

The Culture Of
INDIAN TOBACCO
(*Lobelia inflata* L.)

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U.S.D.A. FORST SERVICE RESEARCH PAPER NE-181
1970

NORTHEASTERN FOREST EXPERIMENT STATION, UPPER DARBY, PA.
FOREST SERVICE, U. S. DEPARTMENT OF AGRICULTURE
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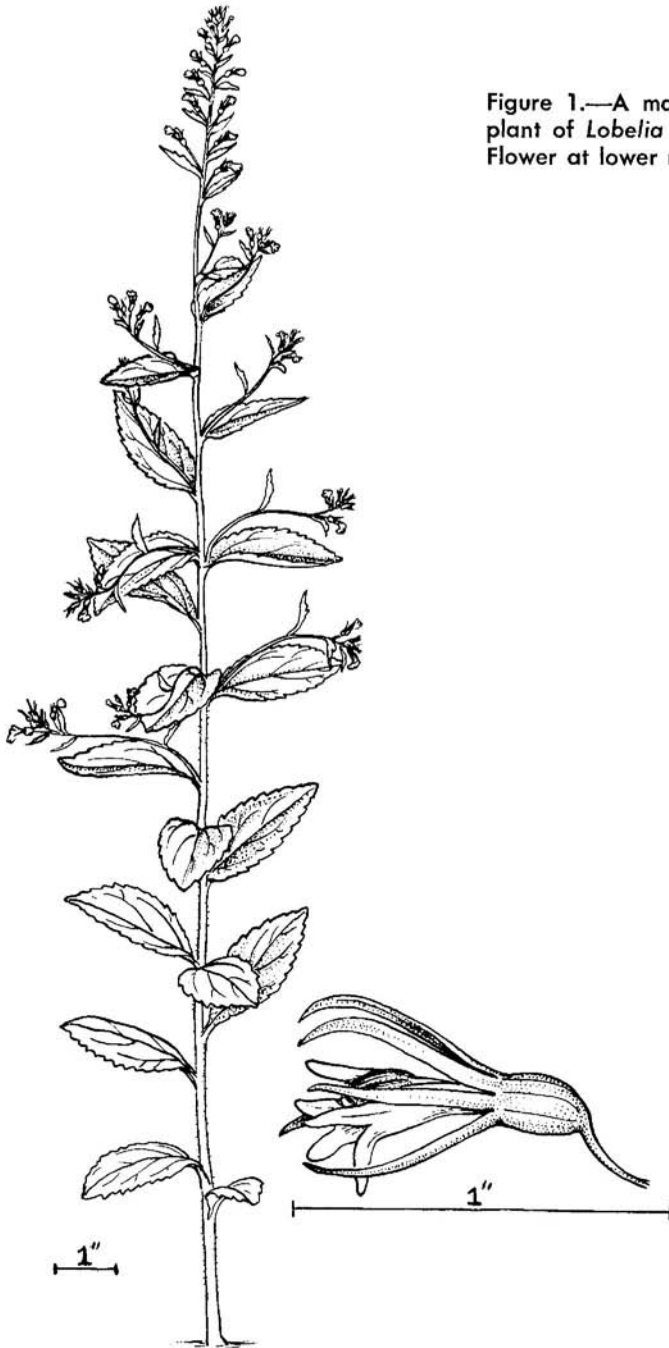
ARNOLD KROCHMAL was graduated from North Carolina State College in 1942; he received his master's degree in 1951 and his Ph.D. in 1952 from Cornell University in economic botany, with a minor in plant physiology. As a Fulbright professor he has worked in Greece, and in Afghanistan, Honduras, and the U.S. Virgin Islands. He has also served as a consultant in Thailand, the Dominican Republic, British Virgin Islands, Jamaica, Monserrat, and Surinam. In 1966 he joined the USDA Forest Service's Northeastern Forest Experiment Station as project leader and principal economic botanist in charge of the Station's timber-related crops research program, located at Berea, Kentucky.

LEON WILKEN was graduated cum laude from the College of Pharmacy at Loyola University in New Orleans in 1951; he received his master's degree in 1953 and his Ph.D. in 1963 from the University of Texas, Austin. From 1953 to 1963 he was employed as special instructor in pharmacy at the University of Texas; from 1963 to the present he has served as associate professor of pharmaceuticals at the School of Pharmacy at Auburn University, Auburn, Alabama. His current research involves the study of plants and folk medicine with active constituents and therapeutic value.

MANUSCRIPT RECEIVED FOR PUBLICATION 16 JULY 1970.

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Figure 1.—A mature wild
plant of *Lobelia inflata* L.
Flower at lower right.



INDIAN TOBACCO (*Lobelia inflata* L.) is the source of an alkaloid (lobeline) that is used in anti-smoking preparations. Because of a brisk market demand for lobelia—and a decline in the harvesting of wild plants—we have studied how to grow this wild Appalachian annual (fig. 1) as a row crop under cultivation.

Our studies, begun in 1967, have continued through 1970. We have learned how to germinate the seed and grow young plants for setting out in the field, and how to care for them until harvest (fig. 2).



Figure 2.—Under cultivation, *Lobelia inflata* plants become bushier and larger, and yield far more marketable plant material.

PROPAGATION

The seeds (fig. 3), which are smaller than tobacco seed, were harvested from wild plants in a wide range of habitats such as abandoned fields, open glades in hardwood forests, and old logging roads. We have found the plants growing on soils with pH's ranging from 4.1 to 5.8, and we believe they will thrive best on acid soils.

Seed harvest can begin about July and continue through August. It is easiest and most practical to harvest entire plants with seed capsules (fig. 1), and to remove the capsules indoors to minimize loss of seed. The plants can be air-dried for a week to 10 days; then the capsules will open easily, and seed removal is simple. We have used a 60-mesh screen to separate the seed from chaff. The seed are stored over winter at room temperature in mason

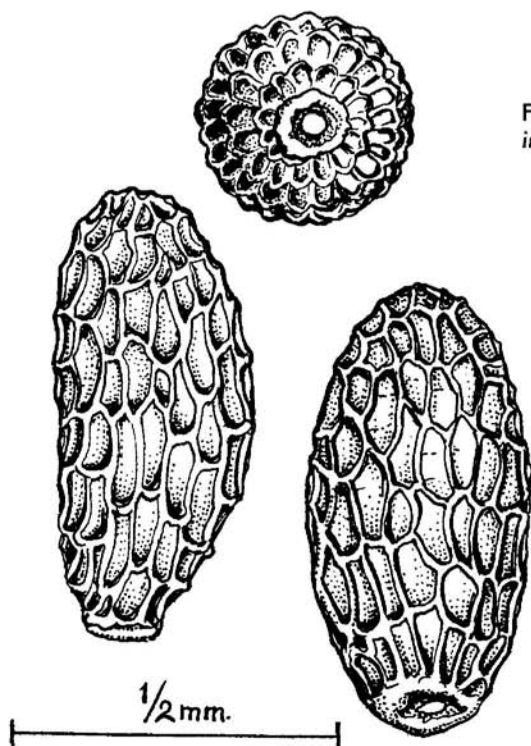


Figure 3.—Seed of *Lobelia inflata*.

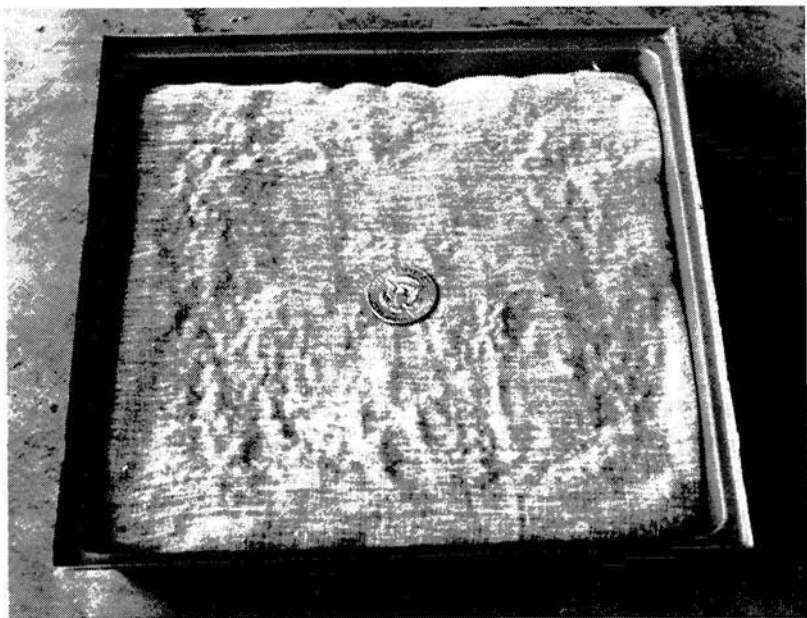


Figure 4.—A plastic seed flat ready for seeding.

jars with cheesecloth covers. Planting is done about January or February.

Seed flats are filled with a potting mix ($\frac{1}{3}$ sand, $\frac{1}{3}$ soil, $\frac{1}{3}$ peat), covered with cheesecloth (fig. 4); and the seeds are scattered over the top of the cheesecloth. Bottom watering is essential to keep the tiny seeds from washing together into clumps. The flats can be set in a shallow tray for this purpose (fig. 5).

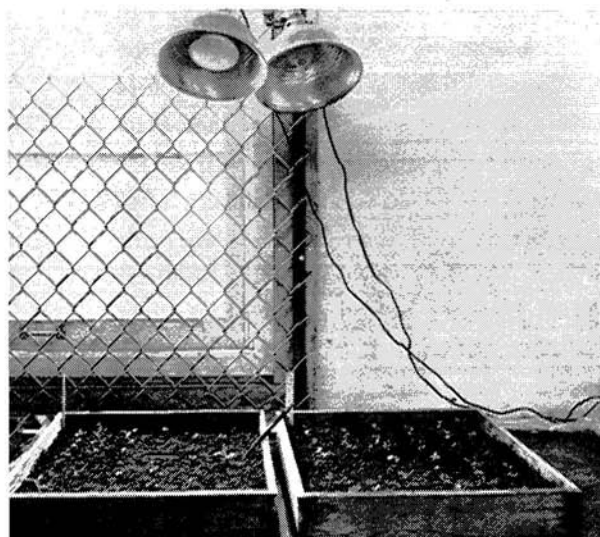


Figure 5.—Two reflectors with incandescent bulbs provide a continuous source of supplemental light. The flats are in a watering tray.



Figure 6.— Germinating lobelia plants are minute. (Photo by James Keen, Louisville Times.)



Figure 7.—When the plants are big enough for first transplanting, the cheesecloth has decayed and removing the plants is easy.



Figure 8.—A larger flat is useful for the larger plants after the first transplanting.

Light in the red end of the spectrum is required for germination. This can be provided by the use of incandescent household light bulbs. A continuous light source of two 200-watt bulbs, in reflectors, or one 200-watt and one 100-watt bulb (fig. 5), can be used to supplement or replace daylight. These lights can be placed about 2½ feet above the seed flats. Each set of 2 reflectors will serve 4 to 8 flats, depending on the size of the flats. Any suitable room or warm area with some sun exposure will do.

Germination takes place a week or 10 days after planting (fig. 6). After 6 to 8 weeks of growth, when some of the plants are about 1 to 1½ inches tall (fig. 7), they should be transplanted into seed flats at a spacing of 2 inches by 2 inches. These flats are filled with potting mix covered with 1 inch of peat moss (fig. 8).

FIELD PLANTING

Three to 5 weeks later, when the plants are about 2 inches tall, they are ready for field planting. We suggest small plantings of $\frac{1}{8}$ acre for growers until they gain experience in handling this plant.

The distance between rows will depend on the implements to be used for weed control, but the rows should be at least 18 inches apart. In Madison County, Kentucky, we have grown crops on silty clay loam with a heavy clay hardpan 24 inches below the surface and with poor drainage.

If flowering begins within a month of planting, removal of the flowers is suggested to increase initial vegetative growth. Weeds should be kept under control during the growing season; and as harvest time approaches, clear cultivation is required to facilitate harvesting while eliminating contaminating weed plants. No need for insecticides or fungicides has been noted.



Figure 9.—A young plant in a field. A ring of peat moss was placed around it at planting time to help conserve moisture.

Avoid the use of herbicides and the risk of contaminating the crop, because no information is available about the effects of various herbicides on lobelia.

In transplanting, a small amount of peat moss can be put into the planting hole, and handful around the base of the plant (fig. 9) to conserve moisture. As the plants are set, they should be watered. Watering should be frequent the first 2 weeks—daily or on alternate days—then as needed, depending on rainfall. No need for fertilizer has been established.

HARVESTING

Harvesting for maximum lobeline requires the plants to be cut at ground level when they are in full bloom, or at the time of early seed set in the middle of August or early September. At these times, plant yields will be highest. Harvesting can be done by knife, sickle, or mowing bar. The plants can be laid in windows until enough are cut to move to the drying area. Because this is a very new kind of crop, we have limited data for predicting yields.

DRYING

Harvested plants should go under cover as soon as practical to reduce possible rain damage and decay. Harvested plants can be spread out on newspaper several layers deep for about a week, or can be dried in a simple home-made drying box.

An inexpensive dryer using an electric forced-air heater can be built easily (fig. 10). The drying plants can be laid five or six layers deep in the trays.

When the plants are crackling dry, they can be bundled into burlap bales for shipment to the buyer. No standard weight or size of package has been established.

A partial list of buyers of botanicals is given in table 1.

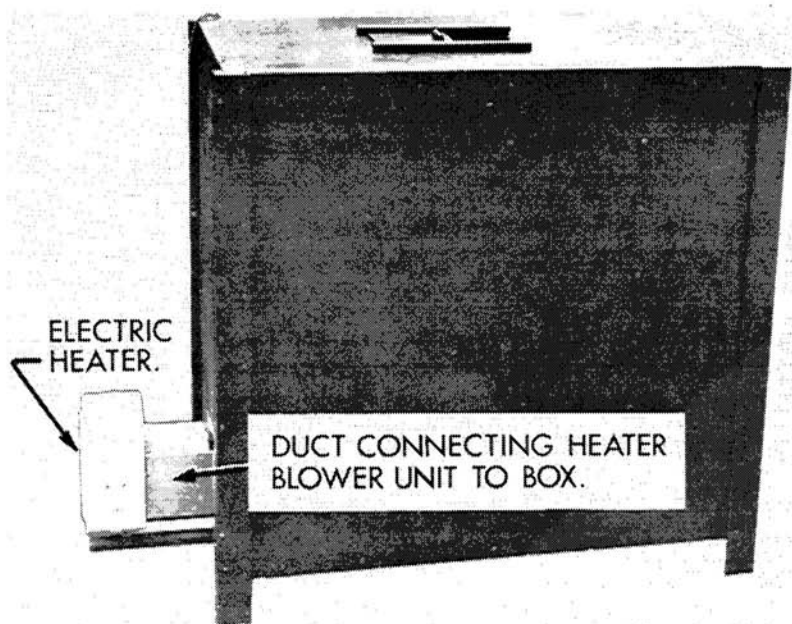


Figure 10.—Side (above) and front (below) views of a simple drying box, using a forced-air electric space heater.

Table 1.—Names and addresses of buying houses*

Name	Address
PURCHASERS OF BOTANICALS	
Blue Ridge Drug Company	Box 234, West. Jefferson, N.C. 28694
Coeburn Produce Company	Second and Grand Streets, Coeburn, Va. 24230
C. R. Graybeal	Roan Mountain, Tenn. 27687
F. C. Taylor Fur Company	227 E. Market Street, Louisville, Ky. 40202
Greer & Greer	Box 307, Princeton, W. Va. 24740
Greer Drug & Chemical Company	Box 800, Lenoir, N.C. 28645
Nature's Herb Company	281 Ellis Street, San Francisco, Calif. 90025
Old Fashioned Herb Company	581 N. Lake Avenue, Los Angeles, Calif. 90026
Smoky Mountain Drug Company	Box 2, 935 Shelby Street, Bristol, Tenn. 37620
Wilcox Drug Company	Box 391, Boone, N.C. 28620
Wilcox Drug Company, Inc.	Box 470, Pikeville, Ky. 41501
IMPORTERS THAT BUY, SELL, AND PROCESS BOTANICALS	
Hathaway Allied Products	2024 Westgate Avenue, Los Angeles, Calif. 90025
S. B. Penick & Company	100 Church Street, New York, N.Y. 10007
VENDORS OF DRUG AND HERB SEED AND OTHER PROPAGATING MATERIALS	
Gardens of the Blue Ridge	Ashford, N.C. 28603
Harry E. Saier	Dimondale, Michigan 48821
Indiana Botanic Gardens	Box 5, Hammond, Ind. 26325

*These firms are mentioned for information only, and this mention should not be considered as an endorsement or recommendation by the U. S. Department of Agriculture or the Forest Service.



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