all important cultural control practices to reduce diapausing populations. Budworms are difficult to control on tobacco prior to flowering because most of the larvae are hidden in the vegetative bud where it is difficult for insecticides to reach.

A number of insecticides, however, are available to control budworms. The economic threshold level for these pests is reached when five or more plants out of 50 are infested with budworms of any size prior to buttoning. Budworms will not cause loss of any importance after the plant has buttoned.

# Cabbage Looper

*Trichoplusia ni* (Hubner), Noctuidae, LEPIDOPTERA



Cabbage looper. A, Larva. B, Pupa. C, Cocoon. D, Adult.

## DESCRIPTION

**Adult** - This grayish-brown moth has a wingspan of approximately 38 mm. Each of the mottled, brown, front wings bears a small, silvery spot resembling a figure 8. The hind wings are a paler brown.

**Egg** - The dome-shaped, greenish-white egg is slightly smaller than a pinhead. **Larva** - About 40 mm long when fully developed, the light green larva has three pairs of slender legs near the head and three pairs of thickened prolegs on the abdomen. The body tapers from the rear to a small head and is generally humped up when at rest or moving.

**Pupa** - The green or brown pupa is nearly 19 mm long and enclosed in a flimsy, silken cocoon.

## **BIOLOGY**

**Distribution** - The cabbage looper is found from Canada to Mexico. In the U.S., this insect is a pest primarily in the South.

**Host Plants** - Host plants include all of the plants of the cabbage family -- cabbage, collards, etc. Also attached are lettuce, spinach, beet, pea, celery, potato, cotton, soybean, tomato, tobacco, and certain flower species.

**Damage** - An occasional pest of tobacco, the cabbage looper leaves ragged holes as it feeds on tobacco leaves.

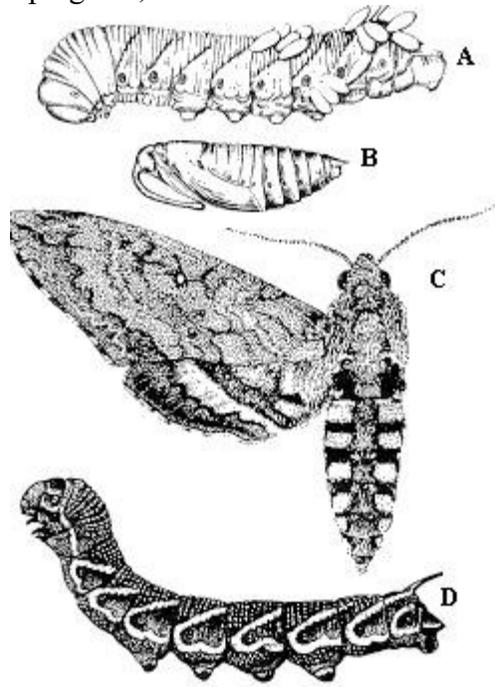
**Life History** - Cabbage loopers overwinter as pupae attached to host plant foliage which has fallen to the ground. The night-flying moths appear in May and lay eggs (up to 350 per moth) singly on cabbage, collards, and other plants. The eggs hatch in about three days, depending on temperature. The loopers feed on leaves for two to four weeks before spinning cocoons and pupating. Ten days to two weeks later a new generation of moths emerges. In North Carolina, there are five to six generations per year, mostly on crucifers.

## **CONTROL**

There is apparently a high degree of natural control of the cabbage looper by predators and parasites. Also a polyhedral virus disease seems to be a key factor in population changes of the cabbage looper. Insecticides are available to control the cabbage looper when it becomes abundant. Treatment is advised when 10 percent of the plants are affected.

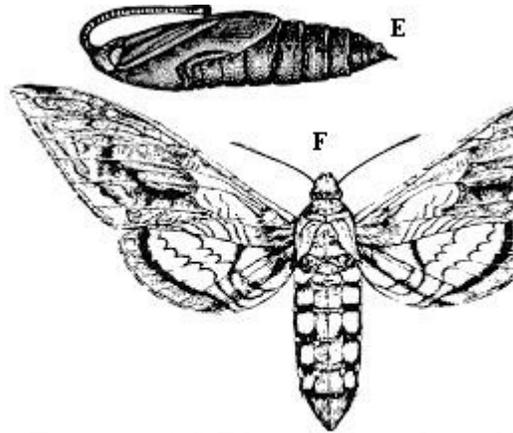
# Hornworms

Tomato hornworm, *Manduca quinquemaculata* (Haworth)  
Spingidae, LEPIDOPTERA



## DESCRIPTION

**Adult** - Adult tobacco budworm moths have a wingspan of about 112 to 127 mm, and are slate brown compared to the ash-gray color of tomato hornworms. Tobacco hornworms have size orange spots on each side of the abdomen; whereas, tomato hornworms have five similar but less distinct spots on each side. Wavy lines on the hind wings of the tomato hornworm are most distinct and jagged than the lines on the hind wings of the tobacco hornworm moth.



**Hornworms. A-C, Tobacco hornworm larva with parasite cocoons, pupa, and adult. D-F, Tomato hornworm larva, pupa, and adult.**

**Egg** - Hornworm eggs are smooth, spherical, and about 1.3 mm in diameter. Light green at first, they turn white before hatching.

**Larva** - Mature tobacco hornworm larvae usually have green bodies with fine, white hairs and seven diagonal stripes on each side; the posterior horn is usually curved and red. Tomato hornworm larvae have eight V-shaped markings on each side; the horn is straight and black. Both species are about 75 to 85 mm long when fully grown.

**Pupa** - Pupae are brown, hard, spindle-shaped, and about 50 mm long. They have a curved, pitcher-handle-like tongue case. The tongue case of the tomato hornworm is longer and more curved than the tongue case of the tobacco hornworm.

## **BIOLOGY**

**Distribution** - The tobacco hornworm ranges from southern Canada to Argentina. The range of the tomato hornworm, however, extends only from southern Canada through the southern U.S. In North Carolina, the tobacco hornworm is more common in the Eastern and Border Belts while the tomato hornworm is more common in the Old and Middle Belts of the Piedmont.

**Host Plants** - Tobacco is the principle host of hornworms, though other plants of the family Solanaceae are consumed, such as tomato and horsenettle.

**Damage** - These important tobacco pests consume large quantities of leaf tissue, particularly as fifth instars. Two or more healthy larvae can completely defoliate a tobacco plant, leaving only midribs and stem. Severe damage most commonly occurs during late July and August.

**Life History** - Hornworms overwinter in the soil as pupae. Moths of this overwintering generation begin to emerge in early June and may continue to emerge as late as August. Nocturnal in habit, hornworm moths frequently can be seen hovering over plants at dusk. At night, eggs are deposited on the underside of leaves. Each moth deposits one to five eggs per plant visit and may lay up to 2,000 eggs. Larvae emerge about 4 days later, depending upon temperature. After feeding for 3 weeks, hornworms burrow into the soil and spend 3 weeks after which a new generation of moths emerges. Heavy egg deposition is common in August and early September due to a peak in overwintering moth emergence along with that of a second (or possibly third) brood.

In North Carolina, at least two and one-half generations occur each year. Early generations are potentially damaging to

marketable tobacco. Later ones feed after harvest on noncommercial suckers. However, these last generations are important because they produce the overwintering pupae. Pupae are stimulated to enter diapause (the resting period) after the second week of August by the shorter day lengths they encountered as larvae.

## **CONTROL**

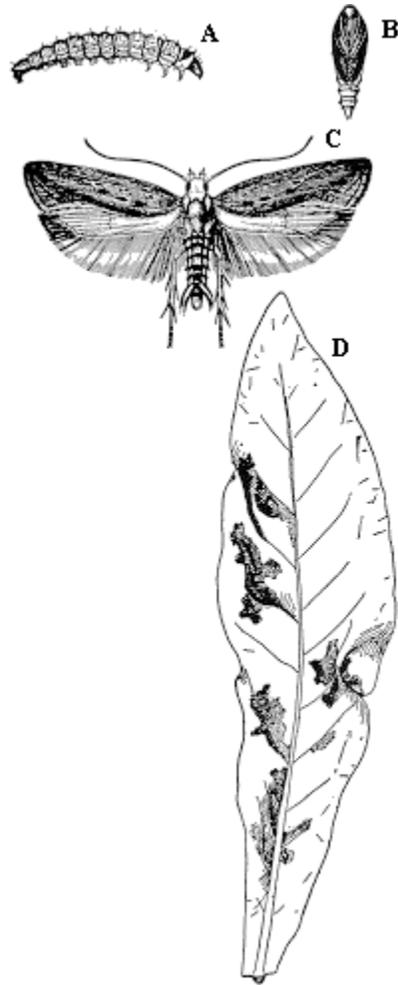
There are a number of natural enemies that help control hornworm populations. The stilt bug *Jalysus spinosus* (Say) attacks hornworm eggs. *Polistes* spp. Wasps prey on larvae. The braconid parasite, *Apanteles congregatus* (Say) lays eggs in first to third instar larvae. Offspring emerge from fourth and fifth instar larvae and spin numerous white cocoons on their backs. *Bacillus sphingidis* White causes hornworm septicemia disease. Two flies (Tachinidae) lay their eggs on hornworm larvae and the developing fly larvae kill the hornworm pupae.

Use of cultural practices is very important. Early planted tobacco, proper (not excessive) nitrogen fertilization, sucker control, stalk destruction, and fall plowing all help to reduce overwintering populations.

Hornworms should be treated with insecticides when infestations exceed the economic threshold level of 5 or more large, unparasitized larvae, 2.5 cm (1 inch) or longer, found per 50 plants. Parasitized hornworms (with small white cocoons) eat less and are counted at one-fifth of a larva. If applications are necessary during harvest, make them immediately after rather than before priming.

# Potato tuberworm

*Phthorimaea operculella* (Zeller), Gelechiidae, LEPIDOPTERA



Potato tuberworm. A, Larva. B, Pupa. C, Adult.  
D, Damage.

## DESCRIPTION

**Adult** - The small, slender moth has narrow, gray forewings with dark brown spots. The hind wings are yellowish-brown. Both sets of wings are fringed. The Moth's body is about 8 mm long and its wingspan about 13 mm. The female is slightly larger than the male.

**Egg** - The oval egg is about 0.5 mm in length. At first white in color, it becomes yellowish before hatching.

**Larva** - The larva, upon hatching, is creamy white with a dark brown head. The larva varies from greenish to pink as it matures and just before pupation takes on a purplish cast. The larva is 13 to 19 mm long when fully grown.

**Pupa** - White at first with green blotches, the spindle-shaped pupa soon turns brown. It is about 8 mm long and enclosed in a flimsy, white, silken cocoon.

## **BIOLOGY**

**Distribution** - The potato tuberworm is a cosmopolitan pest, occurring in most areas where potatoes or other solanaceous plants are grown. It occurs in at least 25 states from the Atlantic to Pacific coasts.

**Host Plants** - The potato tuberworm generally attacks Irish potato foliage and tubers, but will also feed on tobacco, tomato, eggplant, pepper, and jimsonweed.

**Damage** - The potato tuberworm, also known as the tobacco splitworm, generally attacks potato foliage and tubers. However, if Irish potatoes are stored or planted near tobacco fields, the potato tuberworm may also damage tobacco. The potato tuberworm feeds and tunnels between the upper and lower surfaces of leaves causing papery, grayish blotches which become brownish and very brittle. Tuberworm injury is usually concentrated on the older, lower leaves.

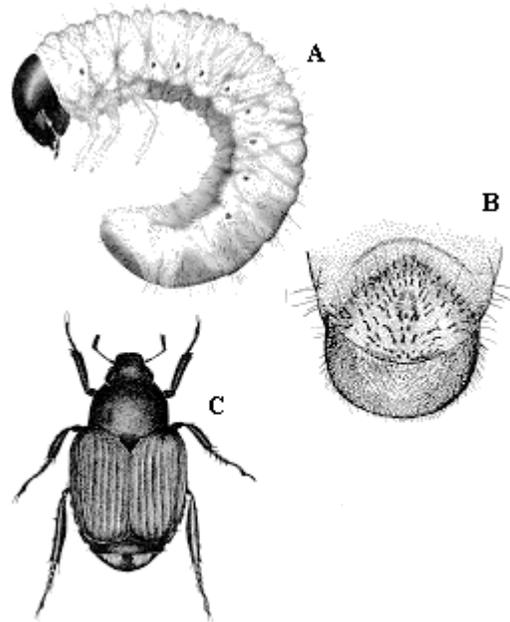
**Life History** - Potato tuberworms overwinter as larvae or pupae in the soil or in potatoes that are not subjected to freezing temperatures. Most active at dusk and dawn, the weak-flying moths emerge in spring and flutter from plant to plant. Each female deposits, singly, 60 to 200 eggs in 4 days or less. Eggs usually are placed on rough surfaces such as the hairy underside of a leaf. Hatch occurs 3 to 6 days later, depending on temperature. Larvae feed and mature in 7 to 10 days under ideal summer conditions, but take longer at cooler temperatures. When fully grown, larvae leave their hosts and pupate in the soil near the base of plants, in leaf remains, or in some other suitably sheltered site. A new generation of moths emerges in 6 to 9 days. Five or six generations occur each year.

## **CONTROL**

Potato tuberworm infestations can be avoided if tobacco is not grown in rotation with or near potatoes. Irish potatoes should not be stored near unharvested tobacco. Tuberworm-infested tobacco should be treated when 25 percent of the plants are damaged.

# Japanese beetle

*Popillia japonica* Newman, Scarabaeidae, COLEOPTERA



Japanese beetle. A, Larva. B, Larval setal pattern. C, Adult.

## DESCRIPTION

**Adult** - The adult is a shiny, metallic-green beetle with copper-brown wing covers. There are six tufts of white hairs on each side of the abdomen near the wing covers. It is about 13 mm long.

**Egg** - The egg is white or cream colored, spherical, and 1.5 mm in diameter when first laid. After being in the ground for about a week, the egg begins to swell and eventually almost doubles its original size. **Larvae** - The larva or grub is about 26 mm long fully grown and white to grayish white with a reddish-brown head.

**Pupa** - The pupa resembles the mature beetle except that legs, antennae and wings are closely folded to the body. Pupae are about 13 mm long, first pale cream in color, then tan.

## **BIOLOGY**

**Distribution** - The Japanese beetle was first found in the U.S. in 1916 in a nursery near Riverton, N.J. It has now spread north to Maine, south to Florida, and westward to the Mississippi.

**Host Plants** - Adult Japanese beetles attack 300 kinds of trees, shrubs, fruits, field crops, and garden plants. Larvae are serious pests of turf and other grass crops.

**Damage** - The adult Japanese beetle has become a more important pest of field tobacco in recent years. Adults sometimes migrate into tobacco fields when their favorite vegetation is scarce. Damage commonly occurs in small localized areas, usually near field borders. The beetles damage tobacco plants by eating ragged holes in the leaves. Larvae feed on grass roots but do not damage tobacco roots.

**Life History** - Japanese beetles overwinter in the soil as partly grown grubs. In spring, they migrate up near the soil surface and feed on grass roots. Pupation occurs in early May in North Carolina. Adult beetles begin to emerge in mid-May but populations do not peak until about mid-July. Soon after emerging, females deposit 40 to 60 eggs in small batches 5 to 8 cm deep in the ground. Under extremely dry conditions, many eggs and larvae perish. However, during warm, wet summers populations thrive and eggs hatch about 2 weeks after deposition. The newly emerged larvae feed until cold weather forces them into hibernation. Only one generation occurs each year.

**CONTROL** If present in large numbers, Japanese beetles may severely damage tobacco leaves. They should be treated when 10 percent of the plants have several leaves damaged.

## ***TOBACCO TRIVIA***

- \* By the time of the Civil War, cigarette use had become more popular. Federal tax was first imposed on cigarettes in 1864. Shortly afterwards, the development of the cigarette manufacturing industry led to their quickly becoming a major U.S. tobacco product. At the same time, the populist health reform movement led to early anti-smoking activity. From 1880-1920, this activity was largely motivated by moral and hygienic concerns rather than health issues.
- \* The milder flue-cured tobacco blends used in cigarettes during the early 20th century made the smoke easier to inhale and increased nicotine absorption into the bloodstream.
- \* During World War I, Army surgeons praised cigarettes for helping the wounded relax and easing their pain.
- \* In 1988 Congress prohibited smoking on domestic commercial airline flights scheduled for 2 hours or less. By 1990, the ban was extended to all commercial U.S. flights.
- \* In 1994 six major U.S. cigarette manufacturers testified before Congress that nicotine is not addictive and that they do not manipulate nicotine in cigarettes.
- \* On April 1, 1998, the Senate Commerce Committee voted in favor of the McCain bill, which gave complete authority to the FDA to regulate nicotine as a drug. It also raised the cigarette tax by \$1.10 per pack and mandated penalties for the industry if specific targets for reducing youth smoking levels were not met. The bill was defeated by the full Senate in June 1998.<sup>5</sup>

## **A Guide to Blending Tobacco & Smoking Characteristics**

**Virginia:** Virginia is by far the most popular tobacco type used in pipe tobacco today. About 60% of the nation's tobacco crop is Virginia. Virginia is mildest of all blending tobaccos and has the highest level of natural dextrose (sugar), which basically gives it a light sweet taste. Virginia is used in virtually all blends, is a good burner and aids in lighting.

Pure Virginia tobacco is best known from flake types. Dunhill's Light Flake is a very expamle. Medium in strength and rather sweet in taste. Several blends by Rattray comes into mind also. Marlin Flake being a rather heavy member of the family, but still very sweet. The Danish manufacturer A&C Petersen has the Blue Caledonian. Mild to medium in strength, and a nice pure taste of Virginia tobacco.

**Burley:** Burley tobacco is the next most popular tobacco for pipe tobacco blending. It contains almost no sugar, which gives a much dryer and full aroma than Virginia. Burley is used in many aromatic blends because it absorbs the flavorings. Burley tobacco burns slowly and is a cool smoke, which makes it a nice addition to blends that tend to burn fast and strong.

The technical term for Burley is "air cured". This air curing is done in large open barns, by the natural air flow, for one or two months. The color is ranging from light brown to mahogany.

Pure Burley blends are mainly produced by U.S. and Danish companies. Blends like Blue Edgeworth, Old English and Half-and-Half are classic examples. The latter being slightly flavoured. Burley is also the main ingredient in most of the Danish McBaren blends.

**Spice tobacco:** Spice tobacco is actually not one type of tobacco, but rather a broad variety of more special types, used in small amounts to create an interesting blend. These would include Oriental, Latakia, Perique and Kentucky among others. Most of them are frequently used in English blends.

**Oriental:** A variety of tobaccos, grown in Turkey, the Balkans, and Russia. The best known types are Izmir, Samsun, Yedidje, Cavella and Bursa. A common characteristic is a dusty, dry and sometimes slightly sourish aroma. Some of them are also used in "exotic" cigarettes from Egypt and other Arab countries.

**Latakia:** Latakia is the result of a curing process involving fire curing the leaves over controlled fires of aromatic woods and fragrant herbs. Probably the most well known spice tobacco. Mainly grown in Cyprus and northern Syria. After the leaves are harvested and dried, they are hung in tightly closed barns and smoke-cured. Small smouldering fires of oak and pine fill the barn with smoke, and covering the leaves with smoke particles.

Latakia produces a very rich, heavy taste, with an aroma that has a "smokey" characteristic. Latakia is an indispensable ingredient of traditional English mixtures. The content can vary from a few percent to about 40-50%, or even more. A few smokers like it at 100%. This would tend to be harsh, not because Latakia is a strong tobacco, but because it burns and tends to dry out your mouth and throat.

Both Dunhill and Rattray have a number of blends that contain Latakia. Dunhill 965, Early Morning and London Mixture are from Dunhill, and Red Rapperee and Black Mallory from Rattray. Seven Reserve from Rattray has a moderate content of Latakia, and might be a good introduction to these kind of blends. Bengal Slices is unique - a flake tobacco with a moderate to high content of Latakia. A very lovely blend if you like Latakia.

**Perique:** Perique is a Red Burley type of tobacco, grown and processed in St. James, Louisiana near New Orleans. Perique is a rare, slow curing, strong-tasting tobacco. Production is small, so its value is quite high.

Perique is cured like Burley, but for a shorter time. There after the leaves are put in large oak barrels under heavy pressure, which will squeeze some juice out and make the whole thing ferment. Once in a while the leaves are taken out for a period and then repacked and re-fermented. This process takes at least one full year. Some times even longer.

The aroma of a tobacco treated by this method is full bodied. The nicotine content is overwhelming, thus Perique can not be smoked by itself. Due to its full-bodied nature, Perique is used on a limited basis in blends. About 5 % in a blend is the maximum. It is usually blended with Virginia to give it more body. Escudo is a good representative of a Virginia blend with Perique. Dunhill's Elizabethan Mixture is a very nice example of Virginia mixed with a touch of Perique.

**Kentucky:** This is actually a specially treated Burley tobacco, produced in Kentucky. Unlike Burley, Kentucky is fire-cured. Its aroma is not as heavy as with Latakia, but very aromatic and unique. The nicotine content tends to be rather high, and therefore is used in limited amounts.

**Havana:** Cuban and other cigar tobaccos are used in a limited range of Virginia blends and mixtures.

**Cavendish:** Cavendish is more a method to treat tobacco than a type. English Cavendish uses a dark flue or fire cured Virginia which is steamed and then stored under pressure to permit it to cure and ferment for several days to several weeks. When done well, this tobacco is really fine stuff. Cavendish can be produced out of any tobacco type (mainly Virginia's and Burley's are used).

The original English Cavendish is produced out of Virginia tobacco, which is slightly flavoured and heated by high pressure. This will give you a very dark, black tobacco. A few English Cavendish blends exist on the market - Rattray's Dark Fragrant and Black Virginia plus McConnel's Maduro.

The modern version of Cavendish is generally much more flavoured. The natural taste of tobacco is almost gone. The flavouring is also called "Casting". This is the term used when you add a considerable amount of additives to the tobacco. This is usually done by producing a fluid mixture of sugar, liquorice or any kind of aromas in which the tobacco is soaked. The goal is to produce a sweet and smooth aroma. Modern Cavendish tobacco comes in numerous flavours, cherry, vanilla, rum, chocolate, strawberry, coconut.....and many other flavors.

#### **Tobacco Classifications**

**Air-Cured:** These tobaccos are dried naturally, sheltered from sunlight in large barns. The drying is carried out on the whole plant or as individual leaves. Sugar is the by-product of this three month drying process.

**Dark Tobaccos:** These tobacco plants are very mature and developed at the time of picking. The leaf is subjected to a second fermentation process. These leaves are used to make cigars.

**Fire-Cured:** Akin to Dark, its natural drying is completed by a wood-fired fumigation (oak is used by the traditionalists).

**Sun-Cured:** Almost all of Oriental Tobaccos are cured by this method. Oriental Tobaccos are grown in Greece, Turkey, Bulgaria and adjoining countries.

The following information was found on the internet at Alt.Smokers FAQ. Many thanks to Robert Wagner for maintaining such a useful and informative site.

#### Chemicals in smoke

What chemicals in smoke cause cancer?

Nobody knows. For 30 years scientists spent hundreds of millions of dollars looking for them. They examined 5,000 compounds comprising 95% of smoke by weight. Individually some are carcinogens, some are actually anti-carcinogenic, but none accounts for the effect of active smoking. Total number of compounds is estimated to be 100,000 (some are unstable and exist for microseconds).

The US EPA has declared environmental tobacco smoke (ETS) a human carcinogen. It estimates that passive smoking kills 3,000 Americans per year due to lung cancer. Is this believable? Is second-hand smoke really dangerous?

The EPA report mentions five carcinogens found in smoke -- in a chart, without explanation. Why? So the unsophisticated could draw the false conclusion that this somehow answers the question which science cannot. Since the EPA brought them up, let's look at the alleged danger they pose in ETS:

Formaldehyde, is designated as a potential carcinogen. A cigarette delivers 20-90 micrograms in mainstream smoke and up to 700 micrograms in sidestream smoke. By comparison, space heaters and gas ranges release 20,000 - 40,000 micrograms per hour. Formaldehyde is also used extensively in wood finish, glue, fabric coating, insulation, etc. In mobile homes, concentrations have been measured in excess of 5,000 micrograms per cubic meter. In 'non-sick' buildings, the typical level is 50 micrograms per cubic meter. Concentration in ETS is THE SAME -- 40-50  $\mu\text{g}/\text{m}^3$ . The official "safe" level is 1,500  $\mu\text{g}/\text{m}^3$ .

Benzene and toluene are mentioned as potential ETS carcinogens. In humans they are associated with leukemia. Yet leukemia has not been linked to \*active\* smoking, much less to the highly diluted concentrations found in ETS. Gasoline is the primary source of benzene, toluene and related aromatics in the air. Also copy machines, glue, paint and the like. Typical concentrations in indoor air is 2-20  $\mu\text{g}/\text{m}^3$ . Again, the concentration in ETS is in THE SAME RANGE. When filling your gas tank, you're exposed to concentrations 50-100 times that high. The "safe" level for benzene is 30,000 and for toluene 375,000  $\mu\text{g}/\text{m}^3$  -- over a thousand times that found in ETS.

Benzo[a]pyrene (BaP) is another carcinogenic aromatic mentioned in connection with ETS. Indoor air typically has .1-1 ng/m<sup>3</sup> with no smoking, .3-1.5 ng/m<sup>3</sup> with ETS. Outdoor air in heavy traffic has 1-3 ng/m<sup>3</sup>. But our primary exposure comes not from air but from food and water. Dietary intake is on the order of 1,000-5,000 ng/day; tap water contains 1-10 ng/L. One piece of charcoal-broiled meat delivers about 2,500 ng. Surprisingly, the richest source is green leafy vegetables, which pick it up from the air. There is no recommended "safe" level.

Nicotine, which is unique to tobacco, is not carcinogenic. Some nitrosamines are. Estimated nitrosamine intake from ETS is .1 ug/day. By contrast, intake from food is 10-100 ug/day.

One of the cardinal rules of environmental toxicology is to identify the specific chemical(s) of concern, because biological responses are highly specific. The simple exposure to a given chemical, even if it is an established carcinogen, is by itself usually not associated with development of cancer. Everyone is exposed to potentially toxic or carcinogenic chemicals every day. Risk is not established by exposure alone; it is established thru a dose-response relationship.

Source: Huber et al., "Smoke and Mirrors", Regulation:16:3:44 (1993)

Original source: Guerin, Jenkins & Tomkins (of Oak Ridge National Labs), "The Chemistry of ETS: Composition and Measurement", Chelsea, Michigan; Lewis Publishers (1992)

### Misc. Tobacco Items

#### Why do smokers litter so much?

This is a cultural phenomenon. It was once acceptable to throw butts on the ground under the theory they would degenerate quickly. While debatable in the old days, that notion should have gone out as quickly as filters came in. Unfortunately it didn't. Considerate smokers don't litter. Those who do deserve criticism as much as any other litterer.

How to dispose of a cigarette butt when there is no ashtray

Tear off the burning tip, as close to the end as you can. Drop it on the ground. Do not step on it. Let it continue burning, resulting in ash only. If near a trash can, dispose of the butt after double checking to make sure it's out. Otherwise put the butt between cellophane and cigarette package for later disposal.

**More useful tobacco information taken from the Internet:**

Pipe Smokers' How-To Guide

Copied from the Pipes Digest web site. ( Thanks Steve )

From: Steve Masticola (masticol@cs.rutgers.edu)

Subject: Pipe initialization and maintenance

There's really no big deal to lighting a pipe; it just takes some practice. First, get yourself a quality pipe and some good tobacco. I like Petersons and GBDs; they're usually a good buy. Avoid pipes with lacquer finishes, or with a lot of fills (putty applied to smooth over surface defects). Rough-surfaced pipes are fine, though, and usually cost a little less (and smoke cooler). You should plan on spending \$30-50 for a decent pipe; smoke

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shops are usually willing to bargain on price, and often have sales. Look them over and buy the one you like best; it's largely a matter of personal preference.

Amphora Regular, or a similar mild non-aromatic or light aromatic Burley/Virginia blend, would be a reasonable tobacco for a beginner. Keep the package tightly sealed to keep it fresh. Experiment with tobaccos until you find what you like. It helps to get a tobacco that your wife or girlfriend likes, so get her input. If she doesn't like pipes at all, get a new one of those, too. :-)

Also get a package of cleaners, a bottle of pipe sweetener, a LOT of wooden matches :-), and a pipe tool with tamper, reamer, and scraper. I have a neat little one made by GBD; it looks like a silhouette of a pipe, and has wooden sides. It cost me about \$12. Now, to the matter of lighting. Pack the tobacco a bit at a time, perhaps 1/3 of the bowl. You want to have it slightly springy, neither loose nor tight. It should be easy to draw through. Use the reamer to loosen it if it's too tight.



Light a match and hold it horizontally until the match completely catches fire. Then hold it horizontally over the bowl, puffing and moving the match in a circular motion over the tobacco until it is alight. Avoid burning the edge of the bowl when you light up. After a little while, the tobacco may go out. If so, tamp it down a little and re-light. If there's a lot of ash in the bowl, empty it out without knocking the pipe, then tamp and re-light.

You may find the pipe getting a little juicy as you smoke. To avoid this, try to keep your mouth dry as you smoke, and avoid swallowing. If it does get juicy, run a cleaner down it to clear it out. However, don't take the stem off the pipe while it's still hot, as this will eventually cause the stem to get loose. (You can, however, take a military-type push stem off a hot pipe; many Petersons and Savinellis have this feature.)

Try to puff rhythmically. If the pipe gets too hot, or if your tongue gets "bitten", slow down, or lay the pipe down and let it cool awhile if necessary. If the pipe goes out a lot, speed up. Before too long you'll find a good rhythm.

Try to smoke your pipe all the way down, as long as it's pleasant. This helps build up an even layer of "cake" (carbon) inside the bowl. When you're done, clean all the dottle (ashes and unburned tobacco) out of the bowl with the reamer. Avoid banging your pipe on the ashtray, as this can make dents in the pipe. Put a cleaner in the (cool) pipe until the next time you smoke it, to absorb any leftover juice and help keep it clean.

"Break-in" refers to the initial carbonization of the bowl. Many pipes now come with pre-carbonized bowls and require no break-in. I'd recommend such a pipe for a beginner. However, it's desirable to maintain a 1-2 millimeter layer of cake for a cool, even smoke.

If your pipe smokes sour or gurgles, if there's a lot of goo inside the stem, or if the cake is very thick, it's time for a cleaning. This usually will have to be done every 5-10 smokes. First, use the knife blade of the pipe tool to scrape the cake to the proper thickness. Then use the reamer to get any heavy goo out of the wood part of the air hole of the stummel (the wood part of the pipe). Dip a cleaner in the pipe sweetner, and run it through the stem; repeat with fresh cleaners until they come out clean. Repeat with the stummel air hole; be careful not to get any cleaner on the outside of the pipe, as this harms the finish. After cleaning, let the pipe rest a few hours before smoking it again, to give the sweetner a chance to dry out.

If you like smoking a pipe, why not get another? Or several? Most pipe smokers have some kind of a collection, since we like variety, and because pipes smoke better if they're given time to rest between smokes. I have about 25, but I've been building my collection for about 15 years. Make sure you've gotten to know the last pipe before you buy the next one, so you don't wind up with a lot of new, unsmoked pipes. It's OK to make mistakes; hardly anyone likes every pipe they buy.

Lastly, enjoy! Don't smoke if you don't feel like it. It should be a pleasurable pastime. There are a million ways to smoke a pipe, all of them right.

#### THE PIPE DIGEST

If you have a computer connected to the internet, you probably will want to check out the Pipes Digest On-line. The Pipes Digest provides a forum for discussing the moderate use and appreciation of fine tobacco including cigars, pipes, quality cigarettes, pipe making and carving, snuff, collectible tobacciana, publications, and related topics. The list is lighted moderated. It is a very friendly and informal place to discuss tobacco. It is free to join and all new members receive a huge resource list for all types of tobacco related items. To subscribe to this list, send a politely worded request to: [masticol@scr.siemens.com](mailto:masticol@scr.siemens.com).



### **MAIL ORDER CIGARS**

Below is a list of fine cigar dealers and manufacturers who will send you a catalog if you write to them:

ROYAL CIGAR CO. 1776 PEACHTREE ST. NE, ALANTA ,  
GA 30309

CASA BLANCA CIGAR CO. 257 EAST MARKET ST.,  
YORK, PA 17403

KEY WEST CIGAR FACTORY PIRATES ALLEY, KEY  
WEST, FL 33040

MARIBEL CIGARS, INC. 3645 WEST FLAGLER ST.,  
MIAMI, FL 33125

LA PLATA CIGARS 1026 S. GRAND AVE, LOS  
ANGELES, CA 90015

VINCENT AND TAMPA CIGAR CO. PO BOX  
5937, TAMPA, FL 33675

AVANTI CIGAR CO. PO BOX 78, SCRANTON, PA  
18508

M. MARSH & SON 915 MARKET ST., PO BOX 6604,  
WHEELING, WV 26003

TAMPA RICO CIGAR CO. PO BOX 4927, TAMPA, FL  
33677

### **MAIL ORDER PIPES**

CONNOISSEUR PIPE SHOP, LTD, 1285 AVENUE OF THE  
AMERICAS, NEW YORK, NY 10019

DAN PIPE FRICKERT & BEHRENS KG, CURSLACKER  
DEICH 136

21039 HAMBURG, GERMANY

PIPE DAN, 13 VESTERGARDE 145-6, COPENHAGEN K,  
DENMARK

PIPE COLLECTOR'S INTERNATIONAL, 1715 PROMENADE  
CENTER, RICHARDSON, TX 75080

GEORGETOWN TOBACCO AND PIPE STORE, 3144 M. ST.  
NW, WASHINGTON, DC 20007

IWAN RIES & CO., 17 SOUTH WABASH, CHICAGO, IL  
60603

Toll-Free Phone Numbers  
( Thanks to the Smoker's Home Page, World Wide Web )

Cigar, Cigarette & Tobacco Dealers

- 800 328-2577 Alps Distributors & Specialties Inc. (Cerritos CA)
- 800 843-2826 American Tobacco Co. The (Chester VA)
- 800 222-4427 Arango Cigar Co (Skokie IL)
- 800 586-8409 Avanti Cigar (Scranton PA)
- 800 637-7964 Campa Import & Export (Miami FL)
- 800 672-4427 Cigar Club, The (Melrose Park IL)
- 800 426-8924 Cigar Warehouse (Sherman Oaks CA)
- 800 842-0849 Cigarette House The (Kenly NC)
- 800 222-8976 Country Squire (Jackson MS)
- 800 348-1412 Cuban Aliados Cigars Inc (Union City NJ)
- 800 328-4365 Davidoff Of Geneva (Stamford CT)
- 800 606-2071 Eastwold Smoke Shop (Sioux Falls SD)
- 800 851-9020 Edward's Pipe & Tobacco (Richardson TX)
- 800 238-2234 Fomseca Cigars (Miami FL)
- 800 243-9377 Fred Stoker & Sons, Inc (Dresden TN)
- 800 345-1459 Georgetown Tobacco (Washington DC)
- 800 523-1641 Holt's Cigar Company (Philadelphia PA)
- 800 572-4427 J R Tobacco (Fairfield NJ)
- 800 862-2220 Liberson's Gourmet International Tobaccos (Toluca Lake CA)
- 800 225-1838 Magic Herbal Cigarettes Retail & Wholesale
- 800 879-6244 Magic-Nicotine Free Cigarettes (Buffalo NY)
- 800 662-4145 Maison Edwards Tobacconist (Ann Arbor MI)
- 800 831-8893 Mom's Cigar (New York NY)
- 800 432-7473 New Tradition Pipe Co (Pinellas Park FL)
- 800 782-8499 Rubovits Cigars (Chicago IL)
- 800 633-9508 Smokers' World (Miami FL)
- 800 551-8750 Tabacceria (Merritt Island FL)
- 800 367-6653 Taylors Pipe & Tobacco Shop (Ft Smith AR)
- 800 934-2424 Tobacco Barn Pipe Shop (Lake Forest CA)
- 800 451-5656 Tuttle's (Grand Rapids MI)
- 800 221-0638 Wally Frank (San Antonio TX)

**Cigar, Cigarette & Tobacco Dealers - Wholesale & Manufacturers**

- 800 237-7215 Fanco International, Inc. (Tampa FL)
- 800 852-4427 Grave F D & Son (New Haven CT)
- 800 522-4427 House Of OPM Distributors (Huntingdon Valley PA)
- 800 922-4858 Indianhead Sales A Northstar Import Co (Minneapolis MN)
- 800 477-1884 M & N Cigar Manufacturers Inc ( )
- 800 826-7930 Tropical Tobacco (Miami FL)

**MAIL ORDER CIGARETTE TOBACCO**

I recommend supplementing your home grown tobacco with fine natural tobacco from these and similar tobacco dealers. The cigarettes you make from these products will be more flavorful and contain far less additives than cigarettes purchased over the counter.

PETER'S SMOKE SHOP MAIN STREET, SHARON, CT  
06069

JAMES B. RUSSELL INC. 25 PARK WAY, UPPER SADDLE  
RIVER, NJ 07458

CORNELL & DIEHL, INC PO BOX 475, MORGANTON,  
NC 28680-0475

Overseas:

Regal Cigars & Tobacco (UK)

36 Clarence Street, Cheltenham, GL50 3NX. UK

Tel/Fax (0) 1242 570073

Havana House Cigars Ltd.

[www.Havanahouse.co.nz](http://www.Havanahouse.co.nz) •

8 Gordon Street, Rozelle, NSW, 2039, Australia

+61 02 9519 2374

[cigars@havanahouse.co.nz](mailto:cigars@havanahouse.co.nz)

## **PRO SMOKING GROUPS AND ADVOCATES**

I hope that all tobacco lovers will unite and express their dissatisfaction with the over taxation of tobacco products and the prohibitive nature of laws currently being passed that seem to be designed to take away our freedom to enjoy our favorite types of tobacco. A good start would be for everyone who reads this guide to write the organizations below and state their opinion.

American Civil Liberties Union  
123 West 43rd St., New York, NY 10109-1592  
American Smokers' Alliance  
Suite 560, 3401 West End Avenue, Nashville, TN 37203  
Atlantic Smoker's Rights Newsletter  
PO BOX 3512, McLean, VA 22103  
FOREST (Freedom Organization for the Right to Enjoy Smoking Tobacco)  
2 Grosvenor Gardens  
London SW1W 0DH  
ENGLAND  
Smoker's Advocate - National Edition  
A service of Philip Morris U.S.A.  
P.O. Box 96599, Washington D.C. 20078-7552  
Smokers' Caucus  
A service of Philip Morris U.S.A.  
P.O. Box 90738, Washington DC 20077-7551  
Smokers' Freedom Society  
8615 St. Lawrence Blvd., Office 300  
Montreal, Que., H2P 2M9 Canada  
Smokers Unite  
32 North Bartlett St.  
Kingston, Ont., K7L 1X7, Canada  
United Smokers' Association of America  
PO Box 4104, Frankfort, KY 40604-9988

## **THE MICROWAVE EXPERIENCE**

Did you know you can actually sample your tobacco within five minutes of cutting the plant? Simply take a few leaves and place in a microwave oven. Turn on medium setting and turn often. Take out of microwave when leaves stop shrinking and are dry to the touch. Roll into a cigarette and enjoy!. But be warned, the flavor will be so robust ( not burning or stinging like commercial tobacco ) that it will take you by surprise. I recommend this procedure for cigarette tobacco only. The rush of nicotine has a very calming pleasant effect but I do not recommend doing this often as the nicotine contents are quite high.

## **How to blow a Smoke Ring**

First, take a drag and INHALE (unlike the above method). Then you exhale just enough to get the right amount of smoke in your mouth (getting the "right" amount takes some experimentation and practice). Shape your mouth as above into a perfect O that doesn't show any teeth.

The diameter of my circled lips when I do it is about 3/4 of an inch, but YMMV. Now comes the part that really takes practice. Shape your tongue into a downwards "L" so that the back part of it is horizontal and the front half bends downwards at a right angle.

Now SNAP it forwards while maintaining the inverted "L" shape. At the end of its path, your tongue should be touching your lower lip and the inside of both cheeks but not your upper lip or front teeth.

The back (horizontal) part of your tongue will be touching your back teeth. (This may not be true for all mouths, which come in all sizes and shapes.)

You exhale while you are forming the required shapes with your lips and tongue; you stop exhaling just before snapping your tongue forward.

This takes considerable practice, but the result, should you persevere, will be far superior rings. They persist longer, are shaped better and travel much further - four or five feet in still air. In unusually still air, I've had some persist for minutes and end up ten feet across the room, by which time they were a foot in diameter. Plus you have positive directional control, and with still more practice, you can put them exactly where you want them - a sort of air quoits.

### **Rolling your own Cigarettes**

Courtesy, Brian's Home Page

There are several handrollers you can buy out there that will supposedly give you a perfect roll every time. If you like to use these, more power to ya. IMHO, I think they roll too tightly and are too much trouble. Here are some steps you might want to follow to get a decent roll.

#### Step #1: Get the tobacco

First you have to get some tobacco. Make sure you have papers to roll with - not all brands come with them. I suggest some papers that have gum (sticky stuff) on them, Zig Zag whites are what I use if I do not have any Drum papers laying around (everyone seems to like a different brand).

#### Step #2

Take out about a gram of tobacco - about a quarter size pinch of tobacco - and spread it out evenly lengthwise down the paper. Most people use too much when they are first starting, it is actually best to use too little. Now start to pack the tobacco down by pinching the strip of tobacco with you thumb and index finger to form a cylinder. This allows you to be a little sloppy on the rolling technique by tightening it down a little first.

#### Step #3

Now here is where you actually roll it. You do this by grasping the underside of the paper between your thumbs and index fingers. Have your fingers towards the edge of the paper using the tips of your thumb to control the middle. Now roll the

cylinder of tobacco until is fairly packed down. Some people like to place the paper and tobacco on a dollar bill and use the outside of the dollar bill to roll with. This is probably a good idea if you are having problems packing down the tobacco.

#### Step #4: The Tricky Part

With the tobacco cylinder on the lower edge of the paper opposite the gum, try to roll the paper up so that you have a cigarette. This step is really hard to do explain. I guess you understand if you reached this point what you need to do, so go ahead and figure out a way to do it. I suggest rolling the lower edge corners in first. Once it is rolled up to the gum line, lick the gum and finish rolling. If the papers you have do not have gum, just lick and stick. Sometimes it helps to rip the edge of these kind of papers before you start so that the frayed edge will stick better.

#### Step #5: The Best One

Light it! Be sure there is no tobacco hanging out the end you have in your mouth - otherwise you will end up chewing the rolling tobacco - something not meant to be done. Now.....

Enjoy it, you earned it.

### TOBACCO TRIVIA

When making your own natural pesticide from cured tobacco, you can create tobacco dust by placing dried leaves in a food blender and setting selection on "chop".

Never smoke when handling young tobacco seedlings, although the plant produces plenty of nicotine when mature, for some reason, young seedlings are very sensitive to it. Also, never plant tobacco next to or close to other members of it's family, namely, tomatoes and potatoes.

Part of an E-mail message from a Pro-smoker Bulletin Board:  
(Author unknown)

Anti-smokers, brought up in schools where the teachers showed them phony pictures of "healthy lungs" and "diseased smoker's lungs" tend to think that there have been thousands and thousands of "studies", linking smoking to every disease from emphysema to heart attacks to lung cancer. When I began researching the subject, however, I found that, like the myth about smoker's lungs turning brown from cigarette tars, the "thousands and thousands of studies" was also a myth.

Now, there were thousands of animal studies (if you consider each animal studied to be "study"), in which researchers tried to induce lung cancer and other diseases in rats, rabbits, mice, monkeys, dogs, etc., by forcing the animals to smoke. But these studies all failed; no diseases were induced. So, I don't have to discredit those studies.

In the late 1950's, the lung cancer societies in England and the US conducted seven epidemiological studies, described in great detail in my book, which purported to establish a statistical correlation between cigarette smoking and lung cancer. Strangely, however, the same studies showed no such correlation between cigar/pipe smoking and either lung cancer or morbidity. In fact, the studies actually showed that pipe smokers live longer than people who don't smoke at all.

Correlation, of course, does not prove causation. In my book, I discuss the biases in the studies which resulted in flawed conclusions. My point here, however, is simply that virtually everything written about the dangers of smoking is predicated on these seven ancient studies. There have been a few new studies, e.g., Wynder's study of smoking in the US and Japan, but I don't have to discredit them, because they prove my point, i.e., that Japanese smoke more than Americans but live longer and have far less lung cancer!!!

## FAST FACTS

How many additives are added to commercially made cigarettes? Consider this, it takes one pound of tobacco to make four hundred all tobacco cigarettes. The cigarette industry uses only one and three quarters of a pound to make a thousand! Kinda makes you wonder what you've been smoking doesn't it?

The nicotine content of tobacco can range from 2 to 10 percent. *Nicotinia rustica* has the highest nicotine content and should be raised if you are considering making your own nicotine based pesticides. The fermentation process that most cigar tobaccos go through removes up to half of the nicotine from the tobacco.

China is the largest producer of tobacco in the world with nearly one fourth of the world's production. However, China exports very little as it is mostly consumed by it's people.

Although used by the Indians for generations before the white man arrived, the Colonists in Virginia were the first to cultivate it as a crop. Records indicate that it was raised as early as 1612.

It seems that smoking has always been considered a health hazard. King James I condemned it in 1604.

The cigar was introduced into Spain in the early 1600s where it was a symbol of wealth.

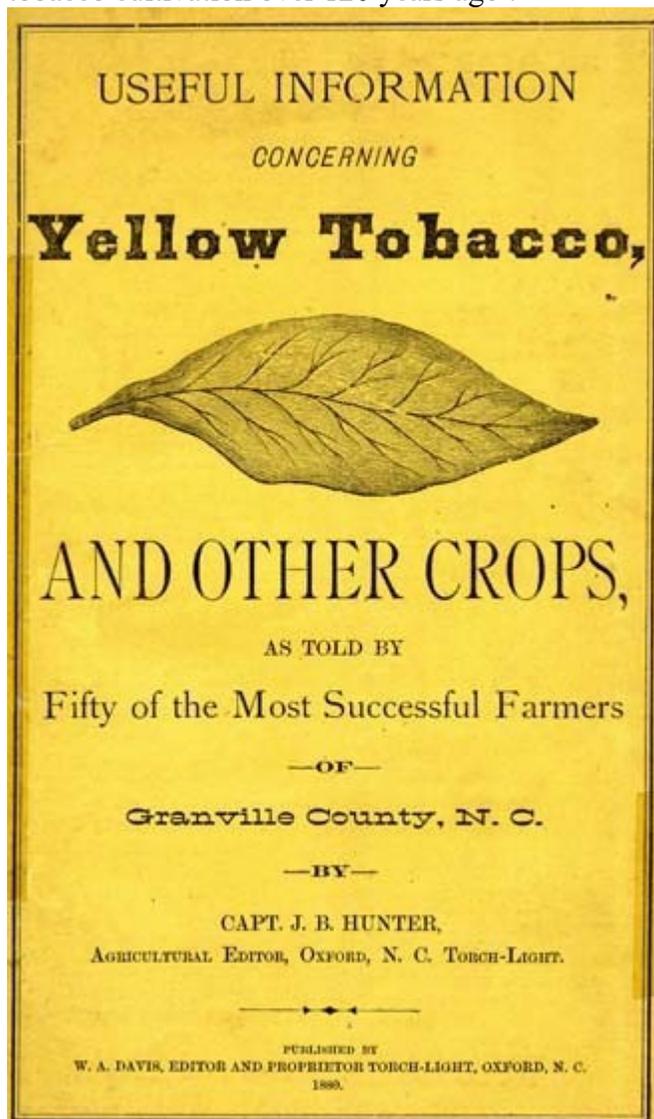
The average number of cigarettes sold during the 1980s? Try this number, over three and one half trillion!

James Bonsack patented his first tobacco machine in 1880. Before his machine, all cigarette rolling was done by hand. Bonsack's machine could produce 120,000 cigarettes a day. This was equivalent to forty expert rollers working twelve and a half hours each!

It has been suggested that the first cigarettes were made in Seville, Spain by beggars. The beggars picked up discarded cigar butts, shredded the tobacco and wrapped it in paper. Late in the 18th century, French and British troops became familiar with them during the Napoleonic wars, the French gave them the name cigarettes.

**Tobacco Info from days gone by.**

The following is an excerpt from a book on tobacco growing, published in 1880, we found it interesting to take a look at tobacco cultivation over 120 years ago :



## Instructions as to the Cultivation and Curing of Fine Yellow Tobacco.

To raise fine Yellow Tobacco, first, grow your plants! Burn and sow during the first dry season after Christmas, the Yellow Oronoko. Select a Southern exposure, a warm situation, for early plants. Use any standard Tobacco fertilizer, when sowing the seed, 100 to 150 lbs. to the 500 square yards, according to the fertility of the land. Hog-pen or hen-house manure is the next best for plant beds. Stable manure should not be used as it breeds flies. Make frequent applications of either, hen-house manure or other fertilizer of known value--only, when the plants are not wet with rain or dew. Grey soils, with dry, porous subsoil, the fresher the better, are best suited to the growth and maturity of yellow tobacco.

From 100 to 300 lbs. of fertilizer may be profitably used to the acre. Apply in the drill, except on new-ground, where it is best to broadcast. Plant in hills, as soon after the 1st of May as plants and seasons will admit. Commence cultivation as soon after the first rain as the plants have taken root. This gives them a start; but this working should be light--only with the hoe. Continue to stir the land with the plow and sweep, until the tobacco begins to come in top. If the sweep is used, there is but little need for hoe work.

Topping must be done according to the appearance and promise of each plant, strength of soil and time the work is done. First topping for medium tobacco, should be from ten to fourteen leaves, priming off lower leaves, just high enough, so that when the plant ripens, the lower leaves may be well off the ground. As the season advances, top lower and lower, as to advance the late plants, that they may be cut before frost. Never cut before fully ripe, and enough fully and uniformly ripe to fill a barn. Cut the tobacco of uniform size, color and quality, putting eight plants to a stick. Get the plants to the barn as soon after they are cut, and with as much care as possible. Place the sticks about eight inches apart on the tier poles.

The first step in curing, is called the steaming or yellowing process. Medium tobacco will require about 36 hours steaming, at about 90 degrees Fahr., but tobacco with more or less sap, larger or smaller, may require longer or shorter time to yellow. Here judgment must be exercised.

The next step in curing yellow tobacco, is called fixing the color. When the tobacco is sufficiently yellowed at ninety degrees, the best leaves of a uniform yellow, and the greener ones of a light pea-green color, the heat should be advanced gradually. Keep the heat from ninety to ninety-five degrees about one hour, then run up from ninety-five degrees, to one hundred degrees, keeping the heat between these figures for about two hours. Should the tobacco get into a sweat at this or any future stage, raise the fires a little and open the door. This creates a current of heated air that will soon dry out the leaf. The thermometer may fall even ten degrees here without injury to the color. If possible, keep the tobacco from sweating. Next, advance the heat running from 100 to 105 degrees for about two hours. When at 105 degrees, you have arrived at the most critical point. The condition and appearance of the tobacco must be the guide.

Too little heat in fixing color operates to stain the face side of the leaf of a dull Spanish-brown color, and is called sponging, and may be known to the novice by its effects being visible only on the face side; too much heat reddens the leaf, first in spots, visible on the edge of the leaf, redder than the former, and visible on both sides of the leaf. Now to prevent sponging on the one hand, and spotting on the other, is the aim of the experienced curer. Therefore no definite time can be laid down to run from one hundred and five to one hundred and ten degrees. Sometimes one hour is sufficient, sometimes three is fast enough. The same may be said in running from one hundred and ten degrees to one hundred and twenty degrees. While it is usual to advance in this stage about five degrees every two hours for medium tobacco, the condition of the tobacco often indicates to the practiced eye

the necessity for slower or faster movements. Remember not to advance over one hundred and ten degrees, till the tails begin to curl up slightly at the ends.

The curing process begins at 120 degrees, here the heat should remain till the leaf is cured, which be in from 4 to 8 hours. When the leaf appears cured, advance five degrees every hour up to one hundred and eighty degrees, and here remain until stem and stalk are cured.

To bring the tobacco in order, that it may be taken to the packing house, cover the flues with brush or wet straw, and keep it constantly saturated with water. Raise the heat to about ninety degrees. This causes the steam to rise and softens the tobacco enough to handle. Bulk down in a dry dark house; when it will be protected, both from dampness and light. If allowed to get in too high order, it will lose its yellow color, and all the work will be lost.

When ready to ship, it should be assorted well, the several grades put together, making about three grades of leaf and two of lugs. Tie in neat bundles five or six leaves of "leaf " and eight to ten of "lugs." Place twenty-five bundles on the stick, and strike down as soon as stripped, unless in too high order. But it is not safe to permit tobacco thus struck down in winter order to remain down longer than 1st of June. Watch it closely to preserve from injury. It is better to market in winter order than to hang up in the barn to dry out and be "re-ordered;" for tobacco once bulked down, and then hung up in the barn again, loses that sweet, mellow flavor, so desirable, and never regains it.

## **FAQ, Opinions and Musings from the SBE Tobacco-Chat Board**

I have maintained an on-line bulletin board for home tobacco growers since 1999. Below are some of the more interesting questions, answers, comments and recipes that I have read. ( go to [www.seedman.com/Tobacco.html](http://www.seedman.com/Tobacco.html) for a link to our current board )

Please note that the answers, opinions and recipes shown here are from visitors to our board, and do not necessarily reflect my opinion or input on the subject.

Notice that we sometimes leave improper spelling and grammar, as it often reflects the viewpoint of the visitor.

**Question:** What is the best pH for tobacco plant I live east of Austin TX and we generally have rather alkaline soil do I need to make it more acid? if so any suggestions? Chris

**Answer:** Hi Chris, Best levels for the PH is between 6.0 and 7.0.If your soil is higher (alkaline) then you need to add some Sulfur at the rate of 10.lbs per 100 sq. feet, this will make a difference of 1 point If the PH is lower (acid) then you will need to raise the PH you should add lime at the same rate. You can send your soil(take samples from various locations and depths) away to be tested and you will receive a full report back telling you of the chemical structure and you will get advice on what to add to get really good soil. Enquire at your local gardening emporium for testing.

**Question:** Is Tree Tobacco Perennial?

**Answer:** Tree tobacco will survive from year to year provided the weather has not been very cold, mine have survived two English winters. Trace nicotine is contained in the leaves and they are said to have medicinal qualities. I am not aware of any real use being made for actual smoking as the leaves are very small, but the flowers are a nice deep yellow trumpet shape. Alan

**Question from Rodney:** Does anybody know what the procedure for growing, curing and fermenting maduro wrapper? What seed to use, where to grow it and whether or not to use a fermenting solution. I cannot seem to get a strait answer or maybe it is a little known subject.

**Answer from Shep:** Maduro (dark red or blackish) wrappers are grown in full sunlight, left on the plant longer, and allowed to ferment longer.

Covering the plants with cheese cloth or otherwise growing in the shade will produce a thinner, lighter wrapper.

The (maduro) leaf will be a bit thicker or rougher than shade grown as well as a little sweeter due to the added sugars and oils produced as protection from the sun. The booklets mentioned elsewhere in this board should give you assistance with the basic procedures of growing, curing, and fermenting.

I'm not familiar with the fermenting solution you are referring to, what is the solution? My guess is that as long as you allowed the sun grown leaf to ferment longer it will get darker.

**Question from Tom:** i need to know how to make chewing tobacco, also what is the best tobacco to grow for chew? where to get the plants or seeds for chew...

**Answer from Alan:** The best tobacco to use is BURLEY if you want a heavily sweetened chew or you can use VIRGINIAN TYPE if you want a less sweet chew. The difference in the two tobacco's is that the BURLEY has better absorption qualities thus allowing it to absorb more of the sweetened sauces.

**Question from Chris:** I've already pruned the flower buds and lower leaves on my first crop my question is this after i dry the can i use this as tobacco dust to kill the pill bugs tat are eating my new plants tat i just transplanted?

**Answer from Jim:** Try 1 teaspoon tobacco dust, 1 teaspoon black pepper, 1/2 teaspoon liquid soap to 1 gallon of water

**Question from Laurie:** Hello. I haven't started growing my own tobacco yet but I did buy some loose tobacco and filter tubes to see what it was like to stuff my own first.

So far I do not like how my cigarettes are coming out. I bought the Escort single cigarette stuffer. It works by filling tobacco in the tray, closing the lid, holding an empty filter tube to the end and sliding it across to fill it.

I find that (1) It's very difficult to get the tube full in the space right next to the filter and (2) Too much tobacco falls out afterward- when I put the cigarettes into a case I end up with a cigarette so loosely packed that it practically falls apart upon use. What am I doing wrong? Any tips appreciated. Laurie

**Answer from Walter:** You can make fine cigarettes using something like the escort deluxe which is the small filling machine. Use dry tobacco and one of two methods. Either fill the space with loose tobacco and use the machine to press it down. Be sure to get the ends filled by a bit of finger packing before you close the lid. Or you can use the packer and press the tobacco down into the groove firmly and you will get a good fill. Takes me about 10 minutes to roll about 2 packs. One of the 40 gm packages of Drum or one of the others will make 2 packs and be dry when you start. After you get better you can use damper tobacco but the papers must be dry. If they have absorbed moisture from the air you will get wrinkles on the end held by the clamp on the machine. If you use a curly shag cut instead of the finer cut you will have less problem with both filling and falling out. Walt

**Follow Up by Bryan:** Laurie there are 2 factors which i have found in making good quality smokes

1, a good machine the cheaper models just don't work that well, I like the Supermatic it cost about \$75 with shipping (I have tried 6 different machines)

2, practice is also important, i was not able to role a good quality/looking smoke until after about 300 tries, now there just like the ones you buy at the store and people have a hard time believing me that i roll my own, that is until I look for one that came out bad and it does happen once in a while.

**TIPS:** Once in a while my Tobacco gets to moist and i find it very hard to push it into the tube, it is sometimes shipped this way or to much moisture in the air. I will place the Tobacco on a tray and place it in the oven AT VERY LOW HEAT do not walk away from your oven check it every 5 minutes or your oven will smoke it for you. Drying can take up to 30 minutes I normally over dry it, then roll my smokes place them in an empty tubes box with the filter end down. I then go into the bathroom turn the shower on, hot water only and weight till the room is full of steam, then turn off the water and let the smokes sit in the room for a little while you have to decide how long to let them soak up the moisture, don't make it so hot you can take a shower and when your dressed there most likely ready. I always spend about 4 hours rolling my smokes 15 packs to last the hole week, the more you roll your own, the faster it's gets. Aloha,  
Bryan

**Follow Up by Alan:** Problems will arise when you first start, it is trial and error. A few tips. Make sure the tobacco is not too moist as that will jam your machine and give you sore fingers. When you fill your m/c make sure the tobacco is filling the ends first. Stand your cigarettes up on the tip end and place in a place where the tobacco can absorb some moisture, this will help to swell the tobacco and make the cigarette tighter. you would be better making your cigarettes a day in advance to allow for this process.

**Question from Maurice:** Can anyone help me - What is the best way to shred leaves for cigarette rolling, are there any machines available.

Also what kind of yield (oz.) can I expect from an average plant.

**Answer from Alan:** you can expect a minimum of 2ozs from 1 plant so base calculations on that. The best machine for shredding is the Cuthof Tobacco Machine from seedman.com.

**Question from Norman:** I've purchased Mr. Daly's booklet and video and tried to follow instructions but I can't get my tobacco to thrive. I started with around 60 seedlings in March and had 7 to survive. The 7 that survived are now set out in the garden, but they're not growing. I started a second bunch of seedlings (40) and about 25 of these are living in my seedling flat. The stalks look bad and the leaves are dying. I've tried adding ashes out of the fireplace, ammonium nitrate, miracle grow, and horse sh\*t. (not all at the same time or all on the same plants) They just won't grow. I grow a garden with no problems, my wife is the manager of a garden center, I live in South Alabama so sunshine and/or heat/humidity shouldn't be a problem. I'm about ready to give up, but I'm thinking there must be something the plants need that they're not getting. Any help would be appreciated.

**Answer from Walt:** I start the seeds in a flat in the basement. Use a couple of 4 ft grow bulbs about 3 feet above the flats. Spray with water every day or two. No need to soak them at this time. After a couple of weeks, the little plants start. When they get to be about 1 inch high I set them outside. I put a couple of 4 x 4s down and place the flats between them and staple a plastic over the flats to the 4 x 4 timbers. lift one side and spray them every couple of days. When they get to be about 2 inches I have to replant them in trays so my 3 or 4 flats become many flats, depending on how much time and garden I am planning. I end up with about 30 to 40 plants per tray or maybe only 12, depending on the tray . I use a fork to split the plants apart and a stick for holes to drop them into. press them down and water well. After a couple of weeks I may have to lay another couple of 4 x 4 timbers down first to get a bit of additional height. Around May 15 th or so I set the plants, now about 4 inches into the field.. Press down well about 2 ft apart in rows about 3 ft apart. Water well. From that point on, I use miracle grow and water by hand about a gallon per plant every 3 or 4 days. I use one of those miracle grow gadgets in the hose line with additional hose attached to the gadget and a sprinkler head on that hose. In a week or so the plants are really taking off and you are battling weeds. If you live in a windy zone, you might wish to put a wire

down the row and attach the plants to the wire after they get up a couple of feet. I once lost half my crop to getting the plants blown over. When they do blow over, just wait a bit and the downed plant will shoot up a new whole series of shoots. trim them back to one or two and you will still be able to harvest a lot of tobacco from them although the leaves may not be as large as from an untoppled plant. Walt

**Follow Up by Errol:** Hey Norman, I live in south Louisiana and this is my first season growing. I was having what I thought was the same problem. It took 6 to 8 weeks for my plants to reach 4-5 inches at which time I put them in the garden. It was a bit slow there also at first. When they reached 6-8 inches the took off like a bat out of hell. Give them plenty of water in this dry, hot weather we are having and you will succeed. Good luck!

**Follow Up by Shep:** Patience, a watched pot never boils. Your tobacco does indeed take a darned long time to grow. Then all the sudden it will shoot up. I had the same thing last season, tended it daily and it wouldn't budge. Then I left it alone and I've been smoking the finished product since.

This year I got hit with some tobacco eating bugs which wiped out all but about 4 plants so will have to replant.

Believe me, it will grow. If it grows here in Washington State it will grow for you. Shep

**Question from Karrie:** Hi everyone, It's the newbie from Southeast Texas again. This story is getting sadder by the day. My seedlings which started out so wonderfully are dying. I strongly believe that they need more water but how much does a tobacco plant typically need? (Burley and Indian right now.) I had been watering 2 gallons morning and evening for every three plants. They are still turning yellow and the edges of the leaves are turning brown as if someone burned them with a flame. I've increased my watering to four gallons per every three plants twice a day and the soil is soaking this up in a matter of seconds - hardly any puddling at all. I know part of it is the drought here - typically this time of year we get nice thundershowers every

afternoon. It did rain a tiny bit yesterday but other than that, we haven't had a drop in weeks. My lawn is dying - but I could care less! hehehehe I just want to make sure these tobacco plants survive.

On the other hand, I don't want to over water either. Any advice is really appreciated!

**Answer from Shep:** You may be overwatering. Proper root growth and conditioning of plant roots requires that you let them dry a bit between watering. Even your lawn will benefit from a heavy watering followed by a day or three without water. I understand the drought but are you trying to compensate for the heat by using water to cool the plants? The best remedy for heat is shade, not water. Try shading with an old tire or ask the local garden place what they recommend for tomatoes in this type of situation as they grow very similar. Also, water in the evening after the sun sets so it won't dry up so fast. Use the miracle grow but on a bi-weekly basis at the most and allow nature to do her job (give your plants some space). Shep

**A later Follow Up by Karrie:** I'm getting a handle on this draught thing (and Mother Nature decided to help me out a bit...but her help has been rather harsh).

My Indian and Burley tobacco are growing like crazy. My Indian is about as tall as my thigh (and I'm 5'10") and my Burley, while not as tall has leaves the size of my TWO outstretched hands. Unfortunately, the leaf chewers are having a field day, but I think I'm doing ok. My Indian is budding nicely and its getting to the point where I'm going to pinch those off.

I'm having to water more often than I expected...I'm at the point where I let the plants tell me. When it gets too bad, they literally wither before my eyes. Mother Nature has also decided to help out by sending some nice thundershowers lately. Even if we don't get rain, but only heavy lightning, the plants perk up. I'm sure there's a whole treatise on what lightning can do for plants. Anyway, the problem has been that Mother Nature has decided to make up for this draught in fits and starts. The rain falls in torrents for an hour, then nothing. The next day, it does it again. My poor Indian plants were getting pummeled into the ground.

The Burley, with its shorter thicker stock, is doing much better. I ended up staking my Indian plants and they started to bud right after that...so I believe they are happy now. I'm trying to keep a handle on the leaf chewers with sevin dust but that is difficult when it does decide to rain. We are still not getting the water we should, but it is getting better.

I just wanted to share with everyone, in case someone was going through this draught problem like I am. We have a very long growing season in Southeast Texas - but also have the bugs that grow with it! Cheers, Karrie

**Question from Clayton:** I am considering cultivation of tobacco on approximately three acres of land which I own. I am told by a friend that it is "illegal" to grow tobacco without a permit from the federal government and that these permits are no longer being issued. Can anyone comment on this? Any information would be most appreciated. By the way, y'all have a really nice bulletin board. I have enjoyed reading your comments. I had no idea there were so many people out there interested in cultivating tobacco.

**Answer from Alan:** Hi Clayton, You are only allowed to grow 1/10th of an acre for your own personal use. The permit situation is for commercial growers putting tobacco into the system and there are plenty of them as it is and many of them have had to cut back on production. Some are even growing less than 3 acres. If you are a farmer and wish to grow tobacco for cattle feed then you will need to contact the appropriate government department.

**Follow Up by Errol:** I am in south Louisiana and began with a little tobacco this year. I called the BATF and was told that it is perfectly legal to plant tobacco in the US. They did tell me not to distill my own whiskey though. :)

**Follow Up by Shep:** Too bad about the whiskey :-)

I understand that you can grow up to 1/10 of an acre for your own use and do it legally without any permits. Shep

**Question from Harold:** Hi, I purchased my seeds (SBE). I have a variety of plants from 6" to 5'. The most mature plants are either now or about to flower.

My questions are: 1) How do I harvest the seeds properly? 2) How many plants of each variety do I allow to go to seed? 3) is it absolutely necessary, for the sake of quality, to prune the buds off?

**Answer from Alan:** Hi Harold, If you have more than one variety of tobacco growing and have not covered over the flowers prior to them opening then you will not have pure seeds as they will have cross pollinated and your seeds will be worthless as far as purity of strain is concerned. It is best to debud all but one of the varieties as soon as the buds appear then save the seeds from that one variety. One good tobacco plant will provide enough seeds to plant 100 acres. There are over 400,000 seeds to the ounce. The seeds will store for quite a few years, so you can slowly keep building up your stocks.

**Question from Errol:** Hi, Exactly when are leaves ready to be harvested? Do they need to turn yellow before harvest or can they be harvested green? I'm a first timer. Please excuse the ignorance. Any help is greatly appreciated.

**Answer from David:** HI Errol, the leaves will be a bit sticky when they are ripe and will also have a marbled look about them. They do not all ripen at the same time so harvest 2 or 3 leaves from the bottom of each plant, leave them laying for a couple of hours so that they go limp and then hang them, wait about a week and do the next 2 or 3 leaves.

**Question from Crystal:** I live in the Mat-Su valley 50 miles north of Anchorage. My neighborhood is in a hollow where the temps are several degrees lower than surrounding areas. Example - today, July 7th is a bright sunny 54 degrees! I grew some wonderful burley in my greenhouse last year and hung it in a large wood shed. Unfortunately, winter set in too early and I lost

it to freezing before it was completely cured. I'm wondering about the use of a dehydrator to speed up the drying process. Thanks!

**Follow-up by Gary:** Hi Crystal, I tried growing an assortment of tobacco seeds here in Juneau last year, but didn't have much luck.

I sent the remaining seed to a friend in Fairbanks earlier this season and the plants have done quite well despite a rather cool summer. The plants are roughly 50 plus inches and the leaves are approximately 18-19 inches long and 12 inches wide.

**Follow Up by Shep:** Funny, you are only a few inches north of me according to my map and here in Eastern Washington we are in shorts and T-shirts :-)

I would think that as long as you allowed the leaves to dry without breaking apart you would be fine with the dehydrator. You would probably want to store them dry then try fermenting them indoors or wait until a warmer season so nothing freezes. Freezing tobacco wouldn't be a problem unless it is still wet. Shep in the sunny lower 48

**Question from Mel:** Help my plants (grown from seeds bought at sbe )turned yellow and died.why? too much light too little?

**Follow Up by Karrie:** My Burley has been doing the same thing in Southeast Texas. But I don't think its truly disease. As the leaves brown, I break them off, and the plant literally shoots up, starting new, gorgeous leaves. (This might be totally wrong but I drop the leaves at the base of the plant and it seems the chewers go after them before attacking the plant itself - I still get holes but overall its much improved.) Right now, the Burley is over my knee with leaves larger than my outstretched hand for the most part. But they show no signs of budding. My Indian tobacco is flowering all over the place, I can hardly keep up with it. I had to stake the Indian plants because they are up to my hip now. Unfortunately, the leaves are still small. Again, they turn brown and die, just like the burley, but as I pinch them off, I get more really nice leaves.

The drought is still bad here and I'm having to keep a very constant watering program going, as well as working hard to keep out weeds - the weeds do so much better than the tobacco! hehehe I'm wondering if this Burley is ever going to bud but I'm still waiting, we have a very long growing season here...now, if only we could get some more rain!

**Follow Up by Frank:** I believe you are right. I've increased my watering and now have some plants taller than 6 1/2 feet. Perhaps it is normal for the lower leaves to yellow out and die. Thanks for posting your observations - I feel a little better about it now.

**Question from Sean:** I just got in from the "plantation" and I have a bunch of questions. I have read all the postings on this board but I am not sure on some things. I live in Michigan and planted my seedlings outside on June 1st. Now the average size is about 5.5 feet tall. All have been topped except for two which will be used for seed. I have had insect problems with the aphids and a touch of tobacco mosaic virus. My indian tobacco went to bud about three weeks ago and now the leaves seem to be sticky. Are they ready to harvest? How sticky do the leaves need to be when they are ready? The stems are "super sticky". Should I wait until the leaves are that sticky?

The rest of my plants (150) are various burley and their leaves are slightly sticky. I would like to cut and hang the entire plant. DO I wait 4 to 6 weeks from now (from being topped)? Also from just walking through the garden and topping/suckering my arms and legs were very sticky from brushing against the plants. I planted them in rows three feet apart but now all leaves touch the others from different rows. These plants are a lot bigger than I expected.

As for the seed pods, do i wait until they dry on the plant or are they ready when the flower drops off?

Is there any danger to letting the plants grow for too long before harvest? And finally, do Japanese beetles damage the plant. I noticed quite a few of them on the plants but I did not see any visible damage. Any advice you can give me will be appreciated.



**Answer from Frank:** From my "encyclopedia" - Tobacco, Production, Chemistry and Technology : Light Air cured tobacco (burley and Maryland):

"Maturity and ripeness are terms used frequently to describe the appropriate time to cut tobacco. However, both terms are somewhat ambiguous and often mean different things to different people. Since light air-cured tobacco must depend on natural curing conditions, selection of the right time to harvest tobacco can influence the cure. Although time after topping is the most common criterion used to judge harvest, many factors influence true maturity or ripeness of a crop. Time after transplanting is not a good criterion due to seasonal variation. ....

Plant characteristics such as color, stalk hardness and leaf firmness do signal maturity but are not clearly defined. A plant's normal green color degrades to a lighter color as physiological maturity occurs. This may be subtle or different depending on various influence. For example, varieties like the burley variety TN 86, or MD 609 grow with a light green color initially. Stems and stalks of burley tobacco do turn a noticeable light cream to white color at maturity, making assessment of maturity easier in burley than Maryland tobacco. Stalk hardening begins as floral initiation occurs and may not be a good indicator of the best time to harvest. Delaying topping till full bloom allows the stalk to harden before topping. This would eliminate stalk hardness as a useful tool for determining maturity under these circumstances. A tobacco leaf that breaks easily when bent signifies maturity and is a relatively easy and nondestructive test. Leaf firmness is easy to evaluate but may also vary due to moisture stress or time of day."

According to this book, Japanese beetles are not listed as a pest of tobacco. Aphids are and carry at least two diseases. However, apparently it is impossible to prevent these diseases by killing the aphids because they are so numerous and the viruses infect the plant minutes after the aphid latches onto the plant. The aphids do secrete a sticky substance called honeydew that can drop onto leaves. This honeydew is not supposed to be a problem but it

allows the growth of a black fungus which can deteriorate the quality of the tobacco it grows on. I personally have aphids and I spray with liquid Seven to try and keep the population down. The planting of tobacco at two foot intervals in rows 3 feet apart is derived from studies of differing plant spacing. Apparently, this spacing yields the best pounds per hectare (I don't know why the scientists don't use acres). My guess is that this spacing results in more dying lower leaves from overcrowding but allows more plants to be planted in a given area. Perhaps the lowest leaves are not the best for smoking so having more plants with healthy upper leaves is better than fewer plants with poorer quality lower leaves.

I've included my bookmarks for NC and Georgia Extension sites regarding tobacco. Also, Brown and Williamson has a great website. Go to their home page, let it load and click on the farmhouse. They have a few movies showing the harvesting of tobacco and you can check out the color of the plants. Further, the website below that has the tobacco farm has pictures of the crop at harvest time. Although they grow dark burley, you can definitely see the yellowing of the leaves at harvest.

<http://www.users.kih.net/~pfranke/burley.html>

<http://www.ces.ncsu.edu/resources/crops/tobacco/burley.shtml>

<http://www.griffin.peachnet.edu/caes/tobacco/handbook/contents.html>

This is my first year at growing tobacco so all that I've posted here is from my books, websites listed above and my experience gleaned so far from growing my own tobacco.

Hope this helps. Frank

**Question from Mike:** This is my first crop. though I got a late start every thing is working out ok, buttttttttt as the subject states, the worms are eating me alive. I go out every day and hand pick the little buggers off. Every day I find 50+. Is there anything natural that I can use? I could sure use a quick answer.

**Answer from Norman:** Sevin dust does a good job of killing the worms and/or dipel dust. Both are safe for use on vegetables

although I don't think I would use either within a couple of weeks of harvest. You can also buy some tobacco dust. I haven't used the tobacco dust, but I understand that it works.

**Question from Greg:** Help! I've got tons of spidermites. I dusted with sevin and sprayed with diazinon. They just keep on multiplying. What should I do!

**Answer from Kerri:** Go to bugstore.com and order some predatory mites. They'll get rid of the spider mites and then die off.

Lady bugs are good, but they can't keep up with the reproductive cycle of the spider mites.

**Question from Dave:** I live in the high, dry desert. I've harvested and

dried my leaves and am looking for advice on a simple, home method of curing (no kilns, nothing fancy).

I don't have the humidity of the South to just let the leaves 'hang out' in a barn, so that's not an option.

How about just soaking them in water, squeezing out the excess, packing them into a jar, and letting them sit like that for a few weeks?

**Answer from Sean:** From what I understand, if you want to do a natural aging/fermentation you will have to wait longer than a few weeks. In the tobacco industry, the dry leaves are bought at auction and then dried and then steamed. This is to ensure a constant moisture level of 13% to 15%. Then the leaves are packed under pressure (I am not sure what the exact pressure is) and put in a warehouse for 18 to 36 months. This allows the tobacco to mature.

The only way I know of to speed this process up is by using a kiln or by stacking the leaves in a pile and letting them break down naturally. This will induce its own heat (just like a compost does).

I think you will have mold problems if you just soak them in

water and then squeeze out the excess. If you let the leaves sit in a room that is about 75% to 80% RH for a couple days it should be at the right moisture content for aging.

**Question from Errol:** How are you Mr. Long. I bought the cheaper of the two books you recommended and thought it was very informative. But, before I can spend \$200 on the other, I hope you might let me pick your brain about it for a while. I am growing tobacco for chewing. I have only been through one growing season and I have had reasonable success with it. I guess what I would like to know is whether or not the book goes into any detail about the actual processes used in making a chewing tobacco ready for consumption? Application and products used in flavoring, for example. I would appreciate your time and answers.

**Answer from Frank:** Yes, there is some info regarding chewing tobacco (lumped together with smokeless tobacco in the book).

Here are some relevant comments about chewing tobacco:

"Dark tobaccos owe the dark green color of their leaves to the high chlorophyll content, the level being twice as high as that of burley tobacco measured on an area basis....These tobaccos are generally grown in heavy soils with wide spacing between the plants, a heavy nitrogen fertilization regime being applied. The plants are topped early, 30 to 40 days before maturity, in order to insure growth of large leaves with a gummy texture and a heavy body. Harvesting takes place most commonly with stalk cutting and the tobacco is either fire cured or air cured." "Smoke from hardwood fires e.g. hickory smoke, is used in the fire-curing process. The tobacco, which is hung in closed barns, undergoes a relatively slow yellowing phase. If adverse weather conditions prevail, small fires may be started to aid this phase. When yellowing is complete and brown spots begin to appear on the leaves, the temperature is increased by using heat from small fires. The humidity is slowly reduced. When the leaves have developed a brown color, they are exposed to large amounts of smoke for 2 to 3 weeks. The smoke is produced by adding wet

sawdust to the fires, which are kept low in order not to provide undue heat. the resultant cured leaves are dark and coated with wood smoke condensate.

: In the air-curing process, the tobacco is not exposed to wood smoke. The stalk-cut tobacco plants are hung in a barn and slowly cured over a period of several weeks. The cured leaf is heavy and thick and has a dark brown color.

: There are two types of dark tobacco grown in the USA: broad leaf types and one-sucker types. The broad leaf types, exemplified by KY 171 and Madole, may be either air-cured or fire-cured, while most one-sucker types e.g. KY 160, are air-cured."

: "Manufacturing methods: Loose leaf chewing tobacco, USA: As mentioned above, Pennsylvania and Wisconsin air-cured tobacco leaves are generally used as raw material for chewing leaf products. The cured tobacco is subjected to "sweating" at a slightly elevated temperature for a certain period of time. [This process is not described at all in the book unlike the redrying and aging process of cigarette tobacco. Apparently the process is similar but may involve longer aging times, higher humidities or higher temperatures than cigarette tobacco. In cigarette tobacco manufacturing, after the tobacco is cleaned, destemmed and brought to a specific humidity level, it is compressed into cardboard or plywood bales and warehoused for about 2 years or more. I assume chewing tobacco is handled somewhat the same but I don't know how long the aging process is]. The tobacco leaves are then threshed into flakes and the mid-ribs (stems) are removed. The tobacco fragments thus obtained are usually treated with a sweet casing solution, dried and packed in the consumer package. Plug chewing tobacco USA: Plug tobacco is usually a compressed form of loose leaf where a certain amount of finished loose leaf tobacco is charged into a mold and pressed to acquire a flat bar shape. Usually, the tobacco bar is wrapped with either natural tobacco or reconstituted sheet tobacco. Two forms of plug tobacco exist, dry and moist plug."

**Question from David:** I have been buying shredded tobacco in 1 pound lots, what is the best way to store it? I have been using an airtight container which seemed to work ok but the last lot that I bought was a bit moister and it has started to grow mould. Is it still ok to use? Should I store it in the fridge?? Should I freeze it?? Hope you can help,

**Answer from Shep:** First of all you need to remove any mold that has developed and discard.

Next I would replace or at least deep clean the container with a disinfectant to kill any leftover mold and mildew.

Sounds like things are a bit too damp. Try letting in some air and allowing it dry out a bit.

**Question from Colin:** Drying, Curing, Aging, Are these all different processes?

**Answer from Frank:** Drying or curing, for cigarette tobacco, is essentially the same thing. Curing of tobacco is a controlled process to some degree, especially with flue cured tobacco. Burley tobacco is cured, generally by cutting the entire plant and placing it in a shaded area, (barn generally) under temperatures that one sees in the late summer/early fall. That is, the temps should be around 70 degrees F with night temps in the 50's or higher. The ideal humidity is about 65% and this varies from day and night. Also, the amount of ventilation alters the humidity. Too much humidity for too long can cause the tobacco to rot and too dry humidity may impede the curing process. Curing or drying in this sense, is more than just the water being drawn out of the plant. The plant's cells don't immediately die once the plant is cut down. As water is eventually removed from the tobacco, the living cells begin metabolizing various constituents from the plant to use as an energy source to continue living, especially sugars and starch. This process is what starts to give tobacco its flavor. The nicotine content is also lowered in curing. Also, burley tobacco, when fully cured, has no sugar in it. The sugar has all been metabolized in an attempt to continue living.

Flue cured tobacco is generally harvested by priming, which means pulling the leaves off the stalk. These leaves are then hung in a special barn that has a heat source. The tobacco is then heated to certain temps and certain humidities for a set period of time. This yellows the leaves, which is part of the process that occurs in burley tobacco mentioned above, but at a much quicker rate. Then the temps are increased, again at a set time and humidity, until finally the temps are raised enough to kill the cells. This tobacco is almost always yellow in color as the process is so fast that the degeneration process doesn't have the time to complete. Also, all this is done in a time frame of about a week I believe. The high heat kills the tobacco cells well before they can metabolize all the sugars so this type of tobacco has a high sugar content.

Aging is the key to good smoking tobacco. This is a mild fermentation process, which both flue cured and burley are subject to. Although commercially, the different leaf positions benefit from differing amounts of aging, generally most commercial tobacco leaves are cured for 1 1/2 or more years in cardboard or plywood boxes, under pressure (they are compressed using an hydraulic ram into the boxes). These boxes are set in warehouses at around 70 degrees F and about 60% humidity.

Tobacco that is just cured, but not aged, is very harsh and still high in nicotine. Once cured, various changes occur that not only lower the nicotine but create flavor components that we associate with good smoking tobacco.

**Question from Marcy:** Could someone tell me the steps I need to take to germinate tobacco seeds indoor?

**Answer from Frank:** I don't know which hemisphere you're in but you need 70's F temperatures inside to get the seeds to sprout quickly. What I did was, in the early Spring (March 1 actually), I planted tobacco seeds in little containers, 18 per flat. I used potting soil and carefully placed a few seeds in each portion. Do not bury the seeds, simply place them on the surface of the soil. I

then covered them with clear plastic wrap and sat them in a window sill where they could get as much sun as they could. Keep the potting soil moist, initially by spraying so as to not upset the seeds and as they get taller, you may have to adjust the plastic wrap so it won't interfere with their growth. An artificial plant light should also work. I first saw very slender sprouts at 10 days. I took over 2 months for me to have plants large enough to transplant but they would have grown faster if I had started placing them outdoors earlier so they could have gotten more sun. They are transplantable when about 7-9 cm high or higher.

**Follow up by Sean:** I agree with Frank, as usual. If you go to your local home and garden store, you can buy little "green houses". Basically a tray with a clear lid. That is what I did. I also built an indoor green house in my basement (can't believe the cops didn't come by). 70°F is a minimum, 85°F max. I left my light on 24 hours a day until I saw the sprouts starting (2 - 7 days depending on variety). After the sprouts were about 1/2 inch I cut the light down to 12 hours per day. Six weeks later, they were 6 - 8 inches tall.

**Question from Colin:** Do you harvest seed after the flower has bloomed

will seed be sterile if not pollinated by a second plant in bloom?

**Answer from Sean:** Yes, harvest the seed after the flower has bloomed. Tobacco plants are pretty much self pollinating. After pollination occurs the flower will fall off and then the seed pod (what the flower was attached to) will start to grow/swell. Wait until the pod turns almost completely brown (well at least half brown). Once the pod has turned brown you can pick it and bring it inside to dry. The seed pod is dry when you can hear the seeds rattling inside when you shake the pod. If you keep your seeds dry and cool (low humidity + °F less than 100) they should last for years.

**Question from Jay:** One of the charges in the lawsuit against the tobacco companies was that they artificially inflated the level of nicotine in their products by significant amounts. Doing some research on the Internet, I found that Hawken chewing tobacco contains .01 mg of free nicotine per gram while Kodiak & Copenhagen contained 6.23 mg per gram. That's a huge difference! I was wondering if anyone who grows their own tobacco, could comment on whether or not smoking/chewing home grown tobacco is less addictive than smoking/chewing manufactured tobacco.

**Answer from Frank:** As a physician who has seen narcotic addicted individuals undergo early signs of withdrawal, I tell you that the idea of "addiction" as currently used is, in my opinion, nothing less than a ploy, started by Surgeon General Koop, to undermine the tobacco companies defense that "plaintiffs could stop their cigarette habit at any time." The term "addiction" is a word with negative connotations and is now being used by antismokers to demean those of us who like to use tobacco. Under the current meaning of the word, caffeine is now addicting - truly a corruption of the word.

To answer the question of whether home grown/processed tobacco has less available nicotine, the answer depends on whether the tobacco is aged. Tobacco that is smoked right after curing (drying) is higher in total nicotine than after aging for 1 1/2 or more years. Green tobacco is even higher in nicotine (hence the "news" that farm workers harvesting tobacco sometimes become ill with nicotine poisoning- the nicotine gets absorbed right through their skin). I believe that most home growers will probably not age their tobacco since it takes so long and many will try to flavor it with available flavorings or home derived flavorings to mask its harshness. If so, then they will get more nicotine from their tobacco. By the way, from a manufacturing viewpoint, tobacco used in cigarette blends apparently contains less nicotine than if the manufacturers used pure tobacco. Reconstituted tobacco, made from tobacco dust or

"fines", has a lower nicotine content than pure tobacco. Further, the use of ammonia, which shifts the equilibrium from the bound to free form (and more easily absorbable) of nicotine is also used for a completely different reason. Ammonia affects taste in that it increases "impact", which means that it increases the irritation a smoker feels in the back of the throat and bronchi upon inhalation (which, in proper balance, is deemed pleasurable to the smoker). The term "impact" has nothing directly to do with nicotine's effects on the brain, which many anti's have misunderstood. Sometime in the 1970's, the major cigarette manufacturers AND the federal government, tried to modify the tobaccos used in cigarettes and their blends to a tobacco blend with less tar but with still a high enough nicotine content to make the cigarette acceptable to consumers. (This is why Brown and Williamson was "accused" of growing the super (high nicotine) tobacco variety. They initially grew it in the US with the government's consent). This process of altering blends and changing hybrids of tobacco has really been going on since the '50's when consumers showed a preference for lighter tar cigarettes. In other words, a manufacturer never has to "spike" their cigarettes with nicotine - the wide varieties of tobacco hybrids available would make that unnecessary.

**Question by Colhays:** I have found that the colour of the leaf does not always match whether it is dry or not I have brown leaves with stalks that are still plump, and green leaves with wizzened stalks. I have started spraying green leaves and putting in the sun.

I presume the stalk should be dry before stripping leaves no matter how dry or golden the leaf is that correct?

Also some dry brown/yellow leaves have green measles (spots)what would that be?

**Answer by Frank:** Yes, you should not strip leaves until the stalk is dry. Ideally, leaves should be hung in a covered area with the temp around 70 degrees F and the relative humidity around

65%. (If tobacco is left in the sun too long, it will "burn" which means that the cells die and therefore won't go through the process of turning brown. This tobacco stays green.) These "ideals" are apparently derived from experimentation and the reality is that you have to use the environment you are living in. However, if your humidity is dry, you can use a humidifier if the area you are using to dry the tobacco is small. I have a little pool building that I used to dry mine and I can vary the humidity by lowering/raising windows as well as placing a room humidifier in the building.

I had a few leaves with green spots as well and I've always assumed that either the tobacco was too green when cut or that particular leaf didn't like the curing environment as well as others. I found that I had to cure my tobacco from late August or early September until it was ready at Thanksgiving. Also, after the tobacco is properly cured or dried, you then have to wait for a rainy or humid day to strip the tobacco. If stripped too dry, it will disintegrate. If stripped and stored too moist, it will rot. Again the ideal humidity is around 65 or 70%. A store bought electronic hygrometer (around \$30) is helpful to determine this.

**Question from Phil:** I have cured my leaf & coated it in a blend of molasses, honey, sugar, & rum. Then pressed it for 5 days under great pressure, Then folded the block in half & re-pressed it for a further 3 days. After cutting it drying to required texture, I find that I can not keep the cigarette burning past one puff. There must be some other additive I am missing. Could some one PLEASE HELP ME.

**Answer from Colhays:** Try Microwaving it for 15 seconds once or twice sealed and in an open container, this will even out the moisture and dry it a bit.

apparently commercial growers steam it to even out tobacco.

**Follow Up by Frank:** The following items are just guesses from my personal experience rolling commercially available RYO tobacco.

Is the tobacco dry enough? When I was spraying various flavorings on commercial RYO tobacco for testing, if the tobacco was too moist, it packed too hard and wouldn't draw or stay lit.

Is the tobacco cut too fine? When I rolling my own with the tobacco fines that are in the bottom of the can, again the tobacco rod is too compact and won't draw or stay lit.

Also, when I was trying to smoke pipe tobacco, the large cut of this tobacco sometimes made it difficult to keep lit, especially if it was too moist.

**Question from Bassmaster:** I was wondering if anyone who grows their own tobacco, could comment on whether or not smoking/chewing home grown tobacco is less addictive than smoking/chewing manufactured tobacco.

**Answer from Shep:** Smoking or inhaling might be the first thing to discuss. I smoke cigars and a pipe and grow my own pipe tobacco. No addiction here, and I smoke for the flavor so I don't inhale into my lungs (no tastebuds there) which may keep me from being too hooked. Your lungs quickly absorb nicotine and that is not a good thing. The mouth, with saliva, absorbs some but dilutes it and rinses it away. Second thing, the cigarette manufacturers use additives to stretch the tobacco, giving more yield, and allow for a more even burning so it will keep lit if you set your cigarette down for a bit while teeing off or whatever. The additives also have been alleged to cause addiction. Ammonia is one of the substances, I understand, offering a greater absorption of nicotine.

**Question from Petra:** Hi out there, ok that's our first try to grow our own tobacco. The plants are big and beautiful and the harvest is immense. We've got all the leaves hanging in a shed and as much as I learned about it the temperatures and the humidity here in NZ should be alright for the drying process.

Does anyone have some advice what the next steps are?  
Does the tobacco just have to hang there for a year or more or do we need to pack and to press it???

**Answer from Frank:** Petra, You didn't mention if the tobacco you have hanging is a burley type of flue cured type of tobacco nor whether you are curing the individual leaves (called primings) or the entire stalk. Traditionally, burley is cured by hanging the entire stalk while flue cured is cured as individual leaves. Flue curing involves a heat source that can reach about 190 degrees F and probably is impossible to perform for the hobbist. However, flue cured tobacco can be dried in a manner similar to burley. The idea is to thoroughly dry (called cure) the tobacco in an environment that is about 70-80 degrees F during the day and maybe 50 degrees F or more at night, with a relative humidity of around 65 % or so. these ideals of course change every day but the cure should be a slow one so the leaves will have a chance to slowly die, converting various leaf components into chemicals that impart the tobacco flavor you want. It took my few (38) plants almost 2 months to dry completely. They are finally dry when the stems to the plant themselves are thoroughly dry and crisp. They should snap when bent. The tobacco, as it cures, will turn yellow as the chlorophyll is changed into xanthophyl and then eventually various shades of brown. The upper leaves are generally reddish in color while the lowest leaves are buff. The middle leaf may be yellow when fully cured. In good cured tobacco, there should be little or no green color. What to do next is up to you. Generally, cured tobacco is not a pleasurable smoke - its very strong in nicotine and very harsh. Mr. Daly, the overseer of this board, mentions in his booklet, ways to try and "age" the tobacco to decrease the high nicotine content and impart some flavor to the smoke. What the cigarette companies do, and what I'm trying, is to strip the tobacco and place it in a box under pressure and let it sit for a year. It is this aging process that imparts the mildness to smoking tobacco.

**Question from Jim:** What can i use to glue cigars when i roll them?

**Answer from Shep:** You can use a bit of apple juice to help it stick together. For a better sticky, try pectin in the canning section of the grocery store.

Follow Up by Dave: You can make a paste using Gum Tragacanth that's available from SBE at <http://www.seedman.com/access.html>

**Question from Rich:** I was just wondering if there is any flavoring that i can add to my hand rolling tobacco to make it taste nice. i have tried putting sherry with it and drying it out but no taste of the sherry. i was just wondering what can i put in it. Thanks.

**Answer from Norman:** I just ordered some flavorings from SBE (seedman.com) for last years tobacco crop. It would appear that, with some experimenting, you can probably come close to duplicating some of the commercial tobaccos with their flavorings.

**Question by D.K.:** My roommate and I decided to grow some tobacco in our dorm room (to be transplanted outdoors once the weather warms). Our plants about half an inch high now and are doing great. However, I have read some things that suggest many of the sprouts will begin to die at this point. Is there anything I should look out for or can do to prevent this?

**Answer from Shep:** Yes, be careful to not have the plants in full sun all the time or forget to water them. At a half inch you've been waiting a long time for these little plants and its easy to start neglecting. On the other hand, don't go touching them

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either. The good ones will survive. When transplanting its best to do it in the evening rather than in the morning so they can get settled in before the hot sun comes up. Good luck!

Follow Up Question: Shep, you would against advise separating

and planting the sprouts in their own containers? I had considered doing this to give them more growing space. (Some of them are quite close to one another.)

**Follow Up Answer:** At half inch I believe it might do more harm than good to separate them. Since you plan to transplant them outside when the weather is nice it is best to just care for them as they are. They will transplant real well once they hit about 4". Just be careful as the roots will just be starting to tangle around one another and you don't want to tear them. Don't sweat it too much though, I grow mine in the Northwestern USA - not exactly Cuba-like weather, and must say they are a pretty durable plant.

**Question:** I had the idea to use actual whiskey or rum to flavor my tobacco. I figured I could spray it on the cut tobacco and let the flavor absorb. The alcohol would evaporate (it evaporates much more quickly than water) and leave only flavor. What do you more experienced growers think of this? Also, is there some way I could naturally add mint flavor? Perhaps just mix dried mint leaves with tobacco?

**Answer:** I have tried a bit of wine and some whiskey during the curing process. Also, I grow different types of mint in my garden and have mixed that in with my pipe blend, giving a menthol flavor. A little goes a long way.

**Question:** How far apart should tobacco plants be spaced? I have limited growing space, so I need to use it for maximum yield.

**Answer:** The optimal plant spacing for commercial growing is 2 feet apart with rows 3 feet apart. You have to be able to walk

between some of the rows in order to spray and check on your plant. Rows too close together will lead to damaged leaves when you are scouting your plants.

**Question:** Does anyone know what is involved in curing and fermenting

tobacco to make it suitable for pipe smoking?

**Answer:** I've had good luck with the recipe included in the book that comes with the tobacco growing kit from seedman.com After drying, fermenting, and aging your homegrown tobacco, you simply cook it off in a big pot, mixing the ingredients in, then drain and press into blocks. Once dried and aged again you can cut it to size. I use a meat grinder. I can also suggest that you allow it to age and mellow out a bit. Trying to rush things will only give you a bitter end result. My first batch was that way and I ended up cutting it down with some store bought pipe tobacco. My latest batch (grown last year) is still aging as leaf. I'll cook it down in a couple months or so. Shep

**Question:** At what stage do you use a kiln, Do you dry first strip the stalk out or what?

**Answer:** You have to dry the tobacco leaf completely, then you place it in a kiln where you can control the temperature and humidity (I use 115-120 degrees F, and 75-85% humidity in the cabinet). You are going to find that you will be able to get a lot more leaf in the cabinet if you don't put the stalk in there with them. I take the leaves off three or four at a time, as they become ripe (this is called priming). I lay them out to wilt for a few hours, then I hang them from coat hangers, on a wire strung between two posts in my barn, until they are completely dry. Then I place them in my stand up freezer cabinet, hanging them in two tiers. My cabinet has a fan that draws air in the cabinet down through the tobacco, where it picks up moisture and heat

from an electric frying pan with water in it. the air then goes through a duct, in the door of the cabinet, up and over a condensation roof attached to the ceiling of the cabinet, which has holes in it. From there it goes down over the tobacco and repeats the process. There are quite a few different ways that you

can achieve that same fermentation, and my way is just one of them. Dave

**Question:** Can someone give me some sites that tell me how to make my own chewing tobacco? I need to know about curing, processing, and flavorings, and everything else. I also need to know the long and short ways. : Thanks in advance, Charles

**Reply:** Some years ago I read an article in The Saturday Evening Post (of all places) that contained an old fashioned recipe for making chewing tobacco. You go into the woods (or wherever) and find a good stout beech log that is at least 4 inches in diameter. You hollow out the wood from one side. You compact several tobacco leaves into the hollow of the beech. Pour on top of the tobacco either molasses or honey. Fashion a wooden plug for the piece of beech wood. Let it sit for 4-6 months while the honey or molasses and the tobacco leaf ferment. That produces chewing tobacco.

**Reply:** I found your question as I searched for an answer to the same question. I have been making my own for over a year. After many failures my best chews go something like this. Buy bulk loose-leaf tobacco without any casings or flavorings. Store it in the freezer in ziplock bags. I only make about a fist sized batch at a time and I keep it in the refrigerator to prevent molds. Its keeps well for a few weeks in the fridge and forever in the freezer. Now for the making part. My favorite chew uses squeezed cherries(we have a lot of those in Oregon) but lots of fruits work well and keep it interesting. Pure apple juice is very good too so we will go with that and keep it easy. Just cover the bottom of a

large skillet with the juice and let her boil. Not too much!! When it boils down you should pour in some more and repeat until get a juice that is missing a lot of its water and is the essence of the fruit juice. When you get there you only need enough to cover the bottom with a skim of juice.(not deep at all) Then add a

couple of tablespoons of molasses. The homemade country store type is the best. Get the best molasses anyway. Now stir this for a moment and kill the heat leaving the mixture really HOT ! Start stirring in tobacco until the leaf is about the wetness you desire. I don't cook the stuff but it is important for the heat to thin the molasses and drive the juices into the leaf. I think it does a world of good to let the finished product set in the skillet for hours and evaporate some more. OH! I do throw a few shakes of salt into the juice and molasses before I add the leaf. Michael

**Question:** I was interested in chewing, but I want to do it the correct way, without looking stupid by getting sick or knocked on my a??. I bet a lot of you are really experienced, so please help!

**Reply:** Chewing is cool, you made a good choice. Start out with a little Red Man. Don't try to chew it at first, just suck out the juice. After a while you'll get used to it, then you can start chewing more or start snuff. By the way, the burning you'll feel at first doesn't mean you have mouth cancer. I've been dipping cope hard core for 2 years and chewed for 5 years before then and I've not got cancer yet.

**Question:** Could anyone please help me? I have access to 1kilo of green leaf and would like to make it into chewing tobacco but i don't know how could someone please e-mail me on how to make it .David

**Reply:** David, I live in the Philippines and cannot buy chewing tobacco over here so I take regular tobacco plants from the local

market which are really designed for smoking. I try to get them as green as possible and I mix coke or Pepsi or a softdrink to moisture them and mix in several spoons of regular sugar. It is similar to Swisher Sweet Chewing tobacco and is not bad but I also would like to find a better way. You have to experiment with the right amount of sugar. Let me know if you find a better

way. The cost is about \$1 for every 6 packs of tobacco including the plants. Bob

**Question:** I have been a cigar smoker for several years and was just recently introduced to pipe smoking. My girlfriend just got me a pipe of my own but I have not had much success with packing it correctly. Any helpful hints or advise would be greatly appreciated.

**Answer:** I too am a cigar smoker but do enjoy an occasional pipe, especially when time is short or I will have short breaks throughout the day. I usually smoke the tobacco I've grown in my pipe and my wife really enjoys the smell. The key to getting an enjoyable smoke is not to fight it, rather pack it properly. Take a pinch and put it in the bowl, followed by another pinch. Then lightly toast the top while puffing. Make sure to toast the whole thing but do not aim to make a big flame of it. This will go out quickly. Once it does you can lightly tamp it down. Some use a pipe tamper but I'm a bit crude and just use the flat head of a wood screw. Then you can relight, making sure once again to heat the entire top of the tobacco as you would the end of a cigar, and enjoy. It may also require an occasional tamp. Sucking too hard will cause a hot burn so puff a couple puffs then wait 30-60 seconds. It is not unusual for a new pipe to be a little clumsy or even taste bitter until it is broken in. Some pipes have had smoke through them from the factory but it will still take a few bowls to get good and sweet. It is recommended to let the pipe rest after use. That means it is good to own at least two and rotate. Clean using a pipe cleaner, removing the moisture but don't get carried away as some build-up is good. Oh, and don't pound the pipe against anything to remove the ashes or it may break. Shep

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**Question:** Is homegrown tobacco better for your health and less addictive than commercial tobacco? the American Indians grew and smoke there own tobacco and didn't seem to have much smoking related illness or addiction, why is that?

**Answer:** You are right in that the native Indians did not suffer the same problems as we do now. Our problems

are a direct result of the chemicals used in the growing and manufacture of tobacco. Some chemicals are so dangerous that the people using them must be given a written warning and then a verbal warning just in case they never read the written one, further no one is allowed into the treated areas for some days. After harvesting and drying the tobacco then goes to the markets for sale. It is almost certain that these chemicals remain in the tobacco.

One big American manufacturer is now going to use tobacco treated in a similar way to how ours is done.

Many home growers have said that they no longer have the morning coughs and chest pains that they used to suffer from. I do not suggest that people who have never smoked start because ours is a safe way. Smoking is still bad for you. If however you are already addicted then i think that an organic tobacco is better than a commercially grown one.

**Recipe Post:** To One and All! Great recipe for flavoring cigarette tobacco

1/2 Cup Water  
1/2 Cup Vodka  
2 - tsp. pure Vanilla  
1 - tsp. imitation Coconut  
1/2- tsp. imitation Rum

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Put in hand sprayer and wet your tobacco leaves before cutting,  
Respectfully, Daisy

**Misc. Post:** I have been growing Maryland #607 variety smoking tobacco for the past five years. It is a burley type that is

much prized by European cigarette manufacturers, although it produces a tasty rich brown leaf that is also great in your pipe! The European cigarette consortium buys most of the Maryland that is produced in this state and they will even pay the farmer to grow it.

The Maryland Department of Agriculture will provide interested parties with a detailed book on cultivating and producing this fine variety and they also got me started by providing a packet of free seed. Every year since, I have simply harvested seed from my plan tops after cutting the stalks.

I start my seeds in flats indoors in late February and transplant to a cold frame covered by white muslin after all danger of cold weather is gone, usually late April. White muslin is best. It allows rain to seep in as well as air and sun, but shades the delicate transplants. I work a lot of manure into the bed of the cold frame. After the little plants get started, I thin and transplant. I usually grow enough to process about 20 pounds each year.

This variety is cured by stripping leaves from the stalks. It needs to be fully sun-ripened first, and is ready for harvest in late August - early September. You cut the stalks at their base, then strip the leaves from the stalks. Don't try to cure Maryland #607 by leaving it on the stalks and hanging them; it doesn't cure evenly. After stripping the leaves from the stalks, I then grade and sort mine on a common picnic table. Then I bundle the sorted leaves by size into 1 pound bunches, all leaves nested neatly one atop the next. I tie off the ends with twine and hang about six of these 1 pound bunches of leaves on tobacco stakes which in turn are suspended horizontally from the rafters of my garden potting shed. The shed is equipped with skylights having louvered and adjustable panes of glass. After suspending all the

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tobacco from the rafters I crank the windows closed and watched the transformation begin. After about a month I open the windows a little to adjust the temperature and let get a little air flow going. This variety requires 90-95 degrees temperature for the first month. But even after it has all turned brown I leave it hang for an entire year in the rafters. After much trial and error,

I've learned that the tobacco is the best and most flavorful if allowed to cure or mature for 1 year.

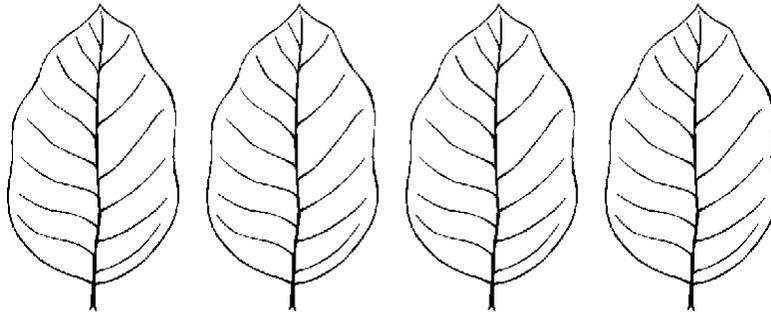
To process the cured leaf, I reconstitute it with water, pull out all the stems by hand and cut it into cubes in a common electrically powered kitchen food processor. The cubed tobacco is perfect for pipe smoking, and tastes quite rich and satisfying. I store the processed tobacco in clear glass Mason jars, and mark the year it was grown on the lid before storing.

**Misc. Post:** Yes, I've grown my own tobacco from scratch. I'm a pipe smoker- once or twice a week. I had heard all the cowboys say that all you need is ground, a clothesline and a knife. Well I didn't trust them. I bought the little booklet, " Tobacco, easier than you thought" and it helped me in every area. I even designed my own fermentation cabinet- a cheap foam cooler- a 40 watt bulb and 2 ice-cream containers with sponges of water at the bottom. When I put my first batch in, they smelt YUK, but after a week, it was the scent of a fine cigar! I know this because whereas at the beginning, I would quickly wash my hands afterwards, now I leave the scent on them- I know- I'm weird I suppose. The first batch I soaked in rum and black treacle and squashed it all in a home made press. Then I dried it out in front of the open fire. 2 days later I had my first smoke. It was a little rough around the edges- like a cheap supermarket variety actually. I am looking forward to the taste in 6 months time.

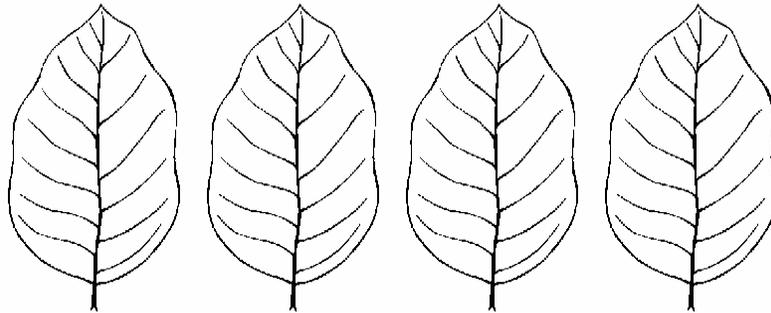
Thanks Allan

If there is any new ideas on curing and manufacturing, I'd like to hear- I've got 2 more batches on the go- all in all enough to get me though the next ten years probably!

Bye from Tasmania



**TOBACCO:**  
**EASIER THAN YOU THOUGHT**  
By A.N. Daly



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# FORWARD

By A.N. Daly

There can be very few hobbies where you are not always laying out money and there are even less where you can actually save money because of what you are producing.

Growing and processing your own tobacco only needs one capital outlay and then you are set to save hundreds of dollars a year for as long as you wish to carry on producing your own tobacco.

The biggest outlay is going to be for purchasing a kiln to ferment the dried tobacco leaf in. This is a MUST if you wish to produce a good quality fermented leaf whether it be for cigarette, pipe, chewing or cigar. The only option to fermenting tobacco leaf this way is to ferment the leaf in bulk and to be quite honest, I don't think that anyone will grow the amount that would be required for doing it this way. Plus it takes anything up to three years.

The rest of the equipment needed will last for many years once purchased, indeed it is quite likely that you will already have much of the equipment in use in your home already.

A lot of experimentation with your finished tobacco leaf will be required to get an acceptable smoke. It is doubtful if you will get away with just one variety of tobacco if you want to make pipe tobacco or cigars.

Coming on to the seeds, it is very important to remember that when growing more than one variety of tobacco plant you should debud all but one variety to stop cross pollination. If you do not debud them then it is best not to harvest the seed pods. This way we will ensure that the plants will grow true to form, hybridizing will ruin the crop in the years ahead. Seeds are cheap enough and since you will be saving money on your smokes you might just as well buy fresh seeds each season. Many people just grow the plants and then dry the leaf and smoke it with no further treatment whatsoever, O.K. you have saved a lot of

money but you will pay for it later on as all the impurities are still present in the leaf that you are smoking. If you want to save that much money why not stop smoking altogether.

Another point to take note of is that you will never be able to make your own tobacco to have the same taste and flavor as that which you purchase from the commercial manufacturers. Over the years you have become accustomed to the chemicals and flavor and it is now time to develop a new taste, experimenting will get you quite close to your normal smoke. Mixing your home made tobacco with your favorite commercial brand will at least help to keep the cost down, and you can gradually adjust the percentages of your mix until you get a mix that satisfies your own requirements.

In the UK a packet of the cheapest cigarettes now cost \$4.80 per packet of twenty, over \$3.50 of this amount is government tax. In the March 98 budget the government levied another twenty pence (32 cents) to go on to a packet of 20 starting in December 98. In March 99 another 18 pence (29 cents) went on a packet of 20.

The point is that if one government can get away with it others will follow. They say that raising the tax will stop people smoking or cut down on it but if you weigh up the increase against the number of people who stop smoking or reduce it the amount of tax collected actually goes up. No government could afford to loose the tax that smokers provide.

We definitely cannot afford to keep on paying these increases. Why must car drivers, drinkers and smokers keep on digging into their pockets. Lets be honest, they could ration or ban those things that they say are bad for the state of our health or those things that cause air pollution, but doing so would bankrupt them.

Smokers and drinkers can at least do something about it. I hope that the following pages will be of help to anyone who wants to start producing their own tobacco.

A.N. Daly



### **Some basic facts**

Tobacco plants are one of the most widely cultivated plants and will grow on almost any type of soil. the growing regions cover almost the entire world where you can get at least 70 days of sunshine. It is even being grown in ALASKA and NOVA SCOTIA.

Some regions are very unique in the type of soil that they have and can produce tobacco of such taste and flavor that it is impossible to copy anywhere else, E.G., PERIQUE.

One ounce of tobacco seeds would be enough to grow about 450.000 plants. The seeds from one good tobacco plant would be enough to plant one hundred acres.

The water content of a tobacco leaf when picked is 80%, therefore when dried and fermented. Twenty pounds of fresh green leaf would finish up as 4 pounds of actual smoking tobacco.

When fresh and prior to picking the tobacco leaf is very brittle and fractures very easily, pick the leaf and lay it on the ground or other suitable surface for two to three hours until it becomes very limp. This way your leaf will suffer very little or no damage during the next stage which is drying.

Do not leave the leaf hanging in sunshine to dry out, it needs to be done a lot slower by being sheltered and in a moving current of air. Once dried the tobacco leaf can be stored for a number of years in paper (NOT PLASTIC) sacks.

### **SEED GERMINATION AND PLANTING OUT**

The only date that can be given for starting your seeds off is 6 to 8 weeks before the last frosts in your part of the world. If you are not sure when this is you can seek advice from an experienced local gardener or your local garden emporium or nurseryman.

Which ever variety of plant you intend to grow the following instructions apply to all.

The trays that are to be used for the seed germination

need to be filled to a depth of about two inches with a good quality seed compost and lightly firmed down and then moistened. There are many different varieties of seed compost on the market so you will have no trouble finding one. The seeds are very small and they do need to be spread out quite a bit.

The best way to do this is by mixing the seed with very fine dry sand before spreading onto your seed trays (flats). I sometimes use a pepper pot for spreading the seed and just pass the pot once over the entire surface of the tray. I said sometimes because if time permits I use trays with compartments in them, tip some seeds onto a sheet of white paper and then using my finger tip I pick the seeds up one by one and drop each one into a separate compartment, sometimes dropping two seeds in here and there to allow for failures. This actually saves a lot of time later on as I do not have to do any transplanting.

The seeds do not need to be covered over with compost or soil. They need light and a temperature of about 70°f for germination. Once they have started to show the leaves they need to be sheltered from strong sunlight, this can be done by covering the trays with a single layer of old newspaper or covering the windows with whiting as is used on glasshouses.

The young plants should not be watered from above during the early stages, the seed trays should have holes in the bottom and all that needs doing is to stand the trays in an inch of water for a few minutes at a time, maybe twice a day when they are nearing two inches. Over two inches they can be watered from above with a very fine sprinkler head on a watering can so as not to crush the young plants.

When the seed trays appear to be getting crowded it is time to transplant the seedlings into larger trays or pots. Use potting compost for this purpose. I have found that the easiest way to separate the seedlings is to partly fill a small plate or saucer with water and then lift a few plants out of the trays with the help of some small flat object like a lollipop stick or plant label and place them on the side of the plate with the roots in the water.

Never pull the plants from the trays as the roots are almost certain to break as they are very fine. Now the roots can be gently teased apart with a matchstick, tooth pick or even the tip of a pencil. Lift the seedlings by holding them by a leaf and not the stem and then transfer them to the bigger trays or pots, allow plenty of room for each plant otherwise you will find that you will have to go through this step again or risk stunting the plants growth. It is also not a good idea to handle the plants if you have been handling manufactured tobacco beforehand without washing your hands.

It is advisable to use a liquid fertilizer in the water from now on, one that is specified for tomato's is quite suitable for this purpose. About three weeks before you intend to put your plants into the final growing plot the hardening off process can begin. This is done by moving the seed trays or pots into a coldframe or other such outside structure where they can be exposed to the good day time weather and then closed in for the colder nighttime weather.

As the weather improves and there is no chance of frosts the plants can remain exposed to the elements during the nighttime. This will be the hardening off completed and the plants are now ready to withstand whatever nature has in store for them.

At least one week before planting out mark out the rows where you want the plants to grow and spread a layer of general fertilizer along these rows and then rake it into the ground. Water the rows as well.

The job of planting out is best done in the evening time as the plants will get a chance to recover from the ordeal of being put into a different type of soil and the roots will have a better chance to re-establish themselves if the strong sun is not sapping energy from the leaves. It is also very important that the plant be removed from the tray or pot with the soil still clinging to the roots and then placed into the ground to the same depth, Fill holes with water before putting plants in, firm in and then water again. All the plants will have recovered within a couple of days and after a few weeks the growth rate is amazing.



## **LOOKING AFTER YOUR PLANTS**

The long wait now begins but don't worry as there is plenty to do as the plants grow towards maturity. One of the biggest problems that we are up against is the garden slug, you will know when it has visited your plants by the piles of black droppings that are present on the leaves.

The best way to combat this horrible slimy free loader is to put a handful of gravel round the base of the plant. You can try wrapping a piece of tinfoil round the bottom of the stalk just clear of the soil, this is said to give the slug an electric shock as it comes into contact with it. At this point it is the slug and not the grower who should recoil in horror.

Also, if you have access to some soot you can spread this round the plant, not too closely as it is a very strong source of nitrate. If all this appears to fail you can use the ultimate solution which is to make a night time journey round your plot armed with a torch and a salt container, search out the little pest and then give it a dressing of salt, this will stop it in its tracks.

As the growing of the plants continue, attention must be given to the side shoots which appear at the leaf joint with the stem. As soon as you can get a grip on them they need to be pinched out.

If they are not pinched out they will take up the sap which should be going to the other leaves, you will also find that the quality of tobacco obtained from these side shoots is of an inferior quality. Some growers do not bother to remove them but just use the leaves from the side growth as filler for cigars. (Leaving side shoots on the plants that you grow for cigar wrapper is said to keep the leaves from getting too fleshy and aids in getting a nice thin leaf).

The point to remember is that by leaving them the rest of your leaves will suffer and not grow to the best possible size. The buds should also be pinched out when they appear, unless you want to leave one or two for seeds (commercial growers tend to wait until a quarter or so of the crop has flowers open and then top all the plants and harvest the entire crop a few weeks later).

I prefer fresh seeds each year from my supplier as I grow

more than one variety of plant, having to cover them up to avoid cross pollination makes a lot of extra work and I also avoid the tedious job of opening the seed pods. Seeds seem to get all over the place.

### **Hard work ahead**

Weeds will appear like giants at the start of the outdoor growing period. The main thing is to keep the area closest to your plants clear from these unwanted, attention demanding, horticultural misfits. Alas, this job is best done by hand when working close to the plant. If you do not keep this area clear your plants will soon vanish under the weed growth.

Further away from the plants weeds can be controlled by the use of a hoe, I prefer the Dutch (push) hoe because it slices through the weeds so easily when done on dry soil, in fact it is best not to attempt this after a good downpour of rain when the soil is wet as it will cling to the hoe and the cutting action will be lost. The hoe will skate over the surface and your weeds will only bend over and then straighten up again in no time at all.

After you have cleared the weeds once, it becomes a very quick operation to just nip along the rows and cut down the new growth. Be extra careful when close to the plants as it is easy to slice them off, also the roots are very near to the surface so do not push the hoe into the soil too deeply. Either rake up the weeds or just leave them to wilt away, best is to gather them up and put them in a compost heap. There are quite a few weed killers on the market ( I am using one this year called ROUNDUP) you cover the whole of your growing area with it a couple of weeks before you intend planting out, you must wait for the weeds to start growing before using it.

Big bonfires on the growing areas will also help to destroy weed seeds if the heat is intense enough to penetrate 4 to 5 inches into the ground. There are certain weeds that seem to grow in the same uncultivated areas every year and when they go to seeds the seeds disperse in the wind all over the place. If you can recall any of these areas then give them a good dose of the weed killer.

Slugs, as we mentioned earlier are a real problem

and in addition to the remedies already mentioned another good way to control them is to bury some plastic containers in the ground and put some beer into them, the smell of beer is very inviting to the slugs and they cannot resist it. In they go, and what a nice way for them to go.

No need to buy the beer if you know any places where beer is drunk on the premises as there are always glasses that still have a drop left in them. You might get some funny looks as you collect up the remains but think of your slugs and the treat that you are collecting for them ( make sure that the drink is finished with though ).

It will not be long before your tobacco plants start to shoot upwards very fast and you can now concentrate on getting the best out of your garden. Unlike your local bank, you can only get out of the garden what you put in. This is where the use of fertilizers comes in. Fertilizers can be spread round the plants at intervals during the rest of the growing season. Sulfate of ammonia or Nitrate of Soda are good for promoting leaf growth. Bonemeal is also a good fertilizer for general use and is a must for your garden, Use according to directions on packet. If you wish to make a good fertilizer then the following is worth making up: 2 parts sulphate of ammonia, 3 parts super phosphate of lime, 1 part Potash, apply to the ground at the rate of 3 ounces per square yard. Care must be taken when spreading the fertilizers to avoid contact with the leaves on the plants or they will get burnt.

Also it is worth mentioning that care must always be taken when moving about between your plants, If you brush against leaves and they snap then they are finished with and will be of no further use to you. The main aim that we should have when growing our plants is to get the biggest possible size of leaf that we can, especially if we are going to be making our own cigars, the bigger the leaves that we can get to cut the cigar wrapper from the better. Smaller leaves though are not wasted as they can always be used for the cigar filler.

Fewer big leaves are far better than lots of little ones, so during your many trips along the rows of plants keep an eye out

for the badly eaten and yellow leaves that will be at the bottom of the plants. If the plants were not spread far enough apart when they were planted out then there will be a loss of light to the lower leaves and they will suffer and turn yellow, pick them out. Its also good for the ego to see rows of large leaves drying on the wires. Above all, make sure that your plants are well watered during long dry spells.

### **WE SHALL COME REJOICING, BRINGING IN THE LEAVES**

To pick or not to pick, that is the question. It is better to pick in three or four passes along the rows than doing it all in one fell swoop, unless you want to cut the whole plant down and hang it to dry. Picking in stages allows the rest of the leaves to mature a bit more.

But how do we know when it is the right time for this to be done. The one time when there is no choice is dictated by the weather, and warnings of early frosts and severe thunder storms. With this in mind it is essential that the position for drying out is already prepared. Hooks in walls, stakes in ground, polythene sheeting to make tent like structure if needed, and of course wire on which to thread the leaves. Hanging the leaves in the sun to dry is not a good way to dry them as the drying out is too quick and the chemical reaction that should take place does not.

Neither should you think of hanging your leaves in the kitchen to dry as they will absorb steam and smells. Any position that is close to strong smells is also best avoided, as are cold and damp places.

The leaf when ripe is not always going to change colour, indeed it will look no different in most cases. Some leaves start getting a mottled look to them. I judge mine as fit to harvest when they feel sticky to the touch, about the same time as the plants are in bloom. Firstly on a sunny day I pick my leaves, three or four from each plant by holding them at the base close to the stem and giving a quick downwards jerk and twist, then lay them on the ground for a couple of hours to let them go

limp. At the picking stage care must be taken as the leaves are very crisp and brittle, it is very easy to put a finger through the leaf.

Now that each plant is getting a visit from you it is a good time to carry out an inspection for more sideshoots and buds that may be appearing, (buds don't only grow at the top of the plant) if you find any, pick them out.

It will have been noticed that a lot of the leaves are covered in insects that have been caught by the gum and other garden things that have been carried in the wind, even bird droppings.

To clean up the leaves I prepare a couple of bowls of water. To one I add a little squirt of washing up liquid, but not enough to make any foam. Next, I put the leaves in one at a time and sponge off any flies and or dirt that may be on them, taking care not to damage the leaf. After this the leaf is transferred to the other bowl of water for a rinse. (Don't try to do too many leaves before changing the water in both bowls).

The leaves are piled up until there are enough ready to hang on the wires where they will stay until dry and ready for the next step. The leaves need to be placed onto the wires so that they are hanging upside down, face to face and back to back. Start by passing the wire through the back of the first leaf about one and a half inches from the base, the next leaf is then put onto the wire facing inwards towards the first leaf, the following leaf is placed onto the wire so that the back of the leaf is towards the back of the previous leaf (leave a gap of about two inches between each pair of inward facing leaves) and so on and so on until your wire is full. Make sure that the size of wire that you are using will support the weight of the leaves that you are putting on them.

If you are not using a rigid wire a pilot hole can be made in the leaf before threading. If your wire has a sharp point take care of your fingers when piercing the leaf. If your leaves all face the same way they will wrap themselves around each other and you will have a real problem sorting them out. When they face inwards they press against each other and dry a lot straighter.

Once the leaves are dried out they behave like seaweed in that they will absorb moisture on wet days and dry out again on warmer days. When dry and crisp they should not be handled as they will just crumble, a bowl of steaming water below them or some warm water sprayed on them will make them more flexible and safer to handle. A moisture content of about 15% is the normal for handling.

The methods described here are for drying and does not constitute curing which is another process. Smoking the tobacco in this condition does not give a good smoke. The time between the picking of the first leaves and the picking of the second batch of leaves is usually about 2/3 weeks.

When threading the leaves onto the wire etc. for drying do not hold the leaf with two fingers going across the spine and then piercing between them. You will find that when piercing the leaf this way there will be a tendency for the spine to snap. Hold the leaf with a thumb and finger either side of the spine on the same side of the leaf and then pierce, this will ensure that the spine does not snap.

## **CURING THE TOBACCO**

Drying of the tobacco is the first step in the curing process that goes towards making the tobacco into a condition that is suitable for smoking, regardless of which form you are going to smoke it in. Drying and Dampening the leaf, pressing it and shredding it is not curing.

Indeed you will more likely get a smell like a garden bonfire that is burning leaves, not a good way to get more converts to home growing. Also the resulting tobacco is very harmful to the health. The tobacco has to be cured in many stages and the fermenting can be done in one of two ways.

Method no 1 is for the grower with a small to medium amount of tobacco and it is as follows.

From the drying process the tobacco leaves need to be

tied together in small bunches and sprayed with a fermenting lotion and hung inside a kiln (details later) making sure that the leaves are clear of the sides so as not to absorb the condensation that will be gathering. The temperature in the kiln has got to be raised to a level of about 115f to 125f but no higher than this. The fermentation will not be speeded up by increasing the temperature too much, over 140f will kill the fermentation and the fermenting of the leaf will come to a halt as all of the bacteria etc. will be killed off. So please do not be in a hurry, wait longer for a better quality smoke, it will be worth it.

Once your kiln has started doing its job you will need to ventilate it at once or twice every day. This is done by opening the two ventilators for a few minutes, one top and one bottom. We all know how cut grass and hay smells when it has been left for a few days, a lovely sweet smell. That is the smell that we are aiming for. It can take a few weeks in some cases but don't be impatient. When the tobacco has finished the curing process the temperature can be raised by 10/15 degrees to halt the fermentation. After 6/8 hours, the heating can be switched off.

If your leaves are a bit too moist you should apply heat or hang the tobacco somewhere warm to dry out till 15/20% moisture content is obtained. That means that the tobacco will not break when you squeeze it, it should be able to be stretched without breaking and not wet to the touch.

Information about kilns is included in this book.

## **METHOD NUMBER 1**

This is a very quick method for people who can't wait for a smoke.

The processing of tobacco at home can be a relatively easy task following the method set out below. I have used the method with great success. This method will also remove a lot of the nicotine. You will need to make or get some wooden boxes 6" w x 1" d x 3" h" inside measurement and 3" G clamps, allow two clamps to each box.

The boxes need to be made of hard wood and the fixing must be done by using screws, using nails etc. will make it easy for the joints to come apart when the tobacco is compressed.

All the wood needs to be 1/2" thick. The base is fitted inside the box and screwed from the back, front and sides. The top of the box is left loose as this will be pressed down inside the box to compress the tobacco.

Before assembling the boxes it would be a good idea to rub the inside faces with candle wax to help protect the wood.

Now we are ready to start. Once the leaves have dried out enough, or too dry, the next step is the processing of the leaves. Normally they are hung on canes and put through a steam process etc., but this time can be reduced by a very big margin as follows. Collect together the following items: large saucepan with lid (12 to 14 pint capacity), strainer, dark or light brown sugar,(demerara etc.), jar of honey, tin of golden syrup/black treacle/molasses, glycerin. Proceed as follows, strip the leaves from the spine, do enough to fill the saucepan. Put 4 pints of water into the pan and add: 2-3 tablespoons of brown sugar, 2 tablespoons of glycerin/glycerol 3-4 tablespoons honey, and 3-4 tablespoons of syrup/treacle/molasses. Bring to boiling and then add your leaves.

Once the leaves are in the pan replace the lid and wait for 10-15 minutes.

Turn down the heat and let the pan simmer for a further 45 minutes, check often to make sure that the pan does not boil dry.

Do not add leaves once you have been boiling for ten minutes as this will be counter productive to the removal of nicotine. When the boiling has finished turn the pan contents into the strainer and leave to cool down.

You can apply some pressure to the leaves to help get rid of the juices, but please don't be in a hurry to handle at this point as the center of the pile takes a long time to cool down.

The next step is to make the boiled leaves into blocks for shredding. Line the box with a sheet of polyethene and push it down inside, leaving enough to fold over the top. Add leaves



until the press is full and then squeeze out as much juice as possible by tightening up the clamps, add more leaves and repeat until you have about an 1" or so of compressed tobacco, turn upside down so that the liquid can drain off. Leave like this for a couple of hours or so then remove.

This is where the extra length of polyethene is handy as you can use it to pull the tobacco block out of the press. Once removed the block should be left for a day or so till dry enough to shred. There are various ways of shredding, the easiest would be to use a Stanley knife or you may have access to a liquidating machine.

There is a very good quality shredding machine available now which will give a very fine cut.

Once the tobacco has been shredded you will need to roast it or toast it using a cookie pan, place it in the oven and set to 350 degrees.) You can also use a grill. How ever you do it you must keep a careful watch on it as there is a very fine line between roasting/toasting and burning. But keep cooking and turning till you have your tobacco with just a small amount of moisture left in it. It must not crumble when squeezed between finger and thumb, if it does you will have to get a bit of moisture back into it, this could be done by leaving it in a damp place for a few hours, or maybe put a slice of potato or apple in with it, you could even use a perfume atomizer and give it a couple of squirts of water, maybe your favorite wine (Spirits would evaporate too quickly).

Once you have completed your processing it would be better to let your tobacco stand for as long as you possibly can before you using it , Months would be better than weeks.

### **Method 2**

Place a couple of layers of leaves into one of your boxes (after you have lined it with polythene), next make yourself a mixture to coat the layers with. The mixture can be one of many different combinations of ingredients:- honey, wine. honey, whisky. Black treacle, rum. use one of the former to two of the

latter. paste this on to the leaves or better still borrow the wife's perfume atomizer (the mixture should be of a thin enough consistency to pass through the nozzle), when your box is full enough use the clamps to compress the leaves, add more leaves if you need to. turn boxes to allow excess juices to drain off.

Leave for a couple of days but keep on adjusting the clamps to keep pressure on the leaves. After removing the blocks put in a small tin and place in a source of heat to dry out a bit more. when dry enough the blocks can be shredded and toasted, when this is done store the tobacco in jars, Do not compress the tobacco, just drop into your container and leave it loose, allowing air to get to it for the first few days to make sure that there is no condensation building up.

This should complete the process and now you can mix the two different types together to make your own blend.

### **KILNS**

This section is reprinted from the handbook of the tilty tobacco center with the kind permission of MRS C DOWN. The Tilty Tobacco and Curing Co-operative, The Tilty. Dunmow, Essex. CM6-2EG. U.K.

The center has a worldwide membership and was formed in 1948. Overseas membership is currently £22-00 sterling to join and then £6-00 a year thereafter. A very good handbook is sent to new members. There is a yearly newsletter at present. With the interest now being shown and the speed of developments this may be increased.

It is a fact that lung cancer in Continental European countries is much lower than in the USA and BRITAIN where flue cured tobacco is smoked. On the European continent they use a similar method to one that we will be describing later in the article. Flue cured varieties, chosen for their easy coloring and thin leaf are often prone to virus. They are also cured at very high temperatures.

Some of the chemical changes associated with fermentation take place during this process but many fermentive

agents are killed, restricting much of the fermentation. The resulting tobacco has an acid character irritating to the throat and lungs.

Official statistics showed that lung cancers in the USSR and POLAND amount to only 6% of total cancers whilst in the USA and BRITAIN it is 26%. It is claimed (by TOBACCO SMOKING RESEARCH under the direction of Jan Beffinger of SPAIN) that cancer causing compounds are left active in the tobacco leaf when it is flue cured.

I think that our respective governments should be taking steps that would see a much safer cigarette being manufactured, It can be done. There is not much hope of getting very long term smokers to suddenly pack it in.

We have become addicted to the nicotine, But if the nicotine level was greatly reduced then cigarette smokers could take it or leave it and not become so addicted.

Don't forget that in England we had a tobacco free cigarette, instead of tobacco it was made with what was called NSM=New Smoking Material. However it was taxed just the same as tobacco and at the same rate, only going to prove that the government still wants its money from us. They were taxing smoking and not tobacco. If everyone in this country stopped smoking all at once the treasury would be in a right old mess and would have to increase tax by 8 pence in the £ that is 12.8 cents, plus the rest of the population would not like to share the tax burden that we would be leaving them with.

In the early days raw dried tobacco was stacked awaiting transit and then bulked in the holds of windjammers on the long voyage from the Americas, through tropical seas to Europe, it was found that the quality or sweetness was immeasurably improved.

From this evolved the three methods of maturing followed today, namely (1) Stacking the leaf for a period of months, often in humid tropics, with self induced heat,(2) Long term bonding, two years or more, at lower temperatures and humidity, but with some self induced heat, compressed in

hogs-heads or bales, (3) Kilning at higher temperatures and humidity for a period of weeks. This last method is largely used on the continent and is the only one adaptable for small bulk curing at home.

Fermentation alters the chemical and structural composition of the cells, the PH. value (more alkaline), drives off toxic elements and gasses (carbon dioxide) and slightly reduces the weight (5-15%). Nicotine is not affected by it. The range of fermentation is 80F (27C) at 20% humidity for, say, 1 year and 130F (54C) at 30% humidity for, say, 1 month. The effective bacteria are different at high and low temperatures resulting in some difference in flavor and color. Some bacteria require moisture and others air (aerobic), some protein and others sugar. Over 130F (54C) the tobacco becomes sterilized ("killed") and ceases to mature. This temperature should never be exceeded until the later stages of curing. Time alone, without bulk, warmth and some moisture content will not mature the leaf.

#### **FERMENTATION AT HOME**

Fermentation for cigar wrappers appears further in the book.

The difficulties in which we small growers find ourselves are the need for BULK in which bacteria may spread, the absence of self-induced heat, the tendency to dry out and the relatively high cost of fuel and apparatus in relation to the quantity being cured . Our results must be a sort of compromise between purely chemical action to drive away toxic elements and the full mellow bloom of adequately fermented tobacco. Here are the methods by which you can work according to the amount of tobacco that you will be curing and the apparatus that is available.

#### **(1) HEAT TREATMENT ONLY.**

A short period (1-2days) at high temperature (200f(93c)max) (30-40%) by any method you can devise to prevent drying out. Or a longer period at a lower temperature and moisture content.

The process need not be continuous. You can put the tobacco in a container standing in a bowl or saucepan filled with water and allow it to simmer at convenient times at the back of the cooker. The rising steam over the partly opened container prevents drying out.

Tobacco can even be made tolerable by covering it with water and slowly boiling it off, or by "panning" or roasting the shredded tobacco over a low flame (don't burn or char it) as is done in the French countryside. These methods do not constitute fermentation, nor is the tobacco mellow, but it should be smokable or good enough to mix with better tobacco or commercial brands.

## **(2) SMALL SCALE FERMENTATION**

One to three pounds of tobacco, depending on the size of apparatus may be treated in a double container as illustrated in FIG 1.

Humidity is provided by a wet sponge or other medium at the bottom of the inner container, ventilation is controlled by a vent (and cork) at the top. You will find that the tobacco tends to dry out at the bottom and must be turned out and reversed every day or so and may need remoistening.

It should be kept as near as possible to 25% moisture content and 110-130f(43-54c) for one to four weeks. It is highly recommended that an electrician is consulted (we all know one who will advise us on the cheap, don't we) as regards the safety aspect of the heating side of the equipment that follows, he may even have a better way of doing the job altogether.

### **Fermentation kilns**

These may also be used for heat assisted coloring and drying for "flue curing". The illustration shown above are by way of being suggestions for chambers in which heat and humidity may be provided and controlled for coloring (with leaves hung as shown) or fermentation (leaf hung closely in hanks or stacked in 15" deep tiers) at the figures given earlier.

Many of you will no doubt have a lot of different ideas according to the materials, heaters or other bits of equipment that



you may have to hand. The Fig 2 (for growers of 10 lb.. or more per year) may be built in an upright position or in a brick recess, or some other piece of adaptable apparatus such as an old clothes drying cabinet or fridge into which additional humidity (steam) can be introduced when required.

**MATERIALS TO AVOID: BECAUSE OF MILDEW AND RUSTING, ALL WOOD SHOULD BE EXCLUDED INSIDE AND ALL METALS RUSTPROOFED. BAMBOO FOR HANGING OR FOR RACKS.**

Construction should be of noncombustible materials and heat resistant asbestos sheeting. The unit must be given the best possible insulation.

**CONDENSATION.** This must be absorbed or diverted by absorbent linings to lids, or a false roof in a kiln.

**HUMIDITY.** The tobacco in fermentation must be kept just pliable-70f(21c) approx., atmospheric humidity at 100f (38c) or more. In a larger kiln a fan in a suitable position may be needed to keep the air in gentle circulation and humidity uniform. Always make sure that the tobacco leaves never touch the walls of the kiln.

**VENTILATION.** Some ventilation is required, reduced as the fermentation proceeds and the bad smells disappear. Provide vents top and bottom that can be opened or closed as required.

**INSTRUMENTS.** A dry thermometer is a necessity (200f(93c)) and an additional wet bulb for measuring humidity would come in handy. These can be viewed through a glass or sliding panel.

**ACCESS.** Any door or screwed on panel must be very close fitting. Try an old casement window with glass replaced with asbestos.

**HEATING.** Electric or hot water radiation. Electrical equipment must be earthed and kept well clear of (and protected from) falling bits of leaf etc. Temperature and steam can be controlled by thermostat and simmerstat respectively.

**CAPACITY.** A kiln measuring 8'X 3' should hold up to 25 lbs. of leaf.

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SUGGESTION FOR

- a. Steam or heqt Tätt
  - b. < @Q88 Cfl g8t0d 1¥@4t l
  - c. Later cank and dry feed
  - d. Divided lid (2 or 3 parts)
  - e. Wet and dry thermometers
- c. False reof £•r condansetion
  - d. Fan
  - e. tn'sjxx:l hon ganel lor tnstaunte

Fermenting of tobacco is a stage in the curing process. Then comes the manufacturing stage (casing and saucing). A brew is made using glucose, essence of chicken ( chicken broth ), citric acid. Distilled water and some fermented tobacco.

When this lot is fermenting it is sprayed onto the leaves which are piled on the floor and left for a couple of days for the leaves to start fermenting.

After which they are hung up and given the humidity and heat treatment. this last step can take from one-four weeks, but it makes a better cured tobacco.

### **RECIPE FOR FERMENTATION CULTURE**

The culture should be prepared in a non metal container using the following ingredients and amounts:-

Distilled water 1 imperial gallon, 4.5 liters.

Citric acid 1 spoonful

Glucose 1/1/2 lb. 0.2kg

Protein (essence beef or chicken) 1 spoonful

To this add a little highly fermented tobacco, (perique/cavendish/latakia/imported havana cigar or American chewing tobacco), raise temperature to 120f (49c), keep at this temperature until fermentation is active. This may be diluted down with distilled water to the quantity required and then sprayed throughout the tobacco before it is put into the kiln. It is very hard to obtain tobacco leaf which is not pasteurized by heat treatment but the above offer the best chance

### **FERMENTING TOBACCO FOR CIGAR WRAPPERS**

Once you have got the leaves that you want to use for your cigar wrappers dry enough (15/20% moisture content) they can be stacked in piles to ferment. Complete the pile in one go and do not add to a pile once it is made and the fermentation has started as we want uniformity. A thermometer is needed (compost heap type) to keep a careful check on the temperature.

The middle of the pile is the best place to get your readings from and if the temperature gets to about 135f then pull

the pile to bits and place the center leaves to the outside of the pile and those from the outside will go to the inside. Carry on doing this until at last there is no further increase in temperature. You need to get the temperature up to 135f and if for some reason it does not get that high it could be that the leaf was over dry to start with. Adding moisture (distilled water is best) will be required and it is best to use warm water as this will penetrate the leaves better but please don't make the leaves too wet just damp, give the leaves time to absorb the moisture and then re-build the pile. If the leaves are too wet then allow them to dry a bit.

Since moisture has been added check frequently to make sure that there is no mould. Any mouldy leaves need throwing away. If you have lots of leaves you will need more piles and as the fermentation of the piles progresses you can merge the piles to increase bulk, the fermentive qualities will be decreasing and you will be waiting longer to reach the 135f mark. If your pile does not attain this reading but holds steady at a lower temperature then that is ok. Take the pile to bits and re-build again with inside to outside. You can do this a few times and after a while you will start to get that nice smell from your leaves that will tell you your leaves are now ready to use. They can be left stacked in boxes until you are ready to use them. One thing to mention is that your piles will take longer to reach the temperatures required or highest possible temperature.

One of the purest ways to smoke the tobacco is in the form of cigars as there are no additives. It is quite easy to make your own cigars and they do not need to look like the commercial ones that you buy. The cigar consists of three sections: filler, binder and wrapper. The filler can be long or short. Short filler consists of odds and ends and bits and pieces that you are cutting from the cigars that you are making.

To start making your cigar select suitable long leaves (binders) and remove the spines then place the two halves with underside facing upwards and diagonally in front of you so that the leaves are pointing from ten to four-o'clock positions. Next



select your filler(long or short) and start wrapping, working in a straight line away from you. Do not roll tight, just concertina it in. If you roll too tight, you will have no suction.

Gum tragacanth is then applied to the end of the binder to hold it in place. The final covering is called the wrapper. This can be applied in many layers. Select long leaves that are suitable for binding, make sure these are dampened off and have a certain amount of elasticity in them. Fold a leaf inwards and then hold the tip in the left hand, using the right hand gently pinch out the end of the spine and pull downwards evenly then bring the right hand up over the left hand and then carry on pulling downwards until the whole spine is removed.

The leaf now has to be trimmed cutting off any uneven edges from the outside edge of the leaf and also trim along the edge where the spine has been removed. Try to get the leaf as rectangular as possible. When applying the wrapper the main thing is to get the veins running in a straight line as evenly as possible. To do this we place one half of the leaf down on the table BUT with the veins running directly horizontal to the cigar.

This way the leaf will be running diagonally again. Next place your cigar on the wrapper and start rolling your cigar away from yourself thus covering the cigar with the wrapper.

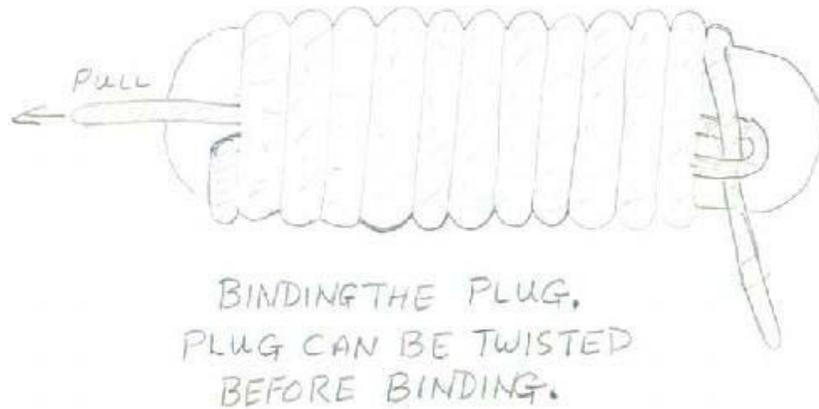
The edge of the wrapper that was nearest to the leaf edge will cover the thicker part of the leaf that was nearest to the spine. At the very end apply some more of the gum to hold the wrapper in position. Before wrapping you may wish to use a pair of nail scissors to shape the mouth piece of the cigar, when wrapping this end you can experiment with cutting the end of the wrapper in different shapes so as to be able to cover the whole of the mouth piece evenly and smoothly.

Once made the cigar can be left to mature like wine. This is usually done by storing them in a HUMIDOR.

Homemade cigars can taste and smell every bit as good as the ones you pay many dollars for in the shops.

## Making Twist Tobacco

To make twist the tobacco leaf is treated with the sauces (rum and honey etc. but two of liquid to one of honey, syrup, molasses) and then rolled in canvas or such like material, it is then twisted and bound up with cord and hung for a few months to mature. To bind, run a length of cord along your wrapped tobacco and then double it back down again then start binding tightly with each turn next to the last. When you get near the end push the loose end of cord through the loop and pull tightly on the other end which is covered by the binding and the loop will pull down inside the binding, cut off any surplus cord. You can unbind and then bind again after a few weeks because the moisture will have evaporated and the package will be loose. This completes the process. After a few months you can undo the binding and cut off what you need but please cut from the end where the loop is. See below for details.



## Swedish Snuff Recipe

Grind or chop 1 kilogram dried tobacco very finely. The pieces should not be bigger than 1/10 to 1/4 of a millimeter. Of course this is a matter of individual taste. A meat—mincer should do the work (if the master of the kitchen allows you to use it).

Mix the grinded tobacco with 1,1 litre of water and 50 gram tablesalt (NaCl). Blend well!

Put the mixture in a bowl made of glass or porcelain. Cover it with a lid or plastic film.

Now place the bowl in a place where you can keep it hot, 45-50 degrees Celsius. Keep it hot for five (5) days and nights (45-50 deg C).

After the five days take the bowl out and add Potassium carbonate, 90 gram should be fine. Blend very well. Put it in the heat for another 24 hours.

Now, the moist snuff is ready. Take it out of heat. Stir it thoroughly, to make it even and to air the ammonia out. Let it cool down. Ready for use.

Take a small amount, a cubic centimeter or two, and form it into a small ball. You have to squeeze it a little. Lift your overlip and put the snuffball under it. Keep it there.

The snuff could be too moist and it will be messy when you form your ball, just let the snuff dry a little. The snuff could be too dry and the ball would not hold together, then add some water and stir.

Well? Can you feel the warm sensation under your overlip. New starters may feel some dizziness.

## **CHEWING TOBACCO**

Many varieties of tobacco leaves are used to make chewing tobacco.

Burley seems to be the most widely used because of its ability to absorb large amounts of liquid. The chewing tobacco when made is called a PLUG.

To make your PLUG cut or chop your leaves into long strips. This is where a PASTA CUTTER comes in handy. Next the sauce is made up and there is no one particular recipe as the taste will vary from person to person.

The recipe given in METHOD ONE earlier in the book will make a suitable starting point but one pint of water instead of four, there is no need to boil it up.

Experiment as you wish. You can add liquorice, starting with about 1 half ounce and adjust as needed. Allow the tobacco strips to soak for a day or two to absorb the sauce. Next remove the leaves from the pan and allow to stand to drain of the excess moisture, add pressure to help this process.

The tobacco can now be rolled into Plugs that look like sausages. Place in an oven with a temperature of no more than 325f until the outside of the Plug is dry, this will seal the sauce into the Plug. The Plug can now be wrapped with a tobacco leaf and once the process is finished the Plug can be given a covering of Glycerine, Just put some on your hands, rub together and then rub it all over the Plug. Keep for a while to mature. This can be done to shredded tobacco that you are going to use for pipes or cigarettes

### **CAUTION**

When using any pesticides you must be careful not to cause any harm to the environment. Once you have diagnosed your disease or pest problem use the proper remedy, only mix up enough to do the job in hand as you do not want to be tipping any surplus down drains or into any water channels. Wear a mask so as not to inhale spray. Follow instructions for use and obey all federal, state, and local pesticide laws and regulations. We want our cigarettes to be as pure and uncontaminated as possible, let us keep the environment in the same condition.

## **CONCLUDING**

I hope that this book has given an insight into tobacco growing at home. I have tried to keep it none technical, It is early days for most growers and other methods of processing tobacco will be devised.

Recipes will be one of the biggest challenges as we strive to find that particular taste that we got used to in the commercial brands. Sharing information will help us to go forward and it will bring home tobacco growing to a larger number of people who until now have had to go out and buy their tobacco products