

ORDER 31. POLYGALACEÆ. (MILKWORT FAMILY.)

Plants with irregular hypogynous flowers, 4-8 diadelphous or monadelphous stamens, their 1-celled anthers opening at the top by a pore or chink; the fruit a 2-celled and 2-seeded pod.

1. POLYGALA, Tourn. MILKWORT.

Flower very irregular. Calyx persistent, of 5 sepals, of which 3 (the upper and the 2 lower) are small and often greenish, while the two lateral or inner (called *wings*) are much larger, and colored like the petals. Petals 3, hypogynous, connected with each other and with the stamen-tube, the middle (lower) one keel-shaped and often crested on the back. Stamens 6 or 8; their filaments united below into a split sheath, or into 2 sets, cohering more or less with the petals, free above; anthers 1-celled, often cup-shaped, opening by a hole or broad chink at the apex. Ovary 2-celled, with a single anatropous ovule pendulous in each cell; style prolonged and curved; stigma various. Fruit a small, loculicidal 2-seeded pod, usually rounded and notched at the apex, much flattened contrary to the very narrow partition. Seeds carunculate. Embryo large, straight, with flat and broad cotyledons, in scanty albumen. — Bitter plants (low herbs in temperate regions), with simple entire often dotted leaves, and no stipules; sometimes (as in the first two species) bearing cleistogamous flowers next the ground. (An old name composed of *πολύς*, much, and *γάλα*, milk, from a fancied property of its increasing this secretion.)

* Perennial or biennial; flowers purple or white; leaves alternate.

+ Flowers showy, rose-purple, conspicuously crested; also bearing inconspicuous colorless cleistogamous flowers on subterranean branches.

1. *P. paucifolia*, Willd. Perennial; flowering stems short (3-4' high), from long slender prostrate or subterranean shoots, which also bear concealed fertile flowers; lower leaves small and scale-like, scattered, the upper ovate, petioled, crowded at the summit; flowers 1-3, large, peduncled; wings obovate, rather shorter than the fringe-crested keel; stamens 6; caruncle of 2 or 3 awl-shaped lobes longer than the seed. — Woods, in light soil, N. Eng. to Minn., Ill., and southward along the Alleghanies. May. — A delicate plant, with very handsome flowers, 9" long, rose-purple, or rarely pure white. Sometimes called *Flowering Wintergreen*, but more appropriately FRINGED POLYGALA.

2. *P. polygama*, Walt. Stems numerous from the biennial root, mostly simple, ascending, very leafy (6-9' high); leaves oblanceolate or oblong; terminal raceme loosely many-flowered, the broadly obovate wings longer than the keel; stamens 8; radical flowers racemed on short subterranean runners; lobes of the caruncle 2, scale-like, shorter than the seed. — Dry sandy soil; common. July.

+ Flowers white, in a solitary close spike; none cleistogamous.

3. *P. Sénega*, L. (SENECA SNAKE-ROOT.) Stems several from thick and hard knotty rootstocks, simple (6-12' high); leaves lanceolate or oblong-lanceolate, with rough margins; wings round-obovate, concave; crest short; caruncle nearly as long as the seed. — Rocky soil, W. New Eng. to Minn., and southward. May, June.

Var. *latifolia*, Torr. & Gray. Taller, sometimes branched; leaves ovate or ovate-lanceolate, 2-4' long, tapering to each end. — Md. to Mich. and Ky.

4. *P. álba*, Nutt. Stems several from a hard rootstock, 1' high; leaves narrowly linear, 3-12" long, acute; wings oblong-obovate; crest small; lobes of the caruncle half the length of the appressed-silky seed. — Neb. and Kan. to Tex.

* * * Annuals, with all the leaves alternate; flowers in terminal spikes, heads or racemes, purple or rose-color, in summer; none subterranean.

+ Keel conspicuously crested; claws of the true petals united into a long and slender cleft tube much surpassing the wings.

5. *P. incarnáta*, L. Glaucons; stem slender, sparingly branched; leaves minute and linear-awl-shaped; spike cylindrical; flowers flesh-color; caruncle longer than the narrow stalk of the hairy seed. — Dry soil, Penn. to Wisc., Iowa, Neb., and southward; rather rare.

+ Keel minutely or inconspicuously crested; the true petals not longer but mostly shorter than the wings; seed pear-shaped.

6. *P. sanguinea*, L. Stem sparingly branched above, leafy to the top; leaves oblong-linear; heads globular, at length oblong, very dense (4-5" thick), bright red-purple (rarely paler or even white); pedicels scarcely any; wings broadly ovate, closely sessile, longer than the pod; the 2-parted caruncle almost equalling the seed. — Sandy and moist ground; common.

7. *P. fastigiáta*, Nutt. Stem slender, at length corymbosely branched; leaves narrowly linear, acute, 3-8" long; spikes short and dense (3" in diameter); the small rose-purple flowers on pedicels of about the length of the pod; wings obovate or oval-oblong, narrowed at the base, scarcely exceeding the pod; bracts deciduous with the flowers or fruits; caruncle as long as and nearly enveloping the stalk-like base of the minutely hairy seed. — Pine barrens of N. J. and Del. to Ky., and southward.

8. *P. Nuttállii*, Torr. & Gray. Resembles the last, but usually lower; spikes cylindrical, narrow; flowers duller or greenish purple, on very short pedicels; the awl-shaped scaly bracts persistent on the axis after the flowers or fruits fall; seed very hairy, the caruncle smaller. — Dry sandy soil, coast of Mass. to Mo., and southward. — Spike sometimes rather loose.

9. *P. Curtissii*, Gray. Slender (9' high); leaves, etc., as in the two preceding; flowers rose-purple, in usually short racemes; pedicels about equalling or exceeding the persistent bracts; the narrow oblong erect wings fully twice the length of the pod; caruncle small, on one side of the stalk-like base of the very hairy seed, which is conspicuously apiculate at the broader end. — Md. to Ga. — The species was founded upon an abnormal form with elongated racemes and pedicels.

* * * Annuals with at least the lower stem-leaves whorled in fours, sometimes in fives; spikes terminating the stem and branches; fl. summer and autumn.

+ Spikes short and thick (4-9" in diameter); bracts persisting after the fall of the (middle-sized) rose or greenish purple flowers; crest small.

10. *P. cruciáta*, L. Stems (3-10' high) almost winged at the angles, with spreading opposite branches; leaves nearly all in fours, linear and somewhat spatulate or oblanceolate; spikes sessile or nearly so; wings broadly

deltoid-ovate, slightly heart-shaped, tapering to a bristly point or rarely pointless; caruncle nearly as long as the seed. — Margin of swamps, Maine to Va. and southward near the coast, and west to Minn. and Neb.

11. *P. brevifolia*, Nutt. Rather slender, branched above; leaves scattered on the branches, narrower; spikes peduncled; wings lanceolate-ovate, pointless or barely mucronate. — Margin of sandy bogs, R. I., N. J., and southward.

— Spikes slender (about 2' thick), the bracts falling with the flowers, which are small, greenish-white or barely tinged with purple, the crest of the keel larger.

12. *P. verticillata*, L. Slender (6–10' high), much branched; stem-leaves all whorled, those of the (mostly opposite) branches scattered, linear, acute; spikes peduncled, usually short and dense, acute; wings round, clawed; the 2-lobed caruncle half the length of the seed. — Dry soil; common.

Var. *ambigua*. Leaves (and branches) all scattered or the lowest in fours; spikes long-peduncled, more slender, the flowers often purplish and scattered. (*P. ambigua*, Nutt.) — N. Y. to Mo., and southward.

*** Biennials or annuals, with alternate leaves, and yellow flowers, which are disposed to turn greenish in drying; crest small; flowering all summer.

13. *P. lutea*, L. Low; flowers (bright orange-yellow) in solitary ovate or oblong heads ($\frac{3}{4}$ ' thick) terminating the stem or simple branches; leaves (1–2' long) obovate or spatulate; lobes of the caruncle nearly as long as the seed. — Sandy swamps, N. J. and southward, near the coast.

14. *P. ramosa*, Ell. Flowers (citron-yellow) in numerous short and dense spike-like racemes collected in a flat-topped compound cyme; leaves oblong-linear, the lowest spatulate or obovate; seeds ovoid, minutely hairy, twice the length of the caruncle. — Damp pine-barrens, Del. and southward.

15. *P. cymosa*, Walt. Stem short, naked above, the numerous racemes in a usually nearly simple cyme; leaves narrow, acuminate; seeds globose, without caruncle. — Del. and southward.

ORDER 32. LEGUMINOSÆ. (PULSE FAMILY.)

Plants with papilionaceous or sometimes regular flowers, 10 (rarely 5 and sometimes many) monadelphous, diadelphous, or rarely distinct stamens, and a single simple free pistil, becoming a legume in fruit. Seeds mostly without albumen. Leaves alternate, with stipules, usually compound. One of the sepals inferior (i. e. next the bract); one of the petals superior (i. e. next the axis of the inflorescence). — A very large order (nearly free from noxious qualities), of which the principal representatives in northern temperate regions belong to the first of the three suborders it comprises.

SUBORDER I. *Papilionaceæ*. Calyx of 5 sepals, more or less united, often unequally so. Corolla inserted into the base of the calyx, of 5 irregular petals (or very rarely fewer), more or less distinctly papilionaceous, i. e. with the upper or odd petal (*vexillum* or *standard*) larger than the others and enclosing them in the bud, usually turned backward

or spreading; the two lateral ones (*wings*) oblique and exterior to the two lower, which last are connivent and commonly more or less coherent by their anterior edges, forming the *carina* or *keel*, which usually encloses the stamens and pistil. Stamens 10, very rarely 5, inserted with the corolla, monadelphous, diadelphous (mostly with 9 united into a tube which is cleft on the upper side, and the tenth or upper one separate), or occasionally distinct. Ovary 1-celled, sometimes 2-celled by an intrusion of one of the sutures, or transversely 2-many-celled by cross-division into joints; style simple; ovules amphitropous, rarely anatropous. Cotyledons large, thick or thickish; radicle incurved. — Leaves simple or simply compound, the earliest ones in germination usually opposite, the rest alternate; leaflets almost always quite entire. Flowers perfect, solitary and axillary, or in spikes, racemes, or panicles.

I. Stamens (10) distinct.

* Leaves palmately 3-foliolate or simple; calyx 4–5-lobed; herbs. (PORRIGÆÆ.)

1. *Baptisia*. Pod inflated.

2. *Thermopsis*. Pod flat, linear.

* * Leaves pinnate; calyx-teeth short. (SOPHOREÆ.)

3. *Cladrastis*. Flowers panicled, white. Pod flat. A tree.

4. *Sophora*. Flowers racemose, white. Pod terete, moniliform. Herbaceous.

II. Stamens monadelphous, or diadelphous (9 and 1, rarely 5 and 5); nearly distinct in n. 14.

* Anthers of two forms; stamens monadelphous; leaves digitate or simple; leaflets entire. (GENISTEÆ.)

5. *Crotalaria*. Calyx 5-lobed. Pod inflated. Leaves simple.

6. *Genista*. Calyx 2-lipped. Pod flat. Seed estrophiolate. Leaves simple. Shrubby.

7. *Cytisus*. Calyx 2-lipped. Pod flat. Seed strophiliolate. Leaves 1–3-foliolate. Shrubby.

8. *Lupinus*. Calyx deeply 2-lipped. Pod flat. Leaves 7–11-foliolate.

* * Anthers uniform (except in n. 13 and 29).

— Leaves digitately (rarely pinnately) 3-foliolate; leaflets denticulate or serrulate; stamens diadelphous; pods small, 1–few-seeded, often enclosed in the calyx or curved or coiled. (TRIFOLIÆÆ.)

9. *Trifolium*. Flowers capitate. Pods membranaceous, 1–6-seeded. Petals adherent to the stamen-tube.

10. *Medicago*. Flowers racemed. Pod coriaceous, wrinkled, 1–2-seeded.

11. *Medicago*. Flowers racemed or spiked. Pods curved or coiled, 1–few-seeded.

* * Leaves unequally pinnate (or digitate in n. 13); pod not jointed; not twining nor climbing (except n. 20).

** Flowers umbellate (solitary in ours) on axillary peduncles. (LOTEÆÆ.)

12. *Hosackia*. Leaves 1–3-foliolate. Peduncle leafy-bracteate. Pod linear.

* * * Flowers in spikes, racemes, or heads. (GALEGEÆÆ.)

— Herbage glandular-dotted; stamens mostly monadelphous; pod small, indehiscent, mostly 1-seeded; leaves pinnate (except in n. 13).

13. *Psoralea*. Corolla truly papilionaceous. Stamens 10, half of the anthers often smaller or less perfect. Leaves mostly palmately 3–5-foliolate.

14. *Amorpha*. Corolla of one petal! Stamens 10, monadelphous at base.

15. *Dalea*. Corolla imperfectly papilionaceous. Stamens 9 or 10; the cleft tube of filaments bearing 4 of the petals about its middle.

16. *Petalostemon*. Corolla scarcely at all papilionaceous. Stamens 5; the cleft tube of filaments bearing 4 of the petals on its summit.