

# Taxonomic notes on *Euphorbia esula* (Euphorbiaceae) with special reference to its occurrence in the east part of the Baltic region

Dmitry V. Geltman

*Geltman, D. V., Herbarium, Komarov Botanical Institute of the Russian Academy of Sciences, Prof. Popov str. 2, St. Petersburg, RUS-197376, Russia*

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The taxonomy, ecology and geography of *Euphorbia esula* L. and *E. virgata* Waldst. & Kit. are discussed. It is shown that both taxa have different ecological preferences and distribution patterns. Special attention is paid to the occurrence of *E. esula* in the east part of the Baltic region, where it shows particularly clear ecological differences from *E. virgata*. It is proposed to treat both taxa as separate species.

Key words: Baltic region, *Euphorbia esula*, *Euphorbia virgata*, taxonomy

## INTRODUCTION

The systematics of *Euphorbia esula* L. (Euphorbiaceae) and related species has been actively discussed in the taxonomic literature during the last three decades (Smith & Tutin 1968, Novikov & Tikhomirov 1987, Crompton *et al.* 1990, Molero & Rovira 1992, Baikov 1996, Geltman 1996ab). Despite the attention given to these species, there is still no consensus about their taxonomic status.

The taxonomic problems of this species complex can be divided into two principal groups: the separation of *Euphorbia esula* from *E. virgata* Waldst. & Kit. and distinguishing *E. esula* (if it is accepted *sensu stricto*) from the other species of the subsection *Esulae* Boiss., described mainly from Eastern Europe (*E. borodini* Sambuk, *E. kaleniczenkii* Czern., *E. tristis* Besser, *E. subtilis* Prokh. etc.). In this paper attention will be mainly paid to the *E. esula*–*E. virgata* interrelationship.

There are at least three main approaches to

the taxonomy of these taxa: the so called “traditional idea” according Molero and Rovira (1992): to accept both as distinct species (Prokhanov 1949, Chrtek & Kriša 1982, Rostański 1992), to separate them at the subspecies level under various names (Smith & Tutin 1968, Molero & Rovira 1992) and even simply to treat *E. virgata* as a synonym of *E. esula* (Novikov & Tikhomirov 1987, Crompton *et al.* 1990).

In my recent works (Geltman 1996ab), I followed the first approach. This decision is justified below. Special attention is paid to the occurrence of *Euphorbia esula* in the eastern part of the Baltic region, where it clearly demonstrates different ecological preferences to *E. virgata*.

## MATERIAL AND METHODS

The work is based on the investigation of holdings of the following herbaria: H, KW, LATV, LE, LECB, MW, MHA,

S, TAA, TU (acronyms according to Holmgren *et al.* 1990) and some field observations in northwest Russia. The “Baltic region” is here assumed to be the same as in Ingelög *et al.* (1993) and its “east part” is regarded as a territory occupied by Finland, the Leningrad<sup>1)</sup> and Kaliningrad provinces of Russia, Estonia, Latvia and Lithuania.

## TAXONOMIC HISTORY

*Euphorbia esula* was described from Western Europe (“in Germania, Belgio, Gallia”) in the first edition of *Species Plantarum* (Linné 1753), where several polynomials from other works of Linnaeus and other authors were cited as synonyms. The diagnosis was almost the same as in an earlier work of Linnaeus which dealt especially with *Euphorbia* (Linné 1752).

*Euphorbia virgata* was described from Hungary (Waldstein & Kitaibel 1803–1805). Some characters were mentioned in the protologue in which this species was said to differ from *E. esula* although, to my mind, these are not very important in their delimitation.

During the nineteenth century taxonomists usually accepted both species. They were recognised in *Flora Rossica* (Ledebour 1850), the classical works of Boissier (1866, 1879), *Conspectus florum Europaea* (Nyman 1881) and in the majority of regional European treatments. Plants with narrowly obovate or oblanceolate leaves, distinctly wider in the upper part than in the lower, were regarded as *Euphorbia esula*, and plants having linear or linear-lanceolate leaves often with almost parallel margins as *E. virgata*. It is interesting that there were no discussions about the possible merger of these species in the taxonomic literature of that time. The idea of unification appeared in North American works (see a good bibliography in Crompton *et al.* 1990), and in European literature such an approach was widely accepted only after the publication of *Flora Europaea* (Smith & Tutin 1968).

## RESULTS

### Morphological differences

*Euphorbia esula* and *E. virgata* differ mainly in the shape of the cauline leaves. As was mentioned above, *E. esula* has narrowly obovate or oblanceolate leaves distinctly wider in the upper part than in the lower, rounded at apex, usually (3)4–7 cm long and 0.7–1.3 cm wide, 3–5(6) times as long as wide (see illustrations in Geltman 1996ab).

Plants with narrower cauline leaves and smaller raylet leaves are regarded as *Euphorbia kaleniczenskii*, which occurs in the south part of Eastern Europe and occasionally in Central Europe (Geltman 1996ab). Although some plants from the area

under discussion, especially from Estonia, resemble this taxon, they are closer to *E. esula* and can be regarded as extreme forms of it.

Typical *Euphorbia virgata* has linear or linear-lanceolate leaves with parallel or almost parallel margins, acute at apex, (3)4–8 cm long and 0.3–1 wide, 6–15 times as long as wide. Sometimes lower leaves are slightly narrowed to the base, but upper ones usually have parallel margins.

It is very likely that *Euphorbia esula* and *E. virgata* can hybridize. Smith and Tutin (1968) mentioned that the hybrid is naturalised “elsewhere”. Some plants from the Baltic region with intermediate characters may well have originated as a result of hybridisation. However, according to my observations in northwest Russia, true hybrids are not very often found.

### Ecology of *Euphorbia esula* and *E. virgata*

Investigation of data from herbarium labels, field observations and personal communications (especially with N. N. Tsvelev) indicate that *Euphorbia esula* and *E. virgata* occur in rather different ecological conditions.

In northwest Russia and the Baltic states, as well as in Finland, *Euphorbia virgata* (plants with linear or almost linear leaves) occur mainly by roadsides and along railways, very rarely in cultivated ground as a weed. In more southern regions of Eastern Europe (the European part of the former USSR) this species grows principally in the same habitats, but can more often occur in cultivated ground, and sometimes also in a steppe environment.

Typical *Euphorbia esula* (with obovate or oblanceolate leaves) occurs mainly not far from the sea coast (or lake shores) in more or less wet (but not just damp) habitats on sandy, often slightly calcareous soils. A good example is the Lahta mire near St. Petersburg where this species was common enough 20–30 years ago (N. N. Tsvelev, pers. comm.) at the margin of the mire (close to the coast of the Gulf of Finland), but not in the mire itself. This habitat is now almost destroyed and *E. esula* has almost disappeared, with some individuals being found only occasionally. Another good example of the ecological preferences of this species is its locality near Riga, where it is found in wet depressions between sand dunes. Sometimes it also occurs in river valleys (e.g. in southeast Estonia).

<sup>1)</sup> Despite the return to the original name of St. Petersburg, the name of the province is still Leningrad (“Leningradskaya oblast” in Russian).

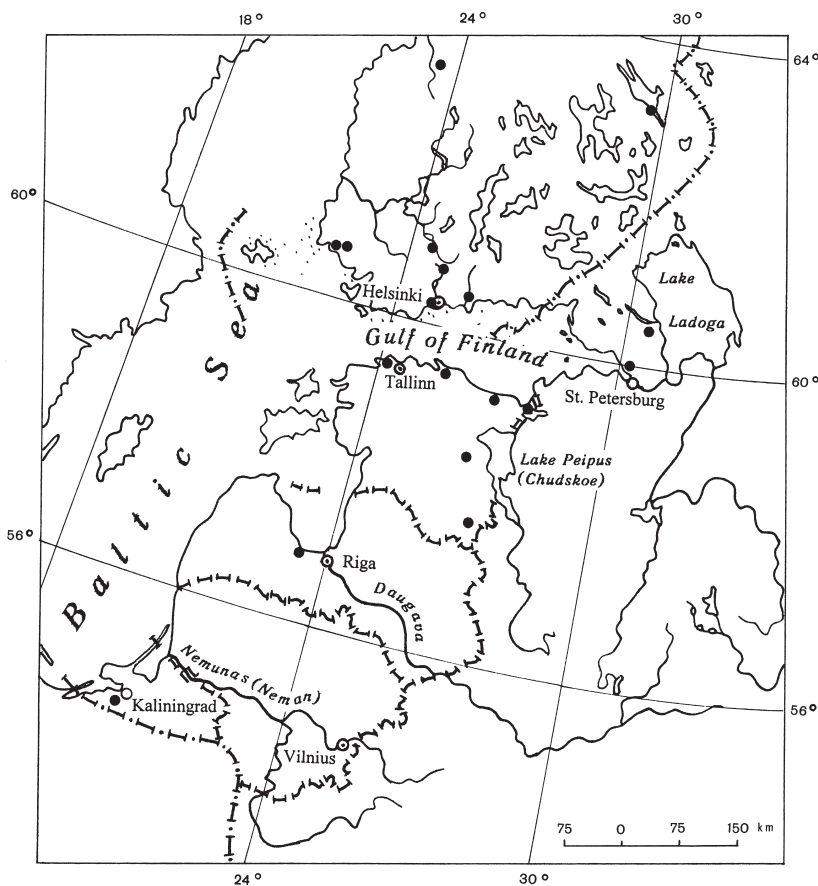


Fig. 1. Distribution of *Euphorbia esula* L. in the east part of the Baltic region.

According to information from herbarium labels, *Euphorbia esula* can also be found in weedy situations, especially in Finland. However, the majority of such localities are near the sea shore. It is therefore likely that *E. esula* originally occupied such localities before they were changed by human influence.

In more southerly regions of eastern Europe this plant is found rarely in floodplains of certain rivers (Oka, Pripiat, Kama) and also in steppes in more or less wet depressions (sometimes with some salinity). It might be mentioned that such an ecological pattern (i.e. occurrence both in littoral and steppe habitats) is known for several other species, e.g. *Centaurium littorale* (Turner) Gilmour and *C. pulchellum* (Sw.) Druce (Tsvelev 1978).

Ecological differences between the species in question were mentioned by Boissier (1866). He characterised the occurrence of *Euphorbia esula* as “*in pratis et humidis Europae praesertim borealis et media ...*” and *E. virgata* as “*in pratis et ad*

*vias ...*”. Because the habitats of *E. esula* (as for example many wetlands) are very vulnerable to human activity (see above example from the vicinity of St. Petersburg), it is very likely that its recent extinction in many places together with the wide distribution of the hybrid *E. × pseudovirgata* (Schur) Soó (= *E. esula* × *E. virgata*) and hybrids with other species of the subsection *Esulae* was the reason that many European taxonomists changed their opinion about its status.

### Geographical distribution of *Euphorbia esula*

The distribution map of *Euphorbia esula* (Fig. 1) clearly demonstrates that the majority of known Baltic localities are found near the coast of the Baltic Sea. Others are connected with systems of lakes which are (or were in recent geological past) connected with the Baltic Sea. Several localities in southeast Estonia are admittedly some distance

from the sea or from lakes, but it is also necessary to take into account different possible configurations of the coastline in comparatively recent geological time.

Unfortunately, I had no opportunity to examine material from Lithuanian herbaria. It is very likely that *Euphorbia esula* is also found in Lithuania. However, my concept of this species is different from that accepted in Lekavičius' (1989) guide for Lithuanian plants.

*Euphorbia virgata* is known throughout the entire region and does not show any special features of geographical distribution.

## TAXONOMIC TREATMENT

Based on the suggestions mentioned above I prefer to treat *Euphorbia esula* and *E. virgata* as distinct species. Following there are nomenclature references and brief morphological descriptions of both taxa.

### *Euphorbia esula* L.

Sp. Pl.: 461. 1753. — *Tithymalus esula* (L.) J. Hill, Hort. Kew.: 172.4. 1768. — *E. esula* subsp. *esula*; [Radcl.-] Sm. & Tutin, 1968, Fl. Europ. 2: 226, p. p.

Perennial herb with erect stems 20–80 cm tall, usually bearing axillary branches and rays. Cauline leaves (3)4–7 cm long and 0.7–1.3 cm wide, 3–5(6) times as long as wide, obovate, oblanceolate or obovate-elliptic, gradually narrowed to the base, usually rounded at the apex. Ray-leaves elliptic or ovate; raylet-leaves semi-circular-reniform, yellow during flowering time, 0.7–1.1 cm long and 0.8–1.2 cm wide. Umbel of (6)7–11 rays. Fruit surface glabrous or slightly rugose, but without prominent tubercles. Seeds 2–2.3 mm long and 1.4–1.7 mm wide, oblong or oblong-ovoid.

*Representative specimens examined.* — **Finland.** Regio Aboensis, Lemu, kirkkomaia 26.VI.1926 (H); Nylandia, Helsingfors, Granö, sandy grounds by the sidewalk, 28.VI.1987 *R. Skytén* 5223 (H); Nylandia, Helsinki, Sörnäisten rantatien varressa lähellä Pääskylänk kulmausta, 29.VII.1957 *A. Vallä* (H); Nylandia, Borgå, Lindorn, 23.VII.1892 *M. Brenner* (H); Karelia borealis, Pielisjärvi, Koli, Selkola, 15.VII.1963 *C.E. Sonck* (H); Kauhava, Huhmarkoski, Kauhavajoen pohjoispuolella, 28.VII.1987 *T. Rajala* (H); Tavastia, Hattula,

ad lhalampi, 14.VI.1901 *O. Collin* (H). **Russia.** Leningrad prov. In isthmo karellico, Rautu, rid Sunibula Matuzn, 27.VI.1866 *A. J. Malmberg* (H); vicinity of Leningrad, swamp brushland near the pass from Staraja Derevnja to Kamenka through the Lahta mire, 22.VII.1959 *N. Tzvelev* (LE). Kaliningrad prov. Königsberg, ad mare balticum, 20.VI.1875 *C. Baenitz* 2520 (S). **Estonia.** Harju rj., Lahemaa Rahvuspark, Loksa — Männiku mut. ja vana Narva mut. ristumiskohast 900 m NNO, salumänniku servas, 23.VII.1976 *R. Sender* (TAA); Röpina rajoon, Tuderna raudtaepeatusest W, raudteetammil, 5.VIII.1957 *M. Kask*, *E. Tammemägi* (TAA); Narva joe suudmes, kalasandamus, 28.VII.1964 *L. Viljasoo* (TAA); Tartu r., Kärkna jaamast lounas, raudteetamme nolval Amme joe ligodal, 24.VI.1968 *S. Talst* (TAA); Auf einem Grassplatze bei Nüggen, s.d., *H. Girgensohn* (LE). **Latvia.** Dunes with scarce pines near the coast of the Gulf of Riga near the Sloka railway station, 12.VII.1992, N 19, *N. Tsvelev* (LE).

### *Euphorbia virgata* Waldst. & Kit.

Pl. Rar. Hung. 2: 176, tab. 162. 1803–1804 (*non* Desf. 1804). *Euphorbia virgultosa* Klok., Fl. URSS, 7: 631. 1955. *Tithymalus waldsteinii* Sojak, Čas. Nar. Mus. (Praha), Odd. Prir. 140, 34: 177. 1972. *Euphorbia kitaibelii* Klok. & Dubovik, Nov. Syst. Pl. Vasc. et Non Vasc. (Kiev): 108. 1976 [publ. 1977], *nom. invalid.*

*Tithymalus tommasinianus* (Bertol.) Sojak subsp. *waldsteinii* (Sojak) Sojak, Čas. Nar. Mus. (Praha), Rada Prir. 148, 3–4: 200. 1980. — *Euphorbia waldsteinii* (Sojak) Czer., Pl. Vasc. URSS: 216. II.1981. — *E. waldsteinii* (Sojak) Radcl. Sm., Kew Bull. 36(2): 216. XI.1981. — *E. esula* subsp. *tommasiniana auct. non* (Bertol.) Nyman: [Radcl.-] Sm. & Tutin 1968, Fl. Europ. 2: 226, p. max. p.

Perennial herb with erect stems 30–80 cm tall, usually bearing axillary branches and rays. Cauline leaves (3)4–8 cm long and 0.3–1.0 cm wide, 6–15 times as long as wide, linear, sometimes linear-lanceolate or linear-elliptic, truncate at the base, acute or rarely rounded at the apex. Ray-leaves linear, linear-ovate or linear-elliptic, raylet-leaves rounded-triangular or semi-circular-reniform, yellow during flowering time, 0.4–1 cm long and 0.6–1.6 cm wide. Umbel of (5)6–14 rays. Fruit surface glabrous or slightly rugose, but without prominent tubercles. Seeds 2–2.3 mm long and 1.4–1.7 mm wide, oblong or oblong-ovoid.

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