**Euonymus europaeus**

**Europeans Atlas of Forest Tree Species**

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**Euonymus europaeus** L, known as spindle, is a shrub or small tree, appreciated for its numerous, capsular pink and red fruits and the attractive autumn colour foliage. It has a wide distribution in temperate regions, generally at low to middle elevations. It is present in Central and Eastern Europe up to the Caucasus as an understorey shrub principally in the mixed broad-leaved oak-hornbeam forests. It is used as an ornamental plant and more recently for extracting compounds of medicinal and veterinary value. This species is free from serious threats, but it can be a host of several diseases of agricultural interest.

The spindle tree (*Euonymus europaeus*) is a much-branched, non-spiny, deciduous shrub or small tree, growing 2-6 m tall, rarely reaching up to 8 m. The bark is grey in colour and smooth[9]. The young twigs are green, 4-angled, without brown protuberances. New shoots grow vigorously, also 4-angled and winged. The buds are 2-4 mm long, ovoid, sharply pointed. The leaves are simple, opposite, lanceolate or ovo-elliptical, 4-10 cm long and 2-3.5 cm wide, narrowing at tip and base. The leaf margins are crenate and finely saw-toothed and the leaves have a rough surface and are bluish-green beneath. The petals are 0.5-1 cm long[9]. This species is *gynoecios*, having female flowers on some individual plants and *hermaphrodite flowers* on others[10]. The flowers are small, delicate and about 1 cm in diameter. They are arranged in inflorescences of 3-10 flowers in leaf axils, on 1-3.5 cm long pedicels, having 4 elements of each of the floral whorls (sepal, petals, stamens and carpels). They blossom in April-July[11]. The fruits are capsules, 1-1.5 cm wide, with 4 angled lobes, green then dark pink or red when mature. Ripe fruits open through 4 valves, containing 4 whitish seeds covered by a fleshy red-orange aril. For example, the cultivar ‘Red Cascade’ in autumn has red pseudo-arils. The wood is used for making tobacco pipes[8, 11]. The red pseudo-aril was also used in the past to make dye[12]. The bark, the leaves and the seeds were used as a purgative, but they are toxic, with similar cardio-stimulant effects to foxglove (Digitalis sp.) Dried, powdered fruits and seeds mixed in butters were used to deter lice[13]. Antifungal chitin-binding proteins have been isolated from bark and leaves[14]. The whole plant contains compounds of medicinal and veterinary value[15, 16].

**Distribution**

The spindle tree is present in temperate climates, from Central to Eastern Europe (except the extreme north and most of the Mediterranean area), and reaches eastwards the Urals and Caucasus[6, 7]. It grows generally at low to middle elevations, from sea level to 1,300 m of altitude in Sicily[8]. It has been planted outside its natural range, new naturalised in some areas (e.g. Scandinavia). Exported also to other continents, in northeast United States and in New Zealand it is considered an invasive species[9].

**Habitat and Ecology**

It Habitats mainly forest margins, clearings and open woodlands, preferring medium moisture levels, and well-drained, preferably alkaline soils in full to partial shade[16]. Woodlands, preferring medium moisture levels, and well-drained, preferably alkaline soils in full to partial shade[16].

**Importance and Usage**

The spindle tree is used mainly as an ornamental shrub for its impressive autumn display of orange, red and purple leaves, accented by magenta pink to red fruits with orange to red pseudo-arils. For example, the cultivar ‘Red Cascade’ in autumn has red leaves and abundant red fruits with rose pseudo-arils[6]. The wood of the spindle is homogenous, white or yellowish, and easy to work. It is used, more in the past, for plywood and toothpicks[17], knitting needles, combs, and for making spindles, from which the common name derives[4]. The wood is also heat resistant and it was used in making tobacco pipes[6, 14]. Charcoal是从它的木材中得到的。To make charcoal powder. The red pseudo-aril was also used in the past to make dye[12]. The bark, the leaves and the seeds were used as a purgative, but they are toxic, with similar cardio-stimulant effects to foxglove (Digitalis sp.). Dried, powdered fruits and seeds mixed in butters were used to deter lice[13]. Antifungal chitin-binding proteins have been isolated from bark and leaves[14]. The whole plant contains compounds of medicinal and veterinary value[15, 16].

**Threats and Diseases**

There are no serious threats for this species[9]. The spindle tree is the primary overwintering host of the black bean aphid (Aphis fabae) which feeds on field beans (Vicia faba) and sugar beet (Beta vulgaris) and the peach potato aphid (Myzus persicae), a widespread pest of a large number of crops[9, 17, 18]. As a measure against black bean aphid, in the past spindle trees have been removed from hedges and woodlands (e.g. England), although the current populations appear stable[9, 19]. This species can be a host of other diseases, such as a strain of cucumbe mosaic virus, strawberry latent mosaic and in some countries, a strain of cherry leaf roll virus[10]. Despite its toxicity, seeds and aphids can adapt to survive its otherwise ‘insecticidal’ chemistry[10, 17].

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**Field data in Europe (including absences) vs. Observed presence in Europe**

**Autoecology diagrams based on harmonised field observations from forest plots.**

**References**


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**Map 1: Plot distribution and simplified chorology map for Euonymus europaeus.**

Frequency of *Euonymus europaeus* occurrence within the field observations as required by the National Forest Inventions. The chorology of the native spatial range for *E. europaeus* is derived after several sources[7-11, 15-19].

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