Common gorse
Ulex europaeus L.

History and Ecology in North America

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SYNONYMS
Gorse, furze, whin, European gorse

CLASSIFICATION

RANKING	SCIENTIFIC NAME	COMMON NAME
Kingdom	Plantae	Plants
Subkingdom	Tracheobionta	Vascular plants
Superdivision	Spermatophyta	Seed plants
Division	Magnoliophyta	Flowering plants
Class	Magnoliopsida	Dicotyledons
Subclass	Rosidae	
Order	Fabales	
Family	Fabaceae (Leguminosae)	Pea family
Genus	*Ulex*	Gorse
Species	*Ulex europaeus* L.	Common gorse

HISTORY AND DISTRIBUTION
Gorse is native to western Europe. It was introduced to North America in the 1800s as an ornamental and as a hedge plant to contain livestock, and it escaped cultivation by 1900. Gorse was intentionally introduced to Hawai'i in the late 1800s as a hedge plant and was considered invasive there by 1925. In North America, gorse is currently present the USA (11 states) and Canada (one province) (**Fig. 1**). It is most prolific and problematic in the maritime climate of the Pacific Coast, particularly in northern California and along the southern Oregon Coast where, in 1936, it caused a devastating fire in Bandon (**Fig. 4**).

IMPACT
Although goats, sheep, and wildlife will browse young growth and flowers, the negative impacts outweigh the positive because dense stands of gorse form impenetrable thickets that block access to water and more desirable forage. The spines on older growth make the plant unpalatable to grazing animals, and phenolic compounds in seeds are toxic to livestock if ingested. Gorse competes aggressively with other plants for nutrients, light, and water. It displaces native and/or more desirable species, reducing range, pasture, and commercial forest production. The high oil content of gorse foliage and seeds, and the large amount of dead growth beneath their canopies, make gorse infestations an extreme fire hazard.

IDENTIFICATION
At a Glance
Gorse (**Fig. 2**) is a woody, evergreen shrub typically growing 3–13 feet (1–4 m) tall from a multi-branched root system. Stems are hairy when young and less so as the plant ages. Leaves are alternate and three-parted when the plant is young and are reduced to scales or thick spines as the plant ages. Flowers are yellow, two-parted with an upper and lower lip, and occur either singly in leaf axils or clustered on the

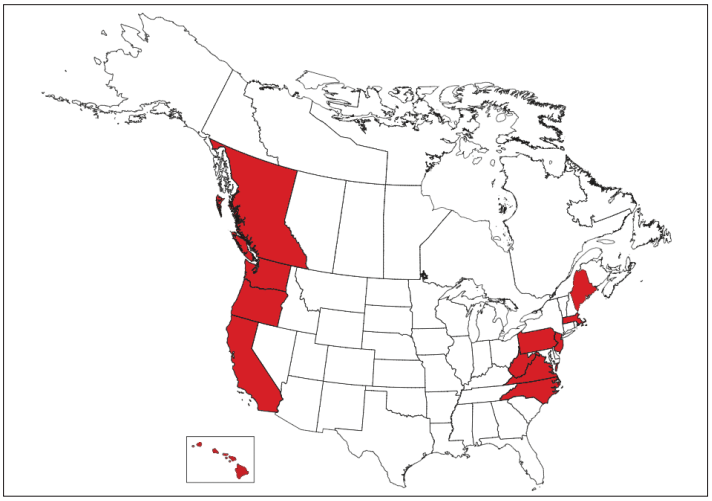


Figure 1. Common gorse reported distribution in North America (Credit: EDDMapS, www.eddmaps.org accessed 5 July 2021; Andreas *et al.* 2017)

Figure 2. Common gorse plant (Y. Liu, iNaturalist.org CC BY 4.0)

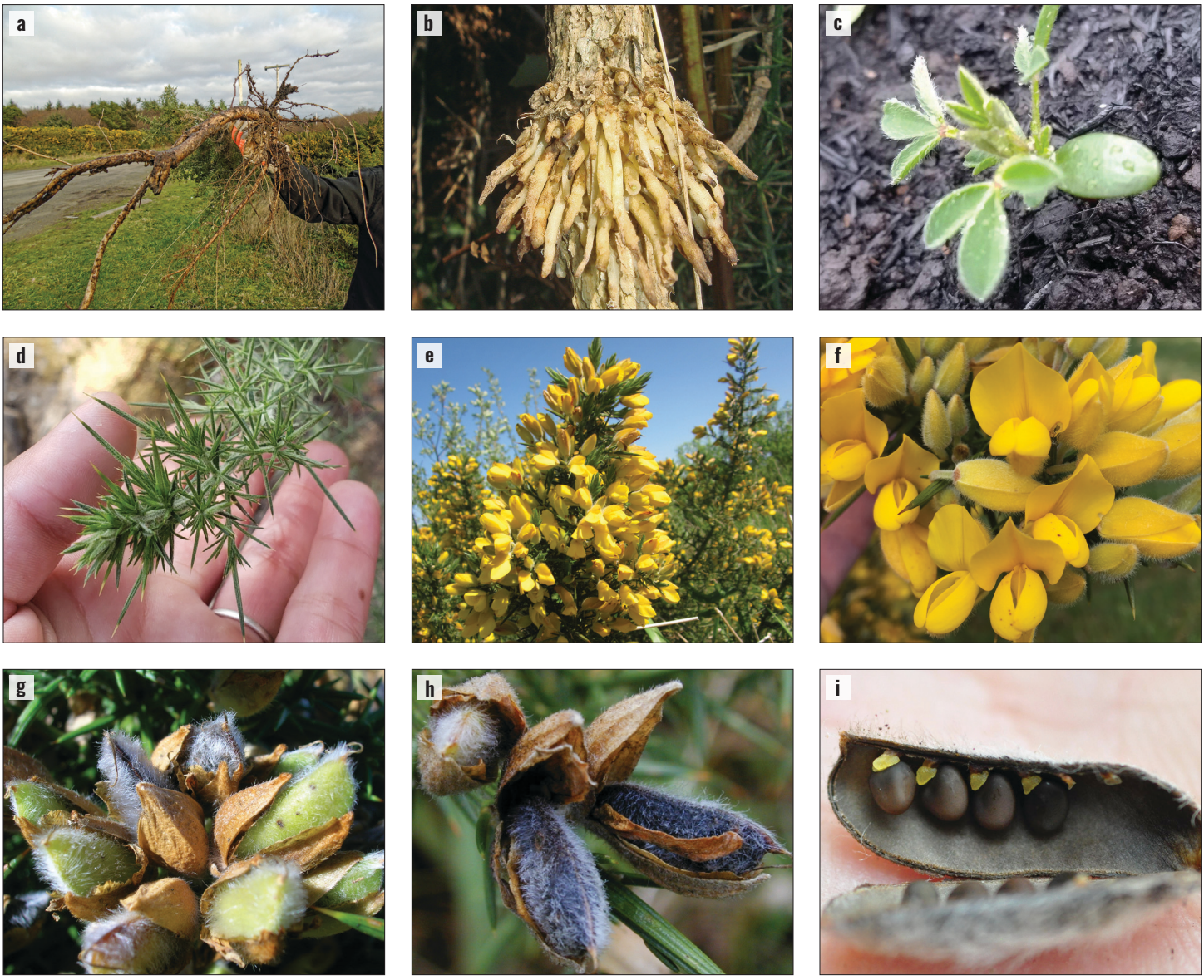


Figure 3. Gorse grows (a) taproots with multiple branching lateral roots just beneath the soil surface and may also grow (b) adventitious aerial roots. Leaves (c) are small and 3-parted when the plant is young, but these are reduced (d) to scales or stiff spines as the plant ages. Flowers are produced in clusters (e) near stem tips; each flower (f) has bright yellow fused petals resembling a boat with a banner, wings, and keel. Seed pods are (g) hairy and green, (h) turning black with age. Each seed pod contains (i) 1–8 hard, dark, oval seeds. (a: Nancy Ness, Grays Harbor Noxious Weed Control Board; b: ©Phil Bendle, Friends of Te Henui, T.E.R:R.A.I.N; c: Leahbean, iNaturalist.org CC BY-NC 4.0; d: Mari Villa, iNaturalist.org CC BY-NC 4.0; e,f: Jennifer Andreas, Washington State University Extension; g,h: Forest and Kim Starr, Starr Environmental, CC BY 4.0; i: Steven Conaway, Penn State University, Bugwood.org, CC BY-3.0 US)

ends of older branches. Seed pods are hairy, turning black with age. They grow to ¾ in (2 cm) long and produce several hard, shiny, dark brown seeds.

Roots

Gorse develops a large taproot up to 2 ft (60 cm) long (**Fig. 3a**) with multiple branching lateral roots typically occurring in the top 4 in (10 cm) of soil. Gorse stems growing low along the ground sprout adventitious aerial roots (**Fig. 3b**). All roots have numerous nodules that contain nitrogen-fixing bacteria, allowing gorse to colonize nutrient poor soils and outcompete other plant species.

Stems and Leaves

Plants may grow prostrate or erect. Prostrate plants typically occur in exposed, windy locations. Erect plants grow 3–13 ft (1–4 m) tall and are often as wide as they are tall. When growing in locations with dense vegetation, gorse produces a single main stem. At more open sites, gorse produces multiple densely branched stems. Stems of young plants are soft, gray-green, and hairy. As the plants age, stems remain green but become woody, angled, and terminate in a spine up to 2½ in (6½ cm) long. Leaves are small, alternate, waxy, and three-parted when the plant is young (**Fig. 3c**), but as the plant ages, these are reduced to scales or sharp, stiff spines up to 2½ in (6½ cm) long that end in a yellow point (**Fig. 3d**). Mature

stems appear leafless and covered with spines (**Fig. 2, 3d**). Both stems and spines photosynthesize. Plants are evergreen; the green scales and spines are present on stems year-round.

Flowers

Flowers occur either singly in leaf axils or clustered on the ends of older branches (**Fig. 3e**). Flowers (**Fig. 3f**) are yellow, ½–1 in (1–2 ½ cm) long, and characteristic of the pea family with petals forming a banner, wings, and keel (similar to a boat; **Fig. 4**).

Figure 4. Typical Fabaceae flower (Scotch broom) with petals resembling a sailboat with a banner, wings, and keel (Jennifer Andreas, Washington State University Extension)

Fruits and Seeds

Seed pods (legumes) are hairy and green, turning black with age (**Fig. 3h**). They grow ½–¾ in (1½–2 cm) long and contain 1–8 seeds. The oval seeds are are up to ⅛ in (3–4 mm) long, hard, shiny, and dark brown or black (**Fig. 3i**). A mature plant can produce up to 18,000 seeds annually.

ECOLOGY

Gorse spreads only by seed, but it can also regenerate from the root crown if the stem is damaged. Most seeds germinate in spring or early summer. Germination rates are highest after seed scarification, in moist soil, and at open, disturbed sites with limited competing vegetation. Seedlings are sensitive to shading from other plants and survive better in areas with little competition for light.

Juvenile plants have small, three-parted leaves. These are reduced to scales and spines as the plant ages. Mature plants photosynthesize with their spines and green stems. Plants begin flowering at 18 months to three years, and some plants may live 25–30 years. In North America, flowering occurs in early spring with a smaller secondary bloom in late fall at some locations. Mature seed pods split open rapidly in dry weather (called dehiscing), ejecting seeds short distances, though most fall within 3.2 ft (1 m) of the parent plant. Seeds are transported by insects, birds, humans, other animals, waterways, ocean waves, and vehicles/equipment. Due to their thick seed coats, seeds can remain viable in the soil for up to 30 years.

HABITAT

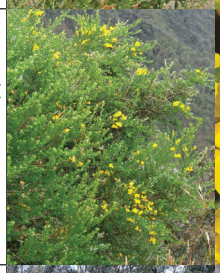
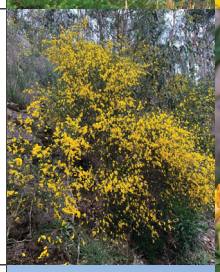
Soil disturbance is an important contributor to gorse seedling establishment. Gorse can often be found creating dense infestations on river banks (**Fig. a**), dry river beds, chaparral, grasslands, degraded coastal dunes (**Fig. 5b**), forest edges, fallow fields (**Fig. 5c**), and hillsides (**Fig. 5d**). A variety of habitat types and plant communities can be invaded by gorse following disturbance, such as heavy grazing, cultivation, logging, and burning. Gorse does best in cool, temperate regions. Severe winter temperatures, extensive summer drought, and heavy shading limit its distribution. Gorse performs best in coarse, well-drained, dry to semi-moist soils with low fertility and in areas without significant competing vegetation.

Figure 5. Gorse infestations: (a) along a river and encroaching forested mountainsides; (b) in degraded coastal dunes; (c) in an abandoned field; (d) blanketing a previously forested mountainside (a,c: Wyatt Williams, Oregon Department of Forestry; b: Barbara L. Wilson, iNaturalist.org CC BY-NC 4.0; d: Alex Fergus, iNaturalist.org CC BY-NC 4.0)

SIMILAR SPECIES

Non-native broom species most closely resemble gorse in North America. Brooms can be differentiated by their lack of spines. Numerous additional species present in North America have yellow pea-like flowers similar to gorse; however, most potential look-alikes can be readily differentiated by not being shrubs and not having sharp spines in place of leaves. Camelthorn (*Alhagi maurorum*) is a non-native, spiny shrub established in North America. It resembles gorse with its pea-like flowers, but can be differentiated by its flowers being pink or maroon, growing only 2–4 ft (0.6–1.2 m) tall from a rhizomatous root system, and its elliptic leaves that remain persistent on mature stems. **Table 1** lists key characteristics useful for differentiating

Table 1. Key traits for differentiating gorse from camelthorn and selected species of broom, all of which are also exotic and weedy in North America.

SPECIES	SIMILARITIES	DIFFERENCES	PLANT	FLOWER	SEED PODS
Camelthorn *Alhagi maurorum* Fabaceae	Leaves alternate; stems slender, green; stems covered in sharp spines; flowers with similar structure; seed pod fruit	Often drier conditions; rhizomatous root system; plants 2–4 ft (0.6–1.2 m) tall; leaves single, elliptic; flowers pink or maroon, <½ in (1 cm) long, in clusters of 1–6 from axillary spines; seed pods ~1 in (2–3 cm) long, constricted between seeds			
French broom *Genista monspessulana* Fabaceae	Similar habitat; leaves alternate, 3-parted; young stems slender, green, ridged; flowers yellow, with similar structure; seed pods linear, ≤1 in (2½ cm) long, covered in dense hair	Often found in soil with higher pH; plants only up to 8 ft (2½ m) tall; leaves hairy above and below, on plant year-round, always 3-parted; mature stems round, not spiny; flowers ≤½ in (1¼ cm), typically in clusters of 4–10, bloom into summer; seed pod hairs more white			
Portuguese broom *Cytisus striatus* Fabaceae	Similar habitat; leaves alternate, deciduous early, some 3-parted; young stems slender, green; mature stems woody; flowers yellow, with similar structure, in clusters of 1–2 in leaf axils; seed pods linear, inflated, covered in dense hair	Plants only up to 10 ft (3 m) tall; leaves hairy below, some leaves not divided; not spiny; flowers paler yellow, bloom into summer; seed pods longer (0.6–1½ in [1½–4 cm] long), hairs more white			
Scotch broom *Cytisus scoparius* Fabaceae	Similar habitat; young leaves alternate, 3-parted; young stems green, hairy; mature stems woody, hairless; flowers yellow, similar size and location, produced in early spring; seed pods linear	Plants only up to 10 ft (3 m) tall; young leaflets larger; not spiny; often blooms 1 month later; flowers occasionally ranging from pale yellow, orange to red; seed pods longer, (1–2½ in [2½–7 cm] long), flattened, with hairs only along the margins			
Spanish broom *Spartium junceum* Fabaceae	Similar habitat; leaves alternate, deciduous early; young stems slender, green; mature stems woody; flowers yellow, similar size and structure; seed pods linear, covered in dense hair	Often drier conditions; plants up to 15 ft (4½ m) tall; leaves single, oval, smooth-margined; young and mature stems smooth and round in cross section; not spiny; flowers in racemes, bloom into summer and fall; flower keel pointed; seed pods up to 4 in (10 cm) long, slightly flattened			

Photos: camelthorn plant (Konstantin Grebennikov, iNaturalist.org, CC BY-NC 4.0), camelthorn leaves, spines, flowers (Elenapalkaflores, iNaturalist.org, CC BY-NC 4.0), camelthorn seed pods (Татьяна Ильина, iNaturalist.org, CC BY-NC 4.0); French broom plant (Philipp Weigell, Wikipedia.org CC BY-3.0), French broom flowers (Calibas, Wikipedia.org CC BY-SA 4.0), French broom seed pods (Chris Ecroyd, iNaturalist.org CC BY-NC 4.0); Portuguese broom plant, flowers (Teknikdma, iNaturalist.org CC BY-NC-ND 4.0), Portuguese broom seed pods (Andyjones1, iNaturalist.org CC BY-NC 4.0); Scotch broom plant (Eric Coombs, Oregon Department of Agriculture Bugwood.org, CC BY-3.0 US), Scotch broom flower (Jennifer Andreas, Washington State University Extension), Scotch broom seed pod (Travis McMahon, MIA Consulting); Spanish broom plant, flowers (Jennifer Andreas, Washington State University Extension), Spanish broom seed pod (Travis McMahon, MIA Consulting)

non-native broom species and camelthorn from gorse and each other.

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SUGGESTED CITATION

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