

Family: Boraginaceae

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Plant Systematics

Family: Boraginaceae

The family Boraginaceae is comprised mostly of hairy herbaceous plants with alternate, simple, entire leaves that do not have stipules. The inflorescence of the plant is usually a helicoid cyme that looks spike-like when it is expanded with the flowers in parts of five and having a superior ovary. In the family there are over 100 genera and 2,000 species found worldwide but only thirteen genera and twenty-five species are found in Pennsylvania according to The Plants of Pennsylvania book by Rhoads and Block. The map below shows the distribution for the whole Boraginaceae family that is present in the herbarium.

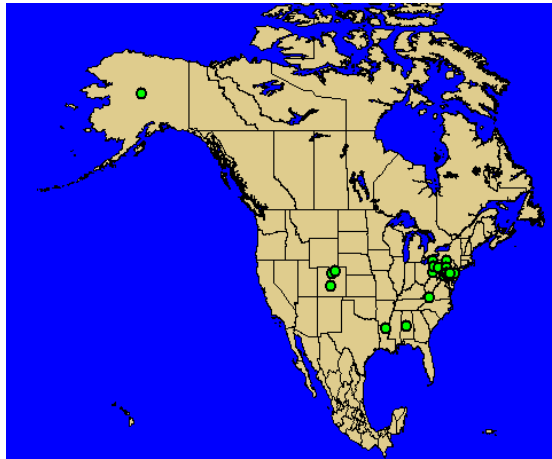


Figure 1. The distribution for the whole Boraginaceae family that is present in the herbarium.

Genus: Anchusa

The first genus present in the Millersville University herbarium is *Anchusa*. Only one sample of this genus is in the herbarium and it is labeled as *Anchusa officianlis* L. and was found in Boulder County Colorado. However in the book The Plants of Pennsylvania the only specie that the authors listed as present in Pennsylvania is *Anchusa*

azurea Mill. The description of the genus *Anchusa* is that it is a single stemmed hairy plant. It is a perennial with petioled basal leaves. The flowers are in a helicoid false raceme and are blue. Typically this plant is cultivated and it flowers from May to July and is a native of the Mediterranean regions. After searching on the Pennsylvania flora database it can be said that the Millersville University herbarium correctly represents the distribution of the specie *Anchusa officianlis* L. There are no known species in the state by that name according to the database which is correctly represented in the herbarium. The North American flora database does not allow access to the family Boraginaceae and therefore could not be searched for any of the following genera or species listed in this report. The map below shows the distribution for the whole *Anchusa* genus that is present in the herbarium.

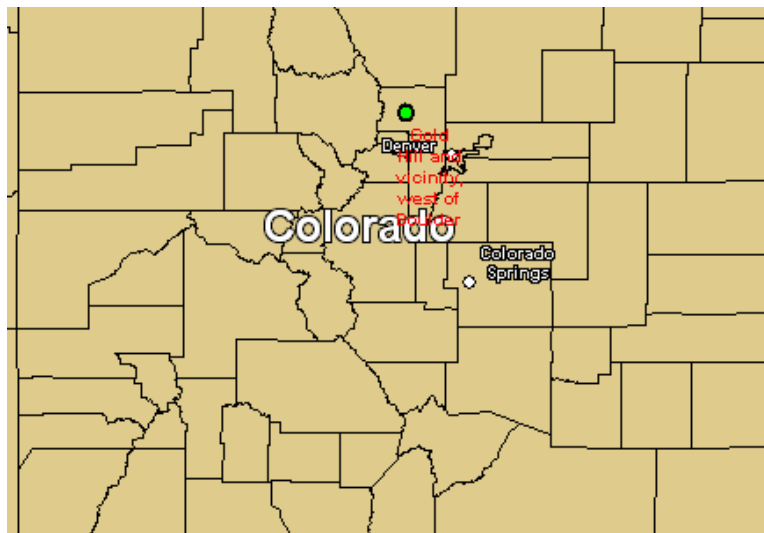


Figure 2. The distribution for the whole *Anchusa* genus that is present in the herbarium.

Genus: *Cynoglossum*

The next genus present in the Millersville University herbarium is *Cynoglossum*. Only one sample of this genus is found in the herbarium and is labeled *Cynoglossum officinale* L. and was found in Monroe County Virginia. The book *The Plants of*

Pennsylvania describes three species of *Cynoglossum* L. found in Pennsylvania. The genus *Cynoglossum* can be described as an erect herb with large leaves. The flowers are in terminal helicoid chymes that seem raceme-like when they are expanded. The corolla is in a tube which is almost closed completely due to hairy appendages at the top of the tube. The color of the flower varies according to species, ranging from a reddish purple to a blue. All species present in Pennsylvania flower during the months of May through June. After searching on the Pennsylvania flora database it can be said that the Millersville University herbarium does not correctly represent the distribution of the specie *Cynoglossum officinale* L. Only one sample is present in the herbarium but the sample was taken from Virginia. The database clearly shows that the specie is distributed throughout most of Pennsylvania except most of Central Pennsylvania. The map below shows the distribution for the whole *Cynoglossum* genus that is present in the herbarium.

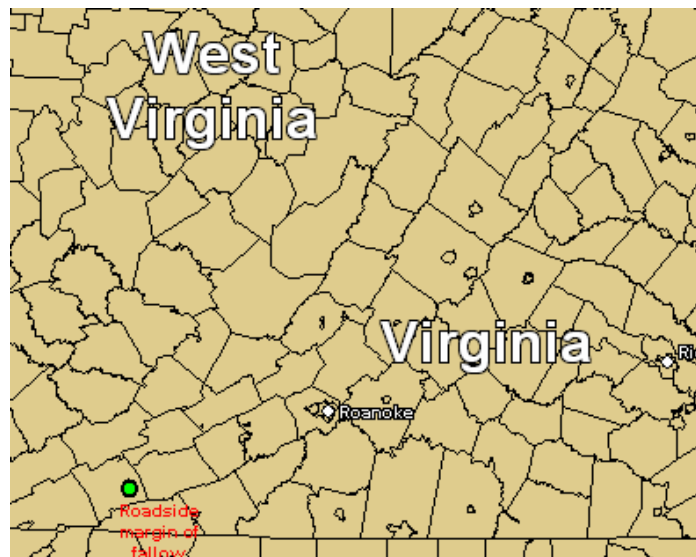


Figure 3. the distribution for the whole *Cynoglossum* genus that is present in the herbarium.

Genus: Echium

The next genus found in the Millersville University Herbarium is *Echium*. Two samples of this genus are found in the herbarium and are both labeled *Echium vulgare* L. and were found in Lancaster County Pennsylvania and Lebanon County Pennsylvania. According to the book *The Plants of Pennsylvania* only one specie in the genus *Echium* is found in Pennsylvania: *Echium vulgare* L. The book describes the genus *Echium* as an erect biennial that is roughly hairy. It grows to 8 decimeters. The flowers are blue in color and are arranged alternately on the terminal end of the stem in many short helicoid cymes and flowers in late June through September. It is typically found in the south in open dry areas such as fields. The genus is native to Europe. After searching on the Pennsylvania flora database it can be said that the Millersville University herbarium it shows that the herbarium does not correctly represent the distribution of the specie *Echium vulgare* L. The database shows that the specie is distributed throughout Pennsylvania and not just concentrated in Lancaster and Lebanon Counties. The map below shows the distribution for the whole *Echium* genus that is present in the herbarium.

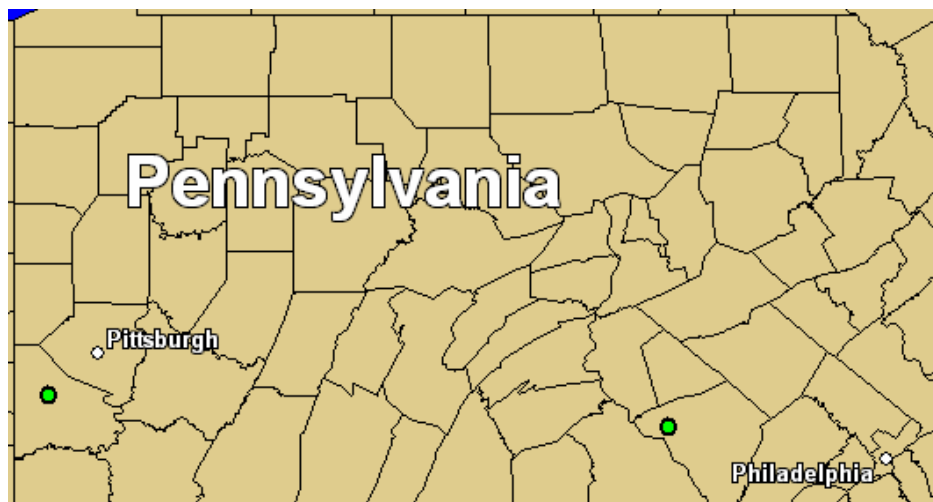


Figure 4. The distribution for the whole *Echium* genus that is present in the herbarium.

Genus: *Lithospermum*

The next genus found in the Millersville University herbarium is *Lithospermum*. There are fifteen different specimen samples total in the herbarium and three different species were collected: *Lithospermum arvense* L., *Lithospermum multiflorum* Torr. Ex T. & G., and *Lithospermum canescens*. Only one sample of *Lithospermum multiflorum* Torr. Ex T. & G. was collected and it was the only sample that was not collected in Pennsylvania, it was collected in Clear Creek County Colorado. According to the book *The Plants of Pennsylvania* that specie is not present in Pennsylvania. The rest of the samples were collected in Pennsylvania in Lancaster, York, Northumberland, and Union counties. The genus is described as erect perennials that have both hairy stems and hairy leaves. The flowers range in colors from orange, yellow, or yellowish white and are generally either in cymes or solitary on the upper axils of the plant. Depending on the specie the plant flowers between April and July. After searching on the Pennsylvania flora database it can be said that the Millersville University herbarium it shows that the herbarium does not correctly represent the distribution of the specie *Lithospermum arvense* L. the herbarium has a sample that was collected in Pennsylvania, but the database says that the specie is no present in Pennsylvania. The herbarium correctly represents the distribution of *Lithospermum multiflorum* Torr. Ex T. & G. in Pennsylvania. There are no records of the specie in the state in the database just as there are no samples of the specie in the herbarium. The herbarium does not represent the same distribution of the specie *Lithospermum canescens* as the database. The counties where the specie was found for the herbarium are not any of the same counties listed on the database. The map below shows the distribution for the whole Lithosperm genus that is present in the herbarium.

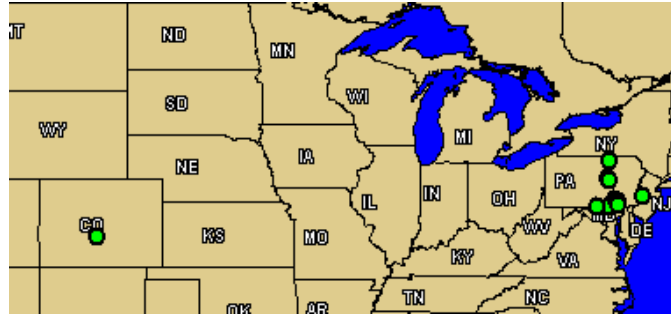


Figure 5. The distribution for the whole Lithosperm genus that is present in the herbarium.

Genus: *Mertensia*

The next genus found in the Millersville University herbarium is *Mertensia*. There are twenty one samples present in the herbarium of this genus and two different species: *Mertensia virginica* (L.) Pers. and *Mertensia viridis*. Only two samples of *Mertensia viridis* were collected which were the only two samples not collected in Pennsylvania, they were collected in Clear Creek County Colorado. According to the book *The Plants of Pennsylvania* that specie is not present in Pennsylvania. The rest of the samples were found in Pennsylvania in Butler, Cumberland, Lancaster, Northumberland and York counties. The genus is described as either an erect or ascending perennial that can be three to seven decimeters tall. The flowers of the plant are in a terminal cyme and are not subtended by a bract. They are usually blue, but can be pink or white. The plant flowers in late April through early May. After searching on the Pennsylvania flora database it can be said that the Millersville University herbarium it shows that the herbarium does not correctly represent the distribution of the specie *Mertensia virginica* (L.) Pers. The distribution of the species is far more extensive than the herbarium collection represents. The herbarium correctly represents the distribution

of the specie *Mertensia viridis* for the state of Pennsylvania because both the database and the herbarium do not show that any of the species are growing within the state. The map below shows the distribution for the whole *Mertensia* genus that is present in the herbarium.

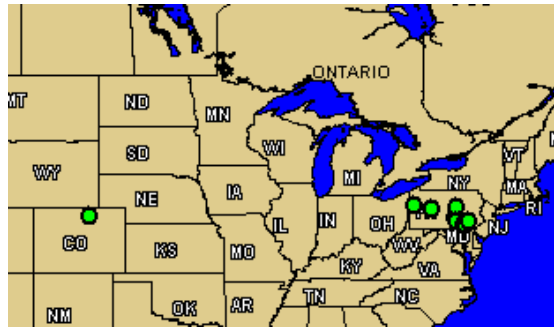


Figure 6. The distribution for the whole *Mertensia* genus that is present in the herbarium.

Genus: *Myosotis*

The next genus found in the Millersville University herbarium is *Myosotis*. There are seven samples found in the herbarium of this genus and five different species: *Myosotis scorpioides* L., *Myosotis macrosperma*, *Myosotis arvensis* L., *Myosotis alpestris*, *Myosotis sylvatica* Hoffm. Only one sample of *Myosotis macrosperma* was collected and it was found in Louisiana, although according to *The Plants of Pennsylvania* book it can be found in Pennsylvania. Only one sample of *Myosotis alpestris* was collected and it was found in Alaska and it cannot be found in Pennsylvania, according to *The Plants of Pennsylvania* book. The rest of the samples were collected in Lancaster, Lebanon, and York counties in Pennsylvania. The genus *Myosotis* can be described as an herb with small flowers in terminal helicoid cymes that can appear to be raceme like when they are fully in bloom. The flower color is typically

blue although it can be yellowish or white and it often has a yellow center. For most of the species in this genus flowering starts in May and ends in June or starts in June and lasts until September. Most of the plants are typically found in the Southern United States and are native to Europe. The specie *Myosotis sylvatica* Hoffm. Is the garden forget-me-not which is usually a cultivated plant and hardly ever wild. The rest of the species are typically wild. . After searching on the Pennsylvania flora database it can be said that the Millersville University herbarium it shows that the herbarium does not correctly represent the distribution of the specie *Myosotis scorpioides* L. the distribution is far more extensive in Pennsylvania than the herbarium collection shows. The herbarium very closely represents the distribution of the species *Myosotis arvensis* L. and *Myosotis sylvatica* Hoffm. They are slightly more distributed on the database than the herbarium but not by much. The database shows that *Myosotis macrosperma* is present in Lancaster County Pennsylvania, while the herbarium only has a collected sample from Louisiana. The database does not show any present species of *Myosotis alpestris* which is consistent with herbarium since the only sample was collected in Alaska. The map below shows the distribution for the whole *Myosotis* genus that is present in the herbarium.

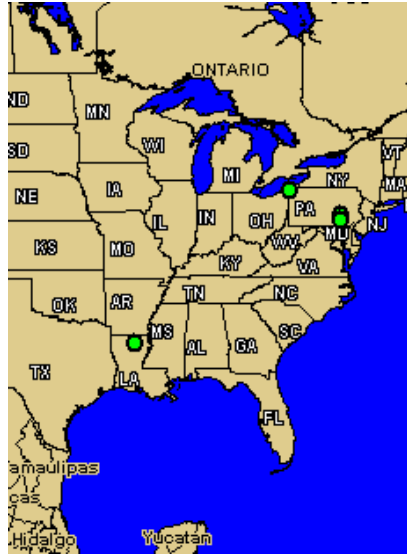


Figure 7. The distribution for the whole *Myosotis* genus that is present in the herbarium.

Genus: *Onosmodium*

The next genus found in the Millersville University herbarium is *Onosmodium*. There is only one sample found in the herbarium and it was collected in Franklin County Alabama. The sample is of the specie *Onosmodium molle* Michx. Although it was found in Alabama it can also be found in Pennsylvania according to The Plants of Pennsylvania book. The book describes the plant as a course hairy perennial having leafy stems. The flowers are in helicoid cymes. The corolla is hairy and almost tubular in shape with erect lobes. Flowering for this genus usually occurs from late June through early July. These plants are rarely found in dry soil on hillsides and pastures and typically are found in the Southern United States. After searching on the Pennsylvania flora database it can be said that the Millersville University herbarium it shows that the herbarium does not correctly represent the distribution of the specie *Onosmodium molle* Michx. It is found in a few

counties in south central Pennsylvania on the database, but is only represented in the herbarium from Alabama. The map below shows the distribution for the whole *Onosmodium* genus that is present in the herbarium.

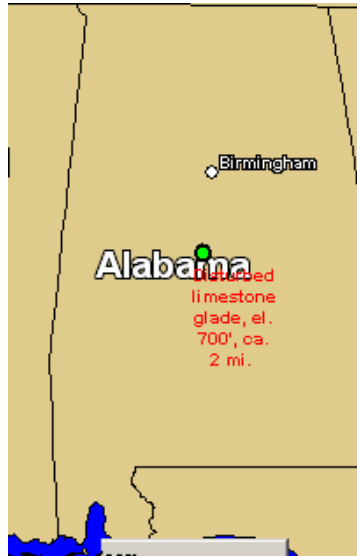


Figure 8. The distribution for the whole *Onosmodium* genus that is present in the herbarium.

Genus: *Phacelia*

The next genus found in the Millersville University herbarium is *Phacelia*. There is only one sample found in the herbarium collection, and it is of the specie *Phacelia dubia* L. It was collected in Adams County Pennsylvania. In the book *The Plants of Pennsylvania* this specie was not placed under the family Boraginaceae, instead it was placed under the family Hydrophyllaceae. Genetic evidence shows that the plant actually belongs to the Boraginaceae family. The genus can be described as an annual or biennial hairy herb. The leaves are alternating and are pinnately lobed. The flowers are arranged in a helicoid cyme and are blue or white. The plants are mostly found in the south and flower from May to early June. After searching on the Pennsylvania flora database it can

be said that the Millersville University herbarium it shows that the herbarium correctly represents the distribution of the specie *Phacelia dubia* L. However the database shows that the distribution is a little more extensive than the herbarium represents. The map below shows the distribution for the whole Phacelia genus that is present in the herbarium.



Figure 9. The distribution for the whole Phacelia genus that is present in the herbarium.