

MALACOMELES, A GENUS OF MEXICAN AND
GUATEMALAN SHRUBS

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During a study of the American species of the rosaceous genus *Amelanchier* it has become apparent that the shrubs of Guatemala, Mexico, southern Texas, that have been variously treated as a section of *Amelanchier*, or of the gerontogean genus *Cotoneaster*, or as a group separate from both, have certain claims to recognition as a distinct genus. This genus, whose legitimate name for reasons set forth below, is *Malacomeles* Decaisne, is probably most closely related to *Amelanchier* Medic., and to the monotypic *Peraphyllum* Nutt., of the western part of the United States.

I am indebted to Dr. M. L. Fernald, Director of the Gray Herbarium (GH), to Dr. A. C. Smith, Curator of the Herbarium of the Arnold Arboretum (AA), and to Mr. P. C. Standley, Curator of the Herbarium of the Field Museum of Natural History (FM), for the loan of herbarium specimens.

NOMENCLATURAL HISTORY

The group of plants under consideration was first recognized as a distinct genus by J. Lindley in 1845. He described it as follows:

"This plant, the *Cotoneaster denticulata* of Mr. Bentham, has all the structure of that genus in its flowers, and much of its habit; but its fruit proves it to be a new genus, which I trust may bear the name of the ingenious Mr. Nägeli, the fellow-worker of Schleiden in botanical investigation. The fruit is a very pale pink colour, about as large as a pistol ball, with a brittle semi-transparent flesh, and the thin putamen of a *Pyrus* instead of the hard bony stone of a *Cotoneaster*. It may be defined as follows—*Nagelia*. Petala parva, patula. Stamina 10–15. Carpella 2, dorso calyci adnata, ventre libera, ovulis 2 collateralibus ascendentibus. Pomum sphaeroideum, calyce coronatum, carnosum, fragile, endocarpio membranaceo. Semina cuique loculo 2, compressa, castanea, ascendencia. Cotyledones tenues plano-convexae.—Frutex *Cotoneasteris* vultu, canescens; sepalis semimembranaceis; petalis calyce longioribus patentibus."

In 1847, M. J. Roemer had also been in doubt as to the propriety of including the only known New World species, *C. denticulata* Kunth, in the otherwise wholly gerontogean genus *Cotoneaster*. Roemer, however, proposed no taxonomic changes, but merely commented as follows: "Sola species americana hucusque nota; an congener?" It was not until 1874 that the theory of the taxonomic distinctness of this group was again advanced, this time by the French botanist Decaisne, who placed *C. denticulata* "H.B.K."

and a newly described species, *C. nervosa* Dene., in his proposed section *Malacomeles* of *Cotoneaster*. This section included Mexican shrubs with denticulate leaves and small white flowers. The brief description is as follows: "Frutices mexicani, foliis insigniter pennatinerviis denticulatis; floribus albis, parvis, axillaribus racemosis v. corymbosis terminalibus; fructibus omnino baccatis." The statement concerning the fruit is evidently an error, because none of the Pomoideae has baccate fruits. Fruits of *Malacomeles* that I have dissected are structurally very similar to those of *Amelanchier*. It should be noted that Decaisne in 1874 actually treated *Malacomeles* as a section of *Cotoneaster*, but in 1881, in reply to criticism by Wenzig of his memoir, he refers to *Malacomeles* as if he had published it as a genus.

The next nomenclatural contribution was made in 1890 by E. Koehne, who described two new species under *Amelanchier*. The first was *A. utahensis*, a true *Amelanchier*, the common and variable xerophytic species of desert and mountainous areas of western United States. The second was described as *A. Pringlei*, and was based upon one of Pringle's collections from Chihuahua, Mexico, (*Pringle 259*) that had been distributed as *Cotoneaster denticulata*. Koehne thus grouped his supposed new species, *A. Pringlei*, which belongs with Decaisne's *Malacomeles* (and is a synonym of *M. denticulata*), with a true *Amelanchier*, *A. utahensis*. In 1906, Schneider protested against this unnatural arrangement and reinstated *Nagelia* as a genus, citing *N. denticulata*, with two varieties, and *N. Pringlei*, as the component species. Rehder, in 1935, transferred Decaisne's section *Malacomeles* from *Cotoneaster* to *Amelanchier*, and described *A. paniculata*, which he supposed to be different from *A. nervosa* (Dene.) Standl.

Whether it be maintained as a genus, subgenus, or section, *Malacomeles* Dene. is the earliest available name for this group, since Lindley's name, *Nagelia* (1845) being a later homonym, is illegitimate. *Nagelia* Lindl. is invalidated by the *Nagelia* of Rabenhorst, described one year earlier. In 1846, Lindley spelled the name *Nägelia*, but this is merely an orthographical variant. Decaisne's name is composed of the Greek *malakos*, "soft," and *meles*, "apple," presumably on account of the soft carpels, as contrasted with the bony carpels of *Cotoneaster*.

RELATIONSHIPS WITHIN THE POMOIDEAE

It is at once evident that *Malacomeles* is a bona fide member of the subfamily Pomoideae Focke of the Rosaceae. The cartilaginous or membranous texture of the carpels is a character that at once separates it from *Crataegus*, *Cotoneaster*, *Mespilus*, *Pyracantha*, *Hesperomeles*, and *Osteomeles*, the latter having pinnate leaves. By the character of the inflorescence, *Malacomeles* is distinguished from *Sorbus*, *Aronia*, *Photinia*, *Stranvaesia*, and *Eriobotrya*, which have the flowers in compound corymbs or panicles. That *Mala-*

comeles does not belong with *Docynia*, *Chaenomeles*, and *Cydonia* is attested by the fact that those genera have the carpels four- to many-seeded. Evidently the true affinities of *Malacomeles* lie with the genera *Malus*, *Pyrus*, *Amelanchier*, and *Peraphyllum*. *Malus* and *Pyrus* have the ovary and fruit two- to five-loculed, each locule being two-ovuled; but in *Amelanchier*, *Peraphyllum*, and *Malacomeles* each locule in the fruit is nearly divided by a false partition growing from the back of each carpel, thus forming an incompletely four- to ten-loculed pome containing, if all mature, only one seed in each locule.

Although supposed originally by Lindley, and later by Decaisne to be closely related to *Cotoneaster*, or even to comprise a section of that genus, *Malacomeles* is rather far removed, phylogenetically, in spite of the fact that the habit and appearance of some of the species of *Cotoneaster* suggested a close relationship. The fact that *Malacomeles* is not closely related to *Cotoneaster*, much less is a section of that genus, is clearly shown by the fact that the latter has the carpels bony at maturity, and the fruit has one to five nutlets. *Cotoneaster* is thus more closely related to *Crataegus* than to the *Amelanchier* group. The leaves of *Cotoneaster* are mostly entire, and the species are confined to the Old World, in Europe, Asia, and Northern Africa.

These three genera may be distinguished by the following key:

- Mature fruits yellowish, bitter, astringent, inedible; flowers solitary or in umbel-like corymbs, the bracts promptly deciduous; petals pink or rose, obovate; calyx-lobes lanceolate, obscurely glandular-margined; leaves narrow, three to five times as long as wide, entire or nearly so, almost sessile, mostly fascicled at the ends of the branchlets; monotypic genus of western United States *Peraphyllum*
- Mature fruits purplish black (sometimes drying brownish), or pink at first, sweet or insipid, normally juicy and edible; petals white; leaves distinctly petioled, not fascicled.
- Petals suborbicular or reniform, the width not exceeding the length; calyx-lobes scarcely longer than wide, obtuse or acute, obscurely glandular-margined or entire; carpels free; bracts of the inflorescence more or less persistent; leaves coriaceous, denticulate to entire; shrubs of Guatemala, Mexico, and southern Texas (Brewster County) *Malacomeles*
- Petals oblanceolate to oval, three to eight times as long as wide; calyx-lobes entire, linear-lanceolate to deltoid, acuminate or acute, mostly longer than wide; carpels connate below; bracts of the inflorescence promptly deciduous; leaves usually serrate or dentate; shrubs and trees of United States, Canada, Europe, and Eastern Asia *Amelanchier*

Malacomeles (Dcne.) stat. nov. *Nagelia* Lindley in Bot. Reg. 31 (Misc.): 40. 1845; Bentham and Hooker, Gen. Pl. 1: 1004. 1865; Schneider in Fedde, Rep. Sp. Nov. 3: 182. 1906. *Nägelia* Lindley, Veg. Kingdom 560. 1846; Wenzig, Linnaea 43: 80. 1880, not Rabenhorst, Kryptog. Fl. 1: 85. 1844, not Regel, Flora 31: 249. 1848. *Cotoneaster* sect. *Malacomeles* Decaisne, Nouv. Arch.

Mus. Hist. Nat. Paris 10: 177. 1874. *Cotoneaster* A. *Naegelia* Wenzig, Jahrb. Bot. Gart. Mus. Berlin 2: 304. 1883. *Amelanchier* sect. *Nagelia* Koehne, Gattung. Pomac. in Wiss. Beil. Progr. Falk-Realgymnas. Berlin 95: 25. 1890; Schneider, Illustr. Handb. Laubh. 1: 742. 1906. *Amelanchier* sect. *Malacomeles* Rehder, Jour. Arnold Arb. 16: 449. 1935. Type species. *Cotoneaster denticulata* Kunth = *Malacomeles denticulata* (Kunth) G. N. Jones.

Shrubs with unarmed branches and simple, coriaceous, alternate, petioled, pinnately veined, denticulate or entire leaves; stipules small, tardily deciduous or somewhat persistent; winter buds solitary, sessile, with several imbricate scales; flowers perfect, actinomorphic, entomophilous, corymbose or paniculate, terminating short leafy branches of the season, appearing after the leaves; pedicels with persistent linear or lanceolate green bracts; hypanthium campanulate or urceolate, more or less adnate to the carpels, becoming ellipsoid in fruit; disk nectariferous; calyx 5-lobed, the lobes broad, entire, imbricate in aestivation, persistent, becoming reflexed on the fruit; petals 5, white, suborbicular, the width equalling or exceeding the length; stamens 20, inserted on the rim of the calyx; styles 3 to 5, free to the base; carpels 3 to 5, cartilaginous or membranous, not bony; ovary inferior, 3- to 5-loculed, each locule 2-ovuled, but in fruit nearly divided by a false partition growing from the back of each carpel, thus forming an incompletely 6- to 10-loculed pome with one seed in each locule if all mature; pome small, berry-like, edible; seeds brown, flattened, smooth; endosperm none.

KEY TO THE SPECIES OF MALACOMELES

- Leaves of the flowering and fruiting branches small, the blades 0.5-1.5 cm. long; lateral veins 4 to 10 pairs, not very conspicuous beneath; sepals suborbicular, ciliate, 2 mm. long; petals 4 mm. long, glabrous; styles three, 2.5-3 mm. long; anthers 1-1.5 mm. long; mature fruits 6-8 mm. in diameter 1. *M. denticulata*
- Leaves larger, usually 1.5-5 cm. long, the lateral veins 10 to 15 pairs, coarse and conspicuous on the lower surfaces; sepals triangular, 3 mm. long, microscopically glandular-denticulate; petals 5-6 mm. long, with a small tuft of hairs on the very short claw; styles five, 3-4 mm. long; anthers 2 mm. long; mature fruits 8-12 mm. in diameter .. 2. *M. nervosa*

1. *Malacomeles denticulata* (Kunth) comb. nov. *Cotoneaster denticulata* Kunth in H.B.K., Nov. Gen. 6: 169, pl. 556. 1823; M. Roem. Syn. Mon. 3: 222. 1847; Decaisne, Nouv. Arch. Mus. Hist. Nat. Paris 10: 177. 1874; Hemsley, Biol. Central Am. 1: 380. 1880; Wenzig, Jahrb. Bot. Gart. Mus. Berlin 2: 304. 1883. *Mespilus denticulata* Sprengel, Syst. Veg. 2: 505. 1825. *Nagelia denticulata* Lindley, Bot. Reg. 31 (Misc.): 40. 1845. *Amelanchier denticulata* (Kunth) K. Koch, Dendrol. 1: 183. 1869; Schneider, Illustr. Handb. Laubh. 1: 743, f. 416. 1906; Standley, Contr. U. S. Nat. Herb. 23: 337. 1922; Standley, Publ. Field Mus. Nat. Hist.

(bot. ser.) 8: 140. 1930. *Crataegus minor* Sessé and Moc., Pl. Nov. Hisp. 84. 1887; (ed. 2) 79. 1893. *Crataegus inermis* Sessé and Moc., loc. cit. *Amelanchier Pringlei* Koehne, Gattung. Pomac. in Wissen. Beil. Progr. Falk.-Real. Berlin 95: 25, pl. 2, f. 20. 1890; Schneider, Illustr. Handb. Laubh. 1: 742, f. 416, 417. 1906. *Nagelia Pringlei* Schneider in Fedde, Rep. Spec. Nov. 3: 183. 1907.

Shrubs 1-3 m. tall; twigs gray or brown when dry, grayish-tomentose when young, becoming glabrous; winter buds small, tomentose; leaves persistent, coriaceous, numerous, oval or elliptical to obovate or orbicular, conduplicate in the bud; upper surfaces of mature leaves glabrous, glossy, obscurely veined, the midvein impressed; lower surfaces closely grayish tomentose, the midvein prominent; mature blades 5-15 mm. long, 3-10 mm. wide, the apices mucronulate, varying from truncate to rounded or acute, the base shortly cuneate to rounded or truncate; lateral veins 4 to 10 pairs; margins denticulate to entire, the teeth when present 4 to 8 on each margin of average leaves of the flowering and fruiting branches; stipules small; petioles 2-4 mm. long, more or less tomentose; flowers about 1 cm. in diameter; inflorescence short, compact, few-flowered, somewhat corymbose; rachis and pedicels glabrous or pubescent, 3-6 mm. long; bracts persistent, carinate, lanceolate, green, ciliate, otherwise glabrous, about 2 mm. long; petals 5, white, suborbicular or reniform, veiny, 4 mm. long, 5 mm. wide, glabrous on both sides; stamens 20; filaments glabrous, minutely papillose; anthers 1-1.5 mm. long; hypanthium glabrous outside, campanulate, 3-4 mm. long, 3-4 mm. in diameter; sepals suborbicular, 2 mm. long, 2.5 mm. wide, rounded at the apex, ciliate, otherwise glabrous, green, soon reflexed; styles 3, glabrous, free to the base, 2.5-3 mm. long; carpels free; summit of the ovary densely white-tomentose; fruits in clusters of 1 to 4, ellipsoid to subglobose, glabrous, purplish black at maturity, 6-8 mm. in diameter; calyx-lobes on the fruit erect or ascending; seeds reddish-brown, smooth or nearly so, obliquely oval, somewhat compressed, 5-6 mm. long, about 3 mm. wide.

Type locality. Actopan, Hidalgo, Mexico.

Range. Brewster County, Texas, southward to Guatemala.

Specimens examined. UNITED STATES. TEXAS: El Solitario, *V. L. Cory* 1651, 1652 (GH); Glass Mountains, *O. E. Sperry* T673 (GH), *B. H. Warnāch* 540 (GH). MEXICO. CHIHUAHUA: Santa Eulalia Mountains, *C. G. Pringle* 259 (AA, GH, FM, isotype of *Amelanchier Pringlei*); vicinity of Santa Eulalia, *Palmer* 136 (FM). COAHUILA: San Lorenzo Canyon, 6 miles southeast of Saltillo, *Palmer* 395 (FM). NUEVO LEON: San Francisco Canyon, about 15 miles southwest of Pueblo Galeana, *C. H.* and *M. T. Mueller* 289 (AA, FM); Hacienda Pablillo, Galeana, *Mary Taylor* 106 (FM). SAN LUIS POTOSÍ: Charcas, *C. L. Lundell* 5458 (FM); without definite locality, *C. C. Parry* and *Edw. Palmer* 230 (FM). HIDALGO: hills above El Salto station, *C. G. Pringle* 11439 (FM);

Zimapan, *L. A. Kenoyer A388* (FM); Actopan, *Bonpland* (type, Herb. Mus. Paris; phototype, AA, UI). VERACRUZ: Maltrata, Tlaxialle, *E. Kerber 251* (FM). OAXACA: Alturas de San Pablo Huitzo, *C. Conzatti 1976* (FM); vicinity of San Luis Tlutilanapa, *C. A. Purpus 3231* (FM). GUATEMALA. GUATEMALA: near Finca La Aurora, *Ignacio Aguilar 35* (FM); on the road between Guatemala and San Raimundo, *P. C. Standley 62941* (AA, FM). SACATEPEQUEZ: Finca El Hato, northeast of Antigua, *P. C. Standley 61154* (FM); near Antigua, *P. C. Standley 61680, 63821* (FM); San Juan, *Jesus Morales Ruano 1375* (FM); Cerro de la Cruz, above Antigua, *P. C. Standley 63330* (AA, FM); Cuesta de las Canas, above Antigua, *P. C. Standley 58913* (AA, FM); near Pastores, *P. C. Standley 59898, 59951* (FM).

2. *Malacomeles nervosa* (Decaisne) comb. nov. *Cotoneaster nervosa* Decaisne, *Nouv. Arch. Mus. Paris* 10: 177. 1874. *Ame-lanchier denticulata* var. *psilantha* Schneider, *Ill. Handb. Laubh.* 1: 743. 1906. *Amelanchier denticulata* var. *nervosa* Schneider, *op. cit.* 744, f. 416, 417. 1906. *Nagelia denticulata* var. *nervosa* Schneider in Fedde, *Rep. Nov. Spec.* 3: 183. 1907. *Nagelia denticulata* var. *psilantha* Schneider, *op. cit.* *Cotoneaster denticulata* var. *latifolia* Hemslley, *Biol. Central Am.* 1: 380. 1880, *nom. nud.* *Amelanchier paniculata* Rehder, *Jour. Arnold Arb.* 16: 449. 1935.

Shrubs 1–3 m. tall; young twigs densely whitish tomentose, tardily glabrate; winter buds densely tomentose; leaves persistent, coriaceous, elliptical to oval, conduplicate in the bud; upper surfaces green, glabrate, glossy, the lower surfaces densely whitish tomentose throughout; mature blades 1.5–5 cm. long, 8–25 mm. wide, the apex acute or obtuse, mucronulate, the base cuneate to rounded; lateral veins 10 to 15 pairs, rather obscure or somewhat impressed on the upper surface, prominent on the lower side; margins remotely and minutely denticulate, the teeth 7–9 per cm., and 6 to 25 on each side of average blades of the flowering and fruiting branches; stipules small, subulate; petioles 5–10 mm. long, densely tomentose; inflorescence terminal or axillary, corymbose, or rarely somewhat paniculate, the pedicels 2–4 mm. long, whitish tomentose; bracts persistent, linear-lanceolate, carinate, green, tomentose on back and margins, 3–4 mm. long; hypanthium loosely floccose, becoming glabrous, somewhat funnel-form, 4–5 mm. long, 5–6 mm. in diameter; petals 5, white, broadly oval or suborbicular, abruptly contracted at the base, somewhat concave, veiny, 5–6 mm. long, 4–5 mm. wide, with a small tuft of hairs on the very short (0.5 mm. long) claw; stamens about 20, unequal; anthers cordate-ovate, 2 mm. long; sepals triangular-ovate, acute, dorsally glabrous, tomentose within, acute, mucronulate, 3 mm. long, about 3 mm. wide, microscopically glandular-denticulate, the glands few, dark-colored; styles five, 3–4 mm. long, glabrous, free to the base; summit of the ovary densely

white-tomentose; ovary inferior, each locule with 2 ovules separated by a false partition; fruits ellipsoid or subglobose, puberulent at first, glaucous, 8–12 mm. in diameter, edible, 6 or more loculed, 4 or more seeded; calyx-lobes persistent, ascending or reflexed, glabrous on both sides or sparsely pubescent within, the margins ciliate; seeds reddish brown, smooth or minutely striate, 3.5–4 mm. long, obliquely lanceoloid or narrowly ovoid.

Type locality. "Regno Mexicano, Prov. Chiapa—fl. february (Linden 1840); Karwinski (herb. Imp. Petrop.)."

Range. Nuevo Leon, Mexico, to Huehuetenango, Guatemala.

Citation of specimens. MEXICO. NUEVO LEON: southwest of Puebla Galeana, C. H. and M. T. Mueller 282 (AA, type of *Amelanchier paniculata*; isotype, FM); about 15 miles southwest of Galeana, C. H. and M. T. Mueller 834 (AA); Hacienda Pablillo, Galeana, Mary Taylor 152 (FM). TAMAULIPAS: Juamave, H. W. von Rozyński 518 (FM); Tula, J. Gregg 599 (GH, syntype of *Amelanchier denticulata* var. *psilantha*). SAN LUIS POTOSI: without definite locality, J. G. Schaffner 460 (AA, FM). CHIAPAS: locality unknown, Linden in 1840 (type, Herb. Mus. Paris; phototype, AA, UI). STATE UNKNOWN: Sessé and Mocino 1012, 2128 (FM). GUATEMALA. HUEHUETENANGO: Chiantla, A. F. Skutch 1125, 1145 (AA, FM), P. C. Standley 65666 (FM); along Aguacatan Road, east of Huehuetenango, P. C. Standley 81964 (FM). STATE UNKNOWN: San Martin (?), J. R. Johnston 1750 (FM).

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DISEASES OF FREMONTIA

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The plants of the genus *Fremontia*, a native of the southwestern United States are highly esteemed by many as ornamental subjects for garden and park and no doubt would be much more widely planted except for certain diseases to which they are susceptible, particularly the first of those treated below.

STEM GIRDLING

This disease, caused by the soil-inhabiting water mold *Phytophthora cactorum* Lib. and Cohn., was first brought to our attention in 1934 because of rather heavy losses in young nursery stock. Since that time it has been seen rather frequently in cultivated specimens of varying size up to fifteen feet or so in height. We have not seen the disease on plants in the wild. The principal effect of this disease is the killing of the bark entirely around the stem commonly at or near the ground line but occasionally higher up. The death of the bark is soon followed by withering of all parts distal to the necrotic portion.