

Wild privet (*Ligustrum vulgare* L.): A Multipurpose Species with an important role in Forest Land Reclamation

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Abstract Wild privet (*Ligustrum vulgare* L.) is generally recognized as a useful shrub species across its wide natural distribution range. The aim of this review paper was to give an overview of the species' multiple uses and highlight its relevance in forest land reclamation projects. Data regarding taxonomy, chorology, ecological requirements and biological characteristics are also presented. Even though it is listed as an invasive species in several countries worldwide, wild privet is one of the main shrub species used in establishing protective forest shelterbelts on several types of degraded terrains.

Key words

wild privet, *Ligustrum vulgare*, land reclamation, afforestation

In general, land reclamation is defined as the process of reconvertng disturbed land to its former (original) or other uses in order to reach certain protective or even productive management goals. Particularly, forest land reclamation represents a system of measures aiming to counteract natural and/or anthropogenic degradation processes affecting both forest and non-forest lands [9]. One of the main ways to achieve this objective is land reclamation through afforestation.

Together with common hawthorn (*Crataegus monogyna* Jack.), Cornelian cherry (*Cornus mas* L.), spindle tree (*Euonymus verrucosus* Scop.), common hazel (*Corylus avellana* L.), redcurrant (*Ribes rubrum* L.) [4] and sea-buckthorn (*Hippophaë rhamnoides* L.) [161614], *Ligustrum vulgare* L. (wild privet) is one of the most used shrub species for land reclamation through afforestation in Romania.

Wild privet belongs to the genus *Ligustrum* L. (*Oleaceae*), which contains, according to different classifications, between 37 and 50 species, divided into five sections. Most of these species are native to Asia and only a few species are present in Europe, Australia, North America or North Africa [33, 37].

Also known as common privet or European privet [27], wild privet is a deciduous shrub species which can reach heights up to 4 or 5 m [38]. Nevertheless, the species has been reported sometimes as a facultative evergreen shrub [18]. *L. vulgare* has small (3–6 cm long) and slightly leathery leaves. The flowers are white and they are grouped in 3–6 cm long panicles and they produce a pungent fragrance. The fruit is a small black berry 6–8 mm diameter, containing one to four seeds [10, 29, 40].

Wild privet is native to Europe, the temperate zone of East Asia and North Africa [40]. Currently, in North America, it is expected that climate change will allow this species to greatly expand its range [7]. In Romania, this species often occurs naturally on several types of degraded soils [2828]. It usually occurs in association with other shrub or tree species in plain, hilly or submontane areas characterized by a dry-warm climate [2828].

Wild privet is generally known as a shade-tolerant species [1717]. However, an experiment conducted in Italy showed that young individuals are able to grow in both low light and direct sunlight conditions (12% and 100% of full sunlight, respectively) [18].

Due to its high ecological amplitude [1, 10, 12, 40], *L. vulgare* is able to tolerate a wide spectrum of soil conditions, ranging from salinized soils in the southern part of the Danube Delta [39] to soils with extremely low trophicity in the steppe region [2828]. It is also resistant to drought [28].

This species can be propagated in both vegetative and generative ways [23]. On the one hand, *L. vulgare* produces numerous seeds and it relies on zoochorous dispersal mechanisms. On the other hand, this species has a high capacity to produce stump and root sprouts, which tend to grow rapidly [10]. Due to this latter feature, wild privet is considered to have a high ability to outcompete and subsequently displace native vegetation. Unsurprisingly, considering also its high ecological amplitude, it is considered to be an invasive species [151513].

Wild privet can also easily be propagated by layering and cuttings [12]. Nevertheless, under extreme

conditions (e.g. on sewage sludge) cuttings have been reported to fail to produce any roots [6].

Regarding its growth rate, saplings of this species were reported to have an average height of 84.3 cm at the age of 4 on a rich chernozem soil with sandy-loam texture [13].

The aim of this paper was to review the multiple uses of wild privet and highlight its importance in forest land reclamation.

Wild Privet: A Multipurpose Species

First, as a result of its high ecological amplitude, fast growth and resistance to pollution, pest and diseases, wild privet is cultivated worldwide as a hedge plant [35, 37].

Second, this species has also known extensive use in landscape architecture [34]. Especially ornamental varieties of wild privet such as: *aureum*, *aureo-variegatum*, *argenteo-variegatum*, *glaucum* and *buxifolium* are commonly used in this field [5]. Consequently, the ornamental use of this species has played a significant role in artificially extending its distribution range in the past two centuries.

Third, wild privet is one of the most important shrub species that provide berries during winter for several frugivorous bird species [2121]. It is also appreciated in apiculture [32].

Fourth, several papers report that many species of the genus *Ligustrum* have been used across the world in traditional folk medicine. For example, in the folk medicine of Azerbaijan, the leaves of common privet are used to treat hypertension [19]. Moreover, water infusions from leaves of *L. vulgare* have shown a high antimutagenic effect [26]. Several extracts from this plant have also been proven to act as a dual angiotensin-converting enzyme [20]. Moreover, privet's green parts are used as anti-inflammatory remedy in the Mediterranean area [31].

Last but not least, wild privet is one of the most used shrub species in establishing several types of protective forest shelterbelts (e.g. antierosional [22] or windbreak [36]).

In Romania, this species has been mainly used in establishing shelterbelts along communication paths, both in marginal or central rows and mixed with tree species like: oak (*Quercus spp.*), maple (*Acer spp.*), ash (*Fraxinus spp.*), etc. It forms dense bushes that quickly cover and protect the soil and it contributes significantly to regulating the penetrability of the shelterbelt [12].

Wild Privet: Its Role in Forest Land Reclamation

It is currently well understood how forest vegetation installed on degraded terrains plays an important role not only in preserving and protecting soils from erosion, but also in their improvement. More precisely, the contribution of forest vegetation consists in improving both physical (structure, porosity, texture, etc.) and chemical (soil pH, salinity, C:N ratio, etc.)

soil properties [1].

A recent study showed that in a black pine (*Pinus nigra* J.F.Arnold) stand located on an eroded soil with a limestone substrate and containing a mixture of desert false indigo (*Amorpha fruticosa* L.)-wild privet in the understory, the humus content increased by 6.4% in 15 years [24].

Wild privet is suitable for several categories of degraded lands (eroded soils, landslides, etc.). In the hilly regions, corresponding to the vegetation layer dominated by beech-sessile oak (*Fagus sylvatica* L. – *Quercus petraea* (Mattuschka) Liebl.) mixtures, it can provide good results on soils with medium to heavy textures, on lands with high to very high levels of soil erosion, on terrains with land slide or crumbling phenomena and on slopes with different inclinations. In steppe regions, it can be used on skeletal soils, on lands with shallow soils and on soils with sandy or fine textures [3].

L. vulgare can also play an important role in sand dune fixation, as it was demonstrated in the Oltenia region (South-Eastern Romania) [30], where only a few species, such as black locust (*Robinia pseudoacacia* L.), honey locust (*Gleditsia triacanthos* L.), Siberian elm (*Ulmus pumila* L.), etc. can adapt and grow. Moreover, wild privet is suitable for land reclamation and ecological restoration in coastline areas, providing a better protection of the rehabilitated area and an improvement of biodiversity [42].

In the Czech Republic, it is considered as one of the shrub species with the highest ameliorative effects. There it is often used for the reclamation of lands polluted with ash depositions caused by the combustion of different types of coal in thermal power stations [8].

L. vulgare is also appreciated for its role in soil protection, promoting litter decomposition [41]. For example, in black locust pure plantations it is recommended to introduce wild privet in groups of 10-20 saplings because this is expected to provide better soil protection and to increase the resistance to harmful factors [11].

In Romania, this species has been used mainly in the plain regions for establishing forest protective shelterbelts, especially in Dobrogea (South-Eastern Romania), in combination with other robust species like: *Crataegus monogyna* Jack., *Prunus cerasifera* Ehrh., *Elaeagnus angustifolia* L., *Acer tataricum* L., etc. [14].

Wild Privet: Drawbacks

Due to its invasive character, in North America wild privet is considered a plague [25]. By quickly invading surrounding areas, *L. vulgare* could have a negative ecological impact on different forest stands or crops due to its capacity to form very dense bushes in a short period of time.

Moreover, it was reported that its pollen can generate allergic reactions to sensitive people [2].

Conclusions

Even if it is listed as an invasive species in several countries worldwide, wild privet has several important roles, especially in land reclamation, being one of the main shrub species used for establishing forest protective shelterbelts on different types of degraded terrains.

Due to its high ecological amplitude and its biological characteristics, in the present context of climate change [43], wild privet should be more extended in culture and used for establishing of protective forest shelterbelts, especially in sites characterized by harsh conditions.

Last but not least, wild privet has other roles such as ornamental, food source for many species of birds, role in traditional medicine or in apiculture, which recommend this species for promotion to the installation of various types of forest cultures.

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