Matthew Ng
Hort 5051
Neil Anderson
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Nicotiana wigandioides

Taxonomy:

Nicotiana wigandioides is an intraspecific hybrid cross between the common garden petunia (Petunia x hybrida) and a tobacco plant (Nicotiana spp.). Both the petunia and the tobacco plant are within the same family, the Solanaceae, but are of different subfamilies, genus and species. The subfamily for Petunia is Petunioidae. The subfamily for Nicotiana is Nicotianoideae. *Nicotiana wigandioides*, the petunia, and the tobacco plant all belong to the same family: Solanaceae. The common garden petunia is thought to be a hybrid cross between, for example, *P. integrifolia* and *P. axillaris*. This petunia, being an interspecific hybrid, would then be crossed with a plant in the genus *Nicotiana*. The genus *Nicotiana*, commonly known to contain tobacco plants, contains eighty four different species, a handful are hybrids. Nicotiana wigandioides is not mixed with a hybrid Nicotiana. The genus Petunia contains twenty three different species; many of the garden varieties of petunias are hybrids. Nicotiana wigandioides is known to be crossed with a hybrid petunia.

Geographical Distribution:

Not much is known about the geographical distribution of *Nicotiana wigandioides*. Since both the petunia and the tobacco plant are in the same plant family, and both plants are able to pollinate each other, the possibility exists for this hybridization to occur in nature. All other species of *Nicotiana* are native to South America with the remainder distributed through Central America, western North America, Australia, and various islands in the South Pacific.

Native Habitat:

Nicotiana wigandioides is native to La Paz, Bolivia, and the seeds for this plant were obtained from Siberia Chica, Carrasco Province at an elevation of 200 meters. The seeds were then sent to North Carolina and were obtained from North Carolina State University. The climate was a mountain rainforest climate where this species was found (USDA Germplasm Research Information Network, 2009). N. wigandioides was first cultivated outdoors in Sebastopol California in the mid 1800's and spread around by Luther Burbank on his experimental farm, but the plant did not survive the winter (Burbank, 1914).

Taxonomic Description:

Nicotiana wigandioides is a perennial eudicot, like all of the Nicotiana species (Winter, 2014). However, most smoking tobacco varieties are grown as annuals (Mackey, 2007). *N. wigandioides* can be from two to six feet tall.

Root

- A long fibrous root, brown and around 10-12 inches, or more.

Stem

- The stem is erect, dark purple-brown, woody and slightly glabrous.

Leaves

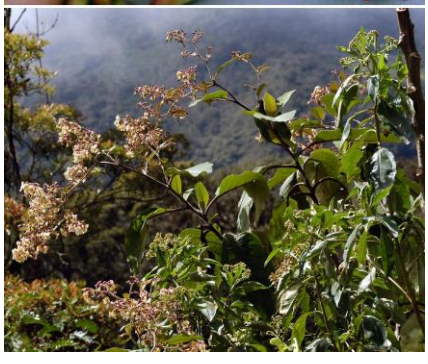
- Appear to grow angled toward the base of the plant, and can be lobed.
- Alternate, occurring as one leaf per node along the stem, often growing to be twenty inches long and ten inches wide! The veins of the leaves are pinnately-netted.
- The leaves are viscid, (but not pubescent like other *Nicotiana*). The leaves are varied in size and shape sometimes they are ovate, can be obcordate, or can be elliptic. A deep green color, with an entire margin. The veins of the leaves are pinnately-netted.

Flowers

- The flowers of *Nicotiana wigandioides* are numerous and smaller than other varieties of *Nicotia*.
- The flowers are mostly white with a reddish tinge of anthocyanin on the petals, sepals, and stem. Flowers can also appear to be tinged green in the petals near the receptacle and sepals.
- The flowers are borne on a terminal raceme panicle which can be compact to very lax with a short or long peduncle. The flowers are trumpet shaped, tubular, and hypogenous with conjoined petals that form a bucket-like ring around the sex organs.

Other Characteristics

- The plant gives off a narcotic odor of a putrid tobacco smell and has a burning taste. *Nicotiana wigandioides* is day neutral like all other species of Nicotiana and will begin to bloom in early summer (Procedures for Experimental Use, 2008).



Name and Description of Varieties/Cultivars on the Market:

There are currently no cultivars of Nicotiana wigandioides on the market, but there are different varieties/species of Nicotiana on the market. For example, the common smoking tobacco is *Nicotiana tabacum*. An example of a more ornamental Nicotiana species or "flowering tobacco" is *N. alata* which was one of the first Nicotiana species to gain popularity with gardeners (National Garden Bureau, 2009). Ornamental Nicotiana are commonly called "flowering tobacco" which can be confusing since all species of Nicotiana are flowering plants, but the name "flowering plant" just refers to the aesthetically pleasing flowers (Premier Star Company, 1999). Other types of Nicotiana that are not used ornamentally, but are used for other purposes, are

Propagation Methods:

Most *Nicotiana* is grown from seed in partial shade to full sun. The seeds take one to two weeks to germinate. Nicotiana does not prefer to have "wet feet" so if planted out doors the soil should be moist and not wet. The propagation method used in this experiment involved achieving seed germination.

From Seed:

No official information exists that provides instructions for germinating Nicotiana Wigandioides. An experiment was conducted where eight of the seeds were covered with vermiculite and eight of the seeds were not covered. The seeds were sown in a 288 plug cell tray on 2/27/14. After thirteen days, on 3/11/14 only two of the seeds germinated. One of the seeds was the vermiculite treated seed, and the other seed was the control.

The seeds of this plant seemed not to do well in the mist house, only two out of the eighteen that were planted actually germinated. The germinated seeds remained stunted and did not develop anything more than two small initial cotyledons until they were taken out of the mist house. The temperature in the mist house was a near 75 degrees during germination. When moved from the mist house, the *Nicotiana* sprouted their first true leaves, indicating that the plant prefers different germination requirements.

Seed dormancy for Nicotiana wigandioides was broken with the typical stimulation of the embryo by the imbibation of water. No other methods of scarification were used because the seeds were incredibly small. There is a possibility that the seeds were stratified because they were left in a seed vault at a lower temperature of x degrees for a prolonged period of time, but much of what is known about the germination of Nicotiana seeds seems to mention that no stratification or scarification methods need to be used for successful germination.

Product Specification:

Nicotiana could do well as an ornamental plant because of its pink tinged flowers in either a container or in a garden provided the climate is warm for long enough during germination and maturation.

Market Niche:

In cooler climates Nicotiana wigandioides should be grown indoors and planted outside after the last frost date (Trueman, 2014). This plant has the possibility of competing with other ornamental flowering tobacco.

A story about this plant could be that it was originally grown by Luther Burbank. It could also be a good plant to pair with petunias as well, that is, if one wanted to contrast with other plants in the Solanaceae.

The limitations of this crop would be cooler weather. Most Nicotiana take about three moths to reach maturity and flower (Winter, 2000), so in Minnesota where winter lasts from November to May, there would be only around two to three months of Nicotiana flowers, otherwise the plant would stay quite "leafy" and boring until flowers appeared. Like other Nicotiana species, Nicotiana wigandioides could have viscid (sticky) leaves which could be problematic if a person is mulching near the plant and happens to get mulch stuck on the leaves.

Anticipated Cultural Requirements:

In Lapaz Bolivia where *Nicotiana wigandioides* grows, the hardiness zones could be 9a, 9b, 10a, and 10b (Central and South America Hardiness Zones, 2011). In the US, these hardiness zones seem to be in the southern, southwestern, and southeastern portion of the country. The ASHS plant heat zone map indicates that based on the hardiness zones where this plant would most likely have optimal conditions in plant heat zones 8 to 11.

Production Schedule:

Nicotiana wigandioides should be sold in seed packets. The plant also could be allowed to mature to flowering stage and sold in a large flower pot, approximately twenty inches tall and at least one to two inches in diameter. The estimated time that it takes for seeds of this plant to germinate, according to the results of the experiment, is 7 to 14 days. From germination to maturation and then to flowering is anyone's guess, since the plant never had enough time to mature, but could be based on the amount of time it takes for other Nicotiana species to flower; "roughly ninety days in zones 9a through 10a" (Premier Star Company, 1999). This crop should be sold as a spring or summer plant, it probably would not be suitable for any holiday themed merchandise.

Needs Assessment for Genetic Improvement:

It is hard to say for certain how exactly Nicotiana wigandioides could be improved through traditional breeding techniques. One thing that might be able to be improved is the viscidity of the leaves. Some people have complained that soil and other debris sticks to the leaves when it is stirred up near the plant (Mackey 2007). Perhaps if this trait was

eliminated, it would make the plant both aesthetically pleasing to the touch and easier to manage if a person needs to cultivate the soil around the plant. Another thing that might make this plant a bit better would be to try to raise the germination potential. Out of all of the seeds used in this experiment, only two germinated. This means that the germination percentage was only 11%.

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