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Research Article

Remarks on *Acalypha rhomboidea* in Europe, with a fifth record at the continental level

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Abstract – *Acalypha* is a genus native to tropical and subtropical regions of the world and eastern North America and Asia, with some species considered as aliens in Eurasia. The European flora is reported to include four species, all occurring in Italy according to Plant of the World Online database. As part of the ongoing studies of the flora of Treviso Province (Veneto region, north-eastern Italy), we came across to a population of *A. rhomboidea* Raf. which represents not only the first record for Veneto and the second one for the Italian flora, but also the fifth discovery of the species out of its native range; a description of the species (the first one for Italy), ecological remarks, and a map of the European occurrences are provided.

Keywords: *Acalypha persimilis*, *Acalypha rhomboidea*, *Acalypha virginica*, Europe, exotic species, Italy, new record

Introduction

Acalypha L. (Euphorbiaceae Juss.) is a genus comprising 429 species naturally distributed across tropical and subtropical regions of the world as well as eastern North America and Asia; some species are considered aliens in Europe, Caucasus, Turkey, Tadzhikistan, and west Siberia (POWO 2025).

According to POWO (2025), the flora of Europe includes four *Acalypha* species, i.e. *A. australis* L., *A. persimilis* Müll. Arg., *A. rhomboidea* Raf. and *A. virginica* L. A proposal to conserve the name *A. ostryifolia* Riddell ex J.M. Coult. (published in 1894) against *A. persimilis* (published in 1865) has been made by Levin et al. (2025) to preserve a well-established name (*A. persimilis*) that has been in use for almost two centuries (so following Recommendation 14A of *Madrid Code*; Turland et al. 2025); we will refer to this species hereafter as *A. ostryifolia*.

During field surveys in Treviso Province (Veneto region, north-eastern Italy) to investigate the flora of this area, we discovered a population of *A. rhomboidea*, representing not only the first one for Veneto and the second one for Italy but also the fifth record of the species out of its native range, after De Almeida and Costa Mato (2006) for Portugal, Di Pietro et al. (2021) for Italy, Borovečki-Voska et al. (2023) for Croatia, and Sîrbu (2023) for Romania. In Italy, three additional species have been recorded, i.e. *A. australis*, *A. virginica* and *A. ostryfolia* (see Del Guacchio 2005, Portal to the Flora of Italy 2025). Since there are difficulties in the identification of *Acalypha* species as well as taxonomic difficulties in the genus as a whole (see e.g., Levin 2016, Levin et al. 2022, Martínez-Gordillo et al. 2022), we also investigate Rafinesque's name in order to verify and clarify its identity.

Material and methods

The present research was based on personal field investigations in Veneto during the spring and summer of 2024, and examination of exsiccata kept in Herbaria BM, BR, CLF, GH, HFLA, LINN, LZ, P, PH, PI, RO, and W (*sensu* Thiers 2026). Relevant literature (protologues included) was also analyzed.

The description of the species is based on observed plants in field and the alien status follows Pyšek et al. (2004).

The articles cited through the text follow the International Code of Nomenclature for algae, fungi, and plants (Turland et al. 2025, hereafter reported as "ICN").

Results

Acalypha rhomboidea Raf., New Fl. [Rafinesque] 1: 45. 1836 ≡ *Acalypha virginica* var. *rhomboidea* (Raf.) Cooperr. in Michigan Bot. 23: 165. 1984.

Lectotype (designated by Weatherby 1940: 46): U.S.A., South Carolina [labelled by Rafinesque] (G, *non vidi fide* Weatherby 1940: 46).

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Description: Herbs, annual, 1.5–6 dm, monoecious. Stems usually erect, sometimes ascending, usually sparsely pubescent, rarely sparsely hirsute. Leaves: petiole 0.5–8.1 cm; blade ovate to rhombic, 2.1–9.5 × 0.8–4.5 cm, base attenuate, margins crenate to serrate, apex acute to slightly acuminate. Inflorescences bisexual, axillary; peduncle 0.1–0.55 cm, pistillate portion 0.7–1.5 × 1–2 cm or pistillate bract solitary, staminate portion 0.2–1 cm; allomorphic pistillate flowers absent. Pistillate bracts loosely arranged to crowded (inflorescence axis scarcely visible between bracts), 6–15 × 9–23 mm, abaxial surface sparsely pubescent and stipitate-glandular; lobes 6–8, lanceolate to triangular, 1/3–2/3 bract length. Pistillate flowers: pistil 3-carpellate; styles multifid or laciniate. Capsules pubescent. Seeds 1.5–1.7 mm, minutely pitted.

Flowering and fruiting times: June to September.

Native distribution area: *Acalypha rhomboidea* is a species native to eastern Canada and central-eastern United States of America (Levin 2016, POWO 2025).

Occurrence of *Acalypha rhomboidea* in Europe: *Acalypha rhomboidea* has been recorded only three times outside of North America, all in European sites (Fig. 1):

> Portugal (De Almeida and Costa Mato 2006): introduced by culture in the Botanical Garden of Coimbra, from which it has escaped, becoming a naturalized alien weed in ruderal communities of gardens and roadsides (70 m a.s.l.). The species is considered naturalized. First introduction: October 2005;

> Italy (Di Pietro et al. 2021): inside and in outer parts of the nursery garden of Aurunci Mountains Natural Park (not there cultivated) at 215 m a.s.l. The species is considered naturalized. First introduction: October 2017;

> Croatia (Borovečki-Voska et al. 2023): in two sites on north-Croatia, i.e. arable land in Karlovac Municipality (at 111 m a.s.l.) and on a gravelled parking in Hrvatsko zagorje (Kostel) at 288 m a.s.l. No specific indication of the status of naturalization was reported by Borovečki-Voska et al. (2023), but the authors stated that "… the plants in Karlovac are numerous and robust, while those in Kostel are stunted. The abundance in the former locality [Karlovac] might indicate that the plants have been present there for a longer time."; so, we can consider the species as casual in Kostel and naturalized in Karlovac. First introduction at Kostel: October 2022.

> Romania (Sîrbu 2023): in the central area of Iași city (north-eastern Romania), as a weed in a garden of ornamental shrubs and trees (50–60 m a.s.l.). The species is considered naturalized. First introduction: August 2021.

The population found in the present research (Fig. 2) grows along banks of the river Sile (not far from the city of Treviso, Veneto region, northeastern Italy); it is represented by about 100 individuals, which occupy an area of about 4 m^2. *Acalypha rhomboidea* is strictly associated with *Persicaria lapathifolia* (L.) Delabre s.l. which is dominant in the plant

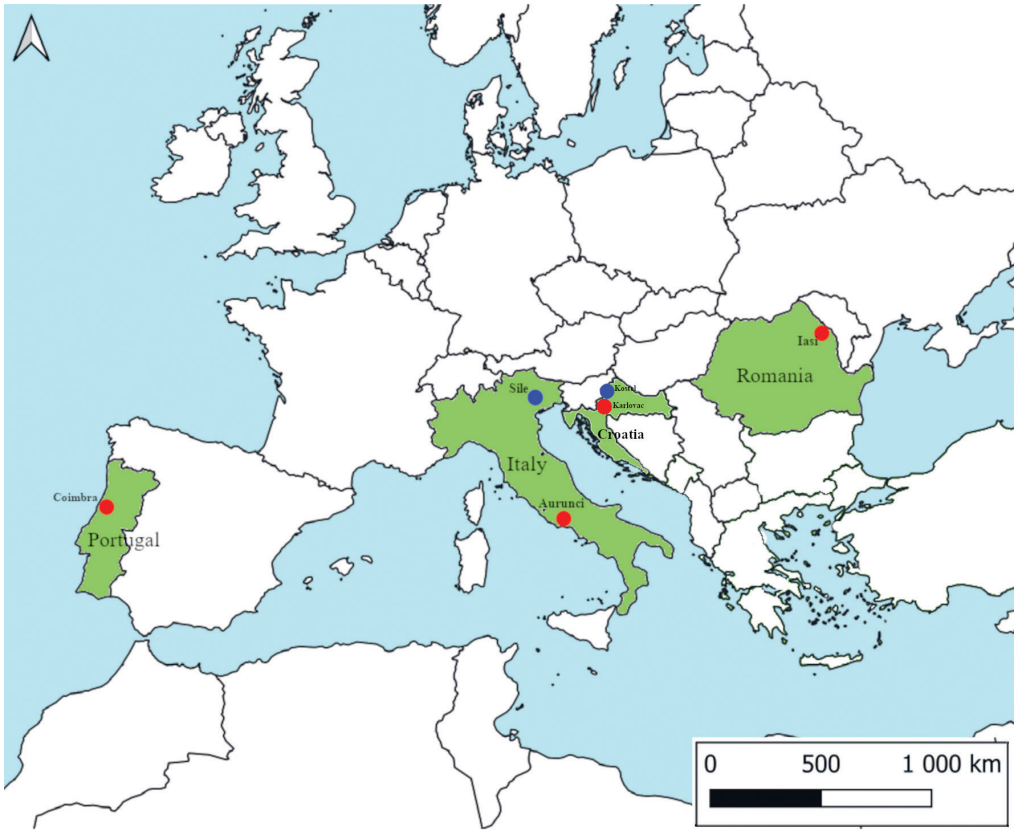


Fig. 1. Distribution map of *Acalypha rhomboidea* Raf. (Euphorbiaceae Juss.) in Europe. Symbols: red dots = naturalized populations (previous reports); blue dot = casual population (new report).



Fig. 2. Habitat where *Acalypha rhomboidea* Raf. (Euphorbiaceae Juss.) grows along river Sile (Treviso Municipality, Veneto region, north-eastern Italy). A – leaf, B – bract of pistillate flower.

community (alliance *Bidention tripartitae* Nordhagen 1940 ex Klika et Hadač 1944, according to Biondi and Blasi 2015). A further common species is *Paspalum dilatatum* Poir., an invasive alien in Veneto region, but in general throughout Italy (excluding Val d'Aosta where it is absent) (Portal to the Flora of Italy 2025). Finally, some individuals of *Convolvulus sepium* L., *Mentha longifolia* (L.) L., and *Rubus caesius* L. occur.

The occurrence of this population does not appear to be linked to *in situ* human activities, while the river plays clearly a fundamental role as pathway of introduction of the species, as highlighted by the first author (DI) for other aliens growing along the banks (see e.g., Iamonico et al. 2010, Ceschin et al. 2016, Iamonico 2021, Iamonico and Nicolella 2023, 2024). Despite this and the high number of individuals found in a restricted area (see above), we were not able to verify its occurrence during the years. Consequently, we prefer to consider *A. rhomboidea* a casual alien in Veneto. Our discovery is not only the first one at the regional level and for northern Italy, but also the second record for Italy and the fourth one out of its native range (Fig. 1).

Typification of the name *Acalypha rhomboidea*: *A. rhomboidea* was firstly described by Rafinesque (1836: 45) in the 1st volume of his *New flora of North America* where a short description was given; the provenance was also reported as "Pennsylvania, to Ohio, Alleghanies &c." and two figures (part of the original material) were cited. The first was "Autikon Raf. 24." This refers to Rafinesque's (1840) *Autikon Botanikon*, where the author included only 1500 of his proposed 2500 species, but no actual illustrations were prepared (Warren 2004: 180). Thus, illustration no. 24 by Rafinesque does not exist. The second cited figure was "Lamarck tab 780," which refers to Lamarck's (1823) *Tableau encyclopédique et méthodique des trois règnes de la nature. Botanique* where, however, the *Acalypha* illustration is no. 789 (image available at https://www.biodiversitylibrary.org/page/33443015), not "780" as reported by Rafinesque (1836: 45; probably an orthographic error). Note that Lamarck's *Tabula* 789 includes two taxa, *i.e. A. spiciflora* Burm.f. (no. 1 under *Acalypha* in Rafinesque's work) and *A. virginica* L. (no. 2 plus magnifications "*f-p*"). The Burman name is currently recognized as a distinct species of *Claoxylon* A.Juss. [as *C. spiciflorum* (Burm.f.) A.Juss; see Montero Muñoz et al. (2022)]. Furthermore, Rafinesque (1836: 45) stated that *A. rhomboidea* is the same as *A. caroliniana* Walter cited by "… Michaux and all our Botanists except Walter and Elliot". In other words, Rafinesque (1836: 45) reconsidered most of the citations of *A. caroliniana* (*e.g.* that by Michaux [1803: 216] in his *Flora Boreali-Americana*), finding them different from *A. caroliniana* as originally published by Walter (1788: 238).

According to Stafleu and Cowan (1983) and HUH-Index of Botanists (2013), Rafinesque's herbarium and types are mainly preserved at P (duplicates in some European and American herbaria). No specimen useful for the lectotypification purpose was traced at P. However, Weatherby (1940: 96) briefly discussed some of Rafinesque's names in *Acalypha* and proposed a lectotype for *A. rhomboidea*, choosing a Rafinesque specimen deposited at G.

Selected specimens examined: *Acalypha rhomboidea*. CANADA: Québec, Sherbrooke, mauvaise herbe dans mon Jardin, 22 August 1974, *A. Legault 9635* (P04786297); Québec, La Trappe, comté Deux-Montagnes, vieux paturages, 7 September 1955, *P. Louise-Marie s.n.* (CLF093404). ITALY: Lazio, Itri municipality, 41°18'16" N, 13°31'59" E, 215 m, inside and in outer parts of nursery garden of Aurunci Mountains Natural Park (where *Acalypha rhomboidea* is not cultivated), 2 October 2018, *M. R. Perna s.n.* (HFLA); Veneto region, Treviso Province, banks of the river Sile, 4 m, 27 July 2024, *M. Crosato s.n.* (RO). U.S.A.: Pennsylvania, Beaver, 1 mile E of Route 30 bridge over Raccoon Creek, 11 September 1951, *M. Henrici s.n.* (PH00456890); North Carolina, Gaston, 4.1 miles east of Gastonia just north of U.S. 29-74 on Ranlo Road, wooded stream, 17 September 1956, *H. E. Ahles 18864* (P05547201); Massachusetts, Hampshire, Mt. Horse, West Hatfield, disturbed areas, 20 August 1975, *H. E. Ahles 81274* (P05547200); Pennsylvania, Berks, Hopewell Furnace National Historic Site, S of furnace near S side of French Creek, edge of woods, 13 September 1986,, *A. E. Schuyler 6794* (PH00459471); Connecticut, Fairfield, Newtown, 5 August 2010, *M. A. Vincent & M. W. Vincent 15141* (GH01069425); Massachusetts, Duke, Thimble Farm, Island Grown Initiative, path between moist woods and farmland on south side of property, 25 September 2019, *G. Palermo & M. Curtin 19-227* (PHARB00993).

***Acalypha virginica*.** ITALY: Italy. Veneto. Venetia. Patavium (Padova), in marginibus herbosis fossarum prope Porta Ponte Corvo, 25 June 1908, *A. Béguinot s.n.*. (PI032585); Veneto, Zenson del Piave, digue du fleuve, 15 September 1978, *S. Pignatti* 9411 (P05082481); Piemonte, Provinz Novara, zwischen Novara und Ticino, ca. 4 km E

Galliata, unmittelbar N der Autobahn, 145 m, 26 October 1996, *R. Karl s.n.* (W2016-0005483); Friuli-Venezia Giulia, Provinz Pordenone, ca. 3 km N Sacile und E Fiaschetti, Umgebung der Brücke über die Livenza, ca. 45 m, 02 September 2002, *R. Karl s.n.* (W2016-0005483). SLOVENIA: Slovenia. Primorska. Provinz Görz: unterhalb des Franziskanerklosters *Castagnevizza* bei Görz, am Wege nach Panowitz, July 1947, *C. Zirnich 22095* (LZ227256). U.S.A.: Texas, Bowie County, near Texarkana, 25 August 1898, 300 feet, *A. A. & E. Gertrude Heller 4151* (P04836907); Arkansas, old fallow bottom field near the Duck Pond, 380 ft., 23 October 1968, *D. Demaree 59595* (P04786299).

Discussion

Acalypha rhomboidea has been often called *A. virginica* in North America, primarily due to controversy about the typification of that name (Levin 2016). Conservation of the type of *A. virginica* by Reveal et al. (1990) resolved the issue. These authors highlighted that Weatherby's (1927) proposed lectotype of *A. virginica* (a Kalm specimen, LINN no. 1139.1; image available at https://linnean-online.org/11787/#?s=0&cv=0) had been examined and circumscribed by Müller (1865) as the broad-leaved *A. virginica* var. *genuina*. On the other hand, Weatherby (1927) considered Müller's narrow-leaved *A. virginica* var. *intermedia* to be a distinct species, i.e., *Acalypha digyneia* Raf. Weatherby's choice was rejected by Mackenzie (1928), who lectotypified *A. virginica* on the specimen *Clayton 201* (BM00038872; image of the lectotype available at https://data.nhm.ac.uk/record/51e7a60c-cbda-4e88-8a68-ef93442643e6/1106/1595951462363), while he referred the *Kalm* specimen to *A. rhomboidea*. After a detailed discussion, Reveal et al. (1990) reached the conclusion that Weatherby's lectotype of *A. virginica*, if maintained, would cause the application of broad-leaved plants to Linnaean species, placing *A. rhomboidea* in synonymy and taking up *A. digyneia* for what generally had been treated as *A. virginica*. Therefore, they proposed the conservation of *A. virginica* using *Clayton 201*, which represents the narrow-leaved plants (= *A. digyneia*; see e.g., POWO 2025). This nomenclatural problem, combined with the use of inappropriate characters to distinguish *A. rhomboidea* and *A. virginica*, has resulted in considerable confusion between these amply distinct species and the clarification of the identity of Rafinesque's *Acalypha* comes full the circle.

Based on literature data, as well as the examination of type material of *Acalyphainica* (lectotype BM00038872) and other specimens collected in both North America and Italy, our opinion is that these two species were (and are still) confused in Europe, as happened in America (see Levin 2016 and Reveal et al. 1990). Therefore, we wonder if at least some European collections of *A. virginica* are actually to be referred to *A. rhomboidea* and we suggest their identifications should be checked. The description given in the present paper is the first one for Italy and Europe [*A. rhomboidea* appeared neither in the recent 2nd edition of *Flora d'Italia* (Pignatti et al. 2017) nor in *Flora Europaea* (Tutin 1968)] so it could be useful to verify European populations currently known as *A. virginica*.

A diagnostic key for *Acalypha* species occurring in Europe, is presented below:

1. Leaf bases cordate ..... *Acalypha ostryfolia*
– Leaf bases cuneate 2
2. Pistillate bract lobes rounded,1/20 as long as the bract .... *Acalypha australis*
– Pistillate bract lobes triangular or lanceolate, at least 1/4 as long as the bract 3
3. Pistillate bract abaxial surface hirsute, lobes triangular, (9–)10–14(–16), 1/10-1/4 as long as the bract .... *Acalypha virginica*
– Pistillate bract abaxial surface sparsely pubescent and stipitate-glandular, lobes lanceolate, 6–8, 1/3–2/3 times as long as the bract ..... *Acalypha rhomboidea*

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