Crataegus laevigata (Poir.) DC., *C. monogyna* Jacq.

Standardized Common Name: Hawthorn

Other Common Names: English Hawthorn, Haw, May Tree, One-seed Hawthorn (*C. monogyna*)

Family: Rosaceae

Taxonomy: *Crataegus* includes perhaps 200 to 250 species of shrubs and small trees, all native to temperate parts of the Northern Hemisphere. The species of *Crataegus* are highly variable and species boundaries are arguable; as a result, the nomenclature is exceedingly complex. Several dozen species-level synonyms refer to each of these two species, both of which belong to Sect. *Crataegus*. The name *C. oxyacantha* L., commonly used for *C. laevigata*, has been officially rejected due to a history of incorrect usage.

Hybridization among these and other species is extremely common, and hybrid populations often are named as nothospecies. The hybrid between *C. laevigata* and *C. monogyna* may be called *C.* ×*media* Bechstein; such hybridization is nearly ubiquitous where the species' ranges overlap. Likewise, hybridization with several other species is recognized and commonplace, resulting in gene flow from other species into the parent populations. Probably few "pure" populations of any species, according to the current species concept, have ever existed.

Description: Shrub or small tree to 8–10 m high, usually bearing indeterminate thorns. Leaves alternate, stipulate, petiolate; shape variable within species, often depending on position on plant, with those on flowering shoots less lobed; upper surface dark green; lower surface pale, more or less soft-pubescent at least on major veins and in vein axils. Inflorescence a corymb, 3–15-flowered, glabrous or pubescent; flowers subtended by linear deciduous bracts; pedicels short to >3 cm long. Hypanthium green, to 4 mm long, glabrous or pubescent. Sepal lobes 5, triangular, often pubescent near apex. Petals 5, white (or dark red in a few cultivars). Stamens numerous; anthers purple. Ovary inferior. Fruit a drupe, red with yellowish flesh, glabrous or pubescent, with persistent sepal lobes at apex; pyrenes usually equal in number to styles, longitudinally grooved on both dorsal and ventral sides.

Crataegus laevigata: Thorns 1–2 cm long or absent. Leaves 2–7 cm long, 1.5–5 cm broad, broadly ovate to rhomboid or suborbicular, with (0–)1–2(–3) pairs of shallow lateral lobes, often all above the midpoint of the leaf; leaves on short shoots narrower and more conspicuously lobed than those on flowering shoots; margins coarsely serrate; apices of lobes obtuse, toothed; base cuneate or somewhat rounded; upper surface more or less soft-pubescent along main veins. Sepal lobes 0.9–2.8 mm long, 1.4–2.6 mm broad; apices acute to round-tipped. Petals 5–10 mm long, 5–9 mm broad. Styles (1–)2–3(–5). Fruit subglobose to broadly ellipsoidal, 6–14 mm long.

Crataegus monogyna: Thorns to 2.5 cm long. Leaves 1–6 cm long, 1–6 cm broad, broadly ovate, deltoid or suborbicular or rarely obovate, with 1–4 pairs of deeply incised lateral lobes, the lowest usually below the midpoint of the leaf, except leaves on flowering shoots sometimes bearing only shallow apical lobes; margins serrate with 1–several teeth per lobe or entire; apices of lobes obtuse or acute; base attenuate or cuneate; upper surface pubescent with soft hairs or glabrous. Sepal lobes 1.2–4.4 mm long, 1.2–2.6 mm broad; apices acute to obtuse. Petals 3–7 mm long, 4–7 mm broad. Styles 1(–2). Fruit subglobose to cylindrical, 6–11 mm long.

Parts in Commerce: Leaves and flowers, sometimes with fruits, or fruits alone

Identification: These two commonly employed species of *Crataegus* share several character states which may differ in other species, including the following:

Leaves

- Mostly lobed, <7 cm long
- With dark green upper surface and pale or grayish green lower surface
- Main veins usually straight, extending from midrib to lobe tips and also to sinuses between lobes
- Petioles distinct, not extremely short
- Taste weak, slightly sweet and bitter

Floral bracts falling off early (therefore often not observed), small, narrow and toothed; not elliptical nor with glandular margins

Flowers

- Hypanthium 2–4 mm long
- Sepal lobes 5, broadly triangular; margins entire, not toothed or glandular
- Petals 5, white or dark red in a few cultivars
- Anthers purple, occasionally dark pink to red; not pink, yellow or white

Fruits

- Fruit a drupe, containing pyrenes or "nutlets" (seeds surrounded by a hard coat), with persistent calyx lobes at apex
- Red at maturity, not yellow, orange, deep purple, or black
- Flesh yellow, dry and mealy; not juicy, not red, orange or green
- Pyrenes with grooved outer and inner surfaces, not with smooth or pitted inner surface
- Taste slightly sweet, mucilaginous

The following table shows characters that vary between *C. laegivata* and *C. monogyna*, together with alternative character states that may be found in undesired species.

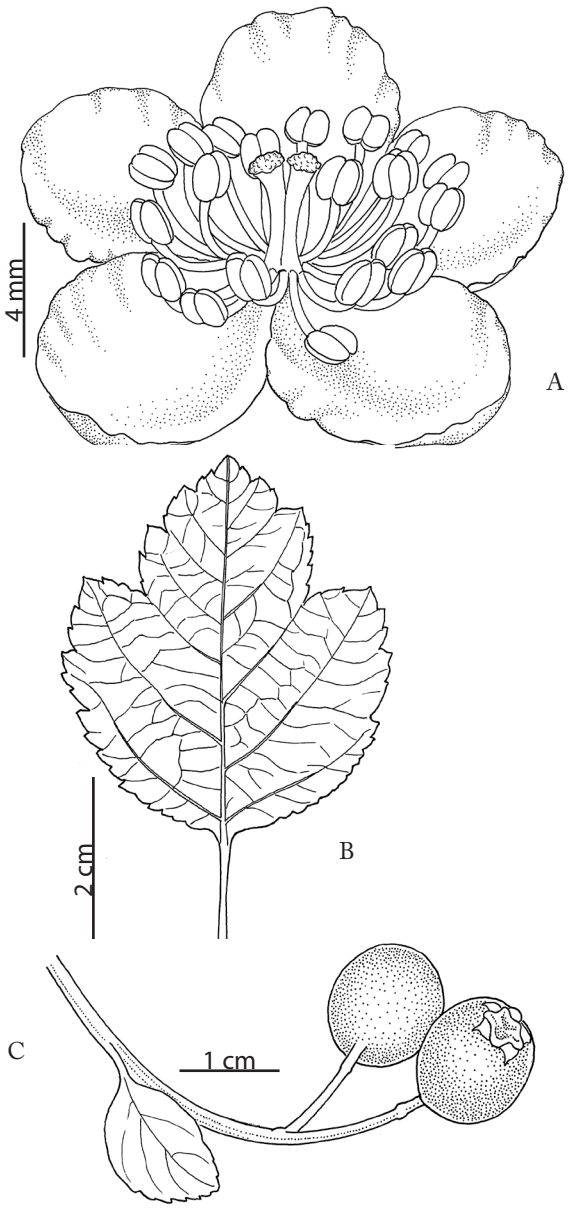

Figure 21: a–c, *Crataegus laevigata* leaf, flower, and fruit

	C. laevigata	C. monogyna	States found only in other species
Leaf shape	Most w/ 1–3 pairs of shallow lobes, usually confined to apical half of leaf	Most with 1–4 pairs of deeply incised lobes, usually the lowest in basal half of leaf	4–9 lobes per leaf or leaves all unlobed
Leaf surfaces	Often with soft straight hairs along main veins, and in vein axils on underside	Hairy along main veins and in axils below, both surfaces sometimes hairy	
Leaf margins	Coarsely serrate, usually with at least several teeth per lobe	One or a few large teeth per lobe	Entire, or with glands on the teeth
Inflorescences	3–11-flowered, loose with long pedicels, usually glabrous	4–15-flowered, loose with long pedicels	15–50-flowered
Sepal shape	Triangular; 0.9–2.8 mm long, 1.4–2.6 mm broad	Triangular; 1.2–4.4 mm long, 1.2–2.6 mm broad	Linear or outside size range of desired species
Petals	5–10 mm X 5–9 mm	3–7 mm X 4–7 mm	Outside size range
Stamen number	17–22	15–20	<12
# of styles	(1–)2–3(–5)	1(–2)	4–6, or more than expected
Fruit shape, size	6–14 mm long, almost spherical to broadly ellipsoidal	6–11 mm long, almost spherical to cylindrical	<6 mm or 15–35 mm long; narrowly elliptical or pear-shaped; with an angular base
Persistent calyx	Sepal lobes reflexed or spreading	Sepal lobes reflexed	Sepal lobes erect
Fruit surface	Bright red, usually hairless or with soft straight hairs	Glossy to deep red, with or without hairs	Not red, or with a waxy coating
Pyrenes	(1–)2–3(–5) per fruit	1 (rarely 2) per fruit	4–6 per fruit

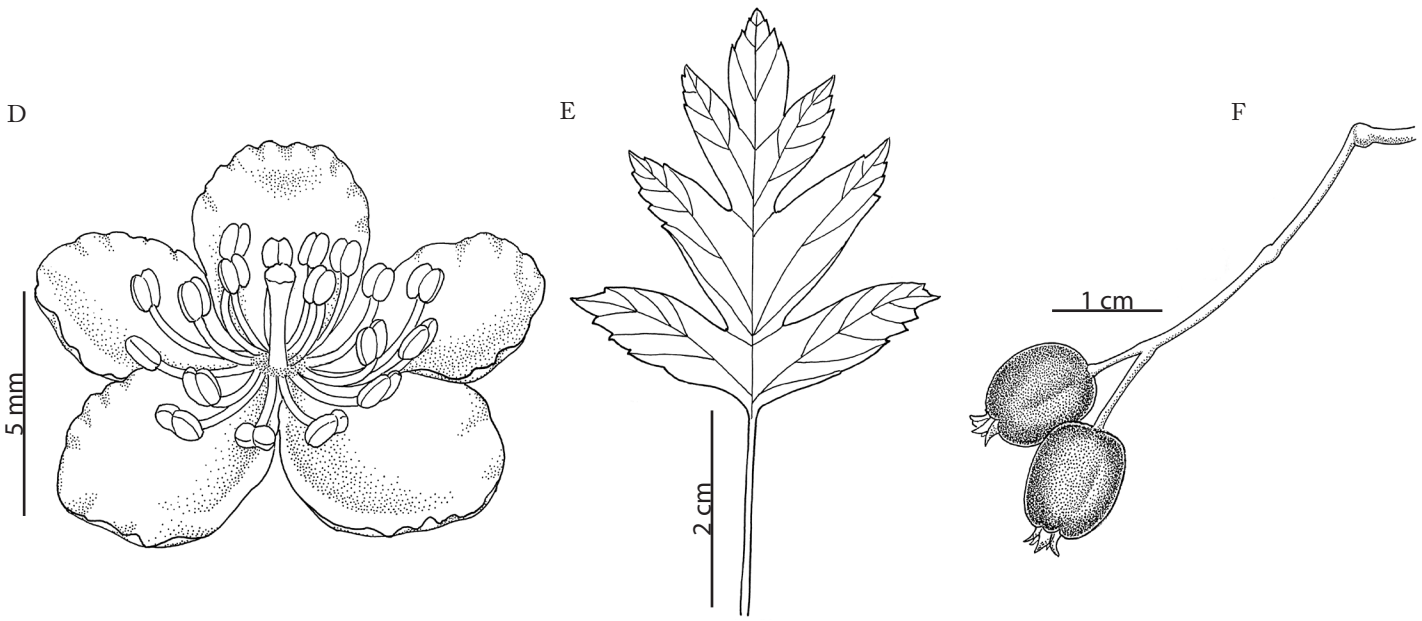

Figure 21: d–f, *C. monogyna* leaf, flower, and fruit.

Hybrid populations carrying genetic material of both *C. laevigata* and *C. monogyna* may appear intermediate between the two parental species. Likewise, hybridization with or introgression of other species may produce similar effects.

Adulterants: Other European hawthorns that are commonly used medicinally include *C. douglasii* Lindl. (Black Hawthorn), *C. nigra* Waldst. & Kit., *C. pentagyna* Waldst. & Kit. ex Willd., and *C. rhipidophylla* Gandoger (the species to which *C. oxyacantha* L. properly applied). All should be distinguishable by combinations of the above characters.

According to *Herbs of Commerce*, the North American *C. rivularis* Nutt. (aka *C. douglasii* var *rivularis* (Nutt.) Sarg.), a black-fruited species with 10 stamens, and *C. piperi* Britton (aka *C. chrysocarpa* var *piperi* (Britton) Kruschke) may be sold interchangeably with the above two species under the name of Hawthorn in North America. Features of the latter include:

- Leaves rhomboid, with short shallow lobes appearing biserrate
- Leaf teeth and pedicels glandular
- Calyx lobes narrow
- Stamens 10; anthers ivory-colored
- Fruits spherical, ca. 10 mm in diameter, salmon-orange to red
- Pyrenes 3–4 per fruit

This circumscription of "Hawthorn" seems inadequately justified. The above two species, although traditionally used in their own right, are not among the closest relatives of the species used in European traditional medicine (and in most clinical trials), nor have they been demonstrated to possess the same (numerous but poorly characterized) therapeutic compounds in greater measure than more closely related species.

References:

British Herbal Medicine Association. *British Herbal Pharmacopoeia.* BHMA; 1996:98–99.

Byatt JI. Hybridization between *Crataegus monogyna* Jacq. and *C. laevigata* (Poiret) DC. in south-eastern England. *Watsonia*. 1975;10:253–264.

Christensen KI. *Revision of* Crataegus *Sect.* Crataegus *and Nothosect.* Crataeguineae (*Rosaceae—Maloideae) in the Old World.* Ann Arbor, MI: American Society of Plant Taxonomists; 1992. Systematic Botany Monographs. Vol. 35.

Phipps JB. Introduction to the red-fruited hawthorns *(Crataegus,* Rosaceae) of western North America. *Can J Bot.* 1998;76:1863–1899.

Wells TC, Phipps JB. Studies in *Crataegus* (Rosaceae: Maloideae). XX. Interserial hybridization between *Crataegus monogyna* (series *Oxycanthae*) and *Crataegus punctata* (series *Punctatae*) in southern Ontario. *Can J Bot.* 1989;67:2465–2472.

Wichtl M, ed. *Herbal Drugs and Phytopharmaceuticals,* 3rd English ed. Stuttgart: medpharm Scientific Publishers and Boca Raton, FL: CRC Press; 2004:152–158.