

## *Acalypha* (Euphorbiaceae): a new genus record for Turkey

Hayri Duman<sup>1</sup> & Salih Terzioğlu<sup>2</sup>

<sup>1</sup> Department of Biology, Faculty of Arts and Science, Gazi University, Ankara, Turkey

<sup>2</sup> Department of Forest Botany, Faculty of Forestry, Karadeniz Technical University, Trabzon, Turkey, e-mail: sterzi@ktu.edu.tr (corresponding author)

Received: March 19, 2009 ▷ Accepted: May 25, 2009

**Abstract.** *Acalypha australis* (Euphorbiaceae), a species of East Asia, has been recently discovered in Turkey (A7 and A8 Trabzon) and recorded as a new alien genus for the flora of Turkey. A detailed description of the species along with its photograph is provided.

**Key words:** *Acalypha australis*, alien species, new record, Turkey

---

### Introduction

Indigenous vascular flora of the NE Anatolia has been subjected to dramatic alteration because of the invasion of alien species from various parts of the world. As a host area, this part of Turkey contains many ecosystems and the migration routes of alien species from East to West. Thus new alien taxa have been continuously reported from the region, as emphasized by Terzioğlu & Karaer (2009). Deutschewitz & al. (2003), for example, reported that ecosystems with anthropogenic disturbances, such as cities or densely populated areas, contain high numbers of alien species, whereas natural or near-natural ecosystems display certain ecological resistance against the introduction of alien species. Climate is a major constraint for annual alien species, as they are unable to complete their life cycle, because the growing period is too short. Occurrence of many taxa is thus ephemeral (Liška & Soldán 2004). The climatically cloudy and humid areas of Turkey, e.g. NE Anatolia, where *Acalypha* L. occurs, have hosted many invasive species now considered a second cause for global biodiversity loss after direct habitat destruction, with adverse environmental, economic and social impacts from the local level upwards (Genovesi

& Shine 2003). Estimating the main type of migration of these species from their natural range to invaded area and combating them is quite a difficult task. Most of the introduced taxa multiply in a limited period of time and destroy the endemic and native flora. Investigation of alien/exotic species has become an imperative issue, because invasion is considered a serious ecological and socioeconomic problem (Negi & Hajra 2007). As emphasized by Byfield & Baytop (1998), the existing populations of alien species in NE Turkey should be identified and monitored at least for conservation of biodiversity. In general, aliens are large, ecologically tolerated taxa, which manage to compete effectively with the natives.

The genus consists of herbs, shrubs and tree species that are mostly monoecious, or occasionally dioecious. Leaves alternate with deciduous and lanceolate or subulate stipules. It is the fourth largest genus of the Euphorbiaceae (Atha 2008). It consists of about 462 species (Qin & al. 2006) that occur in the tropical and subtropical regions of America (ca. 60%) and Africa (ca. 30%) (Atha 2008). The genus belongs to Acalypheae of Acalyphoideae, along with *Ricinus*, *Adriana*, *Mercurialis*, *Dysopsis*, *Cleidion*, *Macaranga*, *Claoxylon*, *Mallotus* and *Trewia* (Takhtajan 1996). Three subgenera of this genus have been recognized so far: subgen.

*Linostachys* (Klotzsch) Müll. Arg., subgen. *Androcephala* Pax & K. Hoffm., and subgen. *Acalypha* (Pax & Hoffmann 1924). This classification system is based on homoplasious inflorescence morphology and is not supported by phylogenetic analysis based on DNA sequence data (Levin & al. 2005; Sagun & Levin 2007). The genus has been treated as one of the *Euphorbioid* genera (Hauxing & Gilbert 2008).

## Results and discussion

The family *Euphorbiaceae* is represented in Turkey by six genera, two of which are naturalized: *Andrachne* L., *Chrozophora* A. Juss. *Mercurialis* L., *Ricinus* L., *Euphorbia* L. and *Acalypha*. This newly recorded genus in the flora of Turkey is distinguished by the following characteristics:

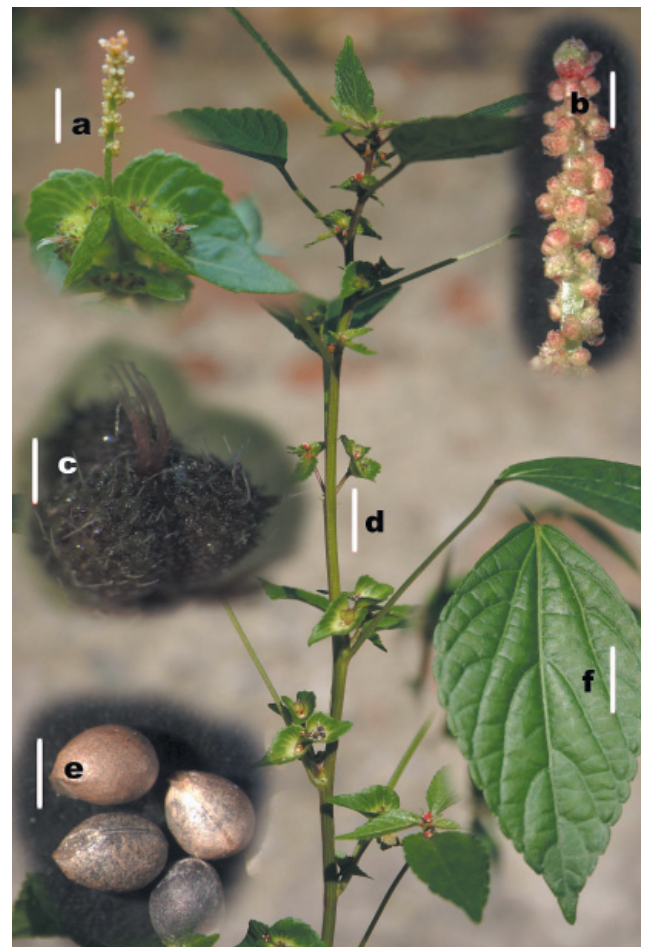
1. Flowers without perianth, inflorescence a cyathium, latex present . . . . . **1. *Euphorbia***
- 1\*. Flowers with perianth, inflorescence not a cyathium, latex absent . . . . . **2**
2. Leaves opposite . . . . . **2. *Mercurialis***
- 2\*. Leaves alternate . . . . . **3**
3. Plant with stellate hairs . . . . . **3. *Chrozophora***
- 3\*. Plant glabrous or with simple hairs. . . . . **4**
4. Leaves palmately lobed . . . . . **4. *Ricinus***
- 4\*. Leaves entire, serrate or crenate . . . . . **5**
5. Perennial, leaves entire, styles bifid . . . . . **5. *Andrachne***
- 5\*. Annual, leaves crenate, styles lacinate . . . . . **6. *Acalypha***

*Acalypha australis* has been collected in NE Anatolia for the first time. This study is based on specimens collected from Turkey: A7 and A8 Trabzon. The first population reported here consisted of several individuals growing in the Solaklı stream bed, where none of the individuals was observed a year later. The description was written with the aid of *Flora of China* (Hauxing & Gilbert 2008) and *Flora of the USSR* (Poyarkova 1974). Specimens were deposited both in the herbarium of the Karadeniz Technical University, Faculty of Forestry, Department of Forest Botany (KATO) and the herbarium of Gazi University.

## *Acalypha australis* L. Sp. Pl. 2: 1004. 1753 (Fig. 1)

An annual herb, 20–60 cm tall, monoecious, strongly branched, branchlets pilose. Leaves alternate, petiole 1–6 cm, leaves broadly lanceolate, or lanceolate–oval, 3–9 × 1–5 cm, membranous, apex shortly acuminate, base cuneate, strongly crenate at margin, 3–nerved at base, pilosulose along veins. Inflorescence axillary, seldom terminal, unbranched, 0.5–6 cm long, staminate and pistillate flowers in one inflorescence. Staminate flowers in elongate thin spikes, 1–3 cm long, in axils of small lanceolate bracts; sepals 4, ca. 0.5 mm, acute, ciliate, stamens (7) 8. Female flowers 1–3 per bract, sessile, styles 3, ca. 2 mm, ovary pilose. Capsule 3–locular, ca. 4 mm in diam., pilose and tuberculate. Seeds subovoid, 1.5–2 mm, smooth. Fl. Aug.–Oct., Fr. Sep.–Nov.

**Collected specimens.** Turkey: A8 Trabzon – Of (Town), Ballica village, Solaklı stream bed, 9 km south of the Black Sea, 25.09.2007, 25 m, HD 9900; Kumlu-



**Fig. 1.** *Acalypha australis*: a – male and female flowers; b – male flower; c – fruit; d – habit; e – seeds; f – leaf. Scale bars: a – 2 mm; b, c, e – 1 mm; d – 0.5 cm; f – 1 cm.

dere Köyü, 06.09.2008, 160 m, KATO 16741; A7 Trabzon – Karadeniz Technical University, Kanuni Campus, 17.09.2008, 60 m, KATO 16742.

Owing to the natural distribution of *A. australis* in the Caucasus as a weed among crops (Poyarkova 1974), its distribution in the Turkish Caucasus is not surprising. Authors have estimated that it is a newly naturalized taxon in Turkey. The flora of Solaklı watershed was studied in 1998, with 1024 vascular plant taxa recorded from the study area (Terzioğlu & al. 2007). However, this species was not found in its first place of collection falling into the above-mentioned study area. The first specimens for the present study (HD 9900) were collected from the same area 10 years later. Observations of the naturalized populations indicate that the species varies somewhat in height and leaf size, depending on humidity and shadowiness of the area. Well-established populations of *A. australis* now exist under such conditions in NE Anatolia. This taxon is easily dispersed by its small seeds, many of which were present in the soil seed-banks throughout the year (Shen & al. 2007). It has been recorded far from its native areas of North America (Delendick 1990), the Caucasus (Poyarkova 1974) and N Australia (Hauxing & Gilbert 2008). While we are not certain how the species got introduced to NE Anatolia, it could have probably been carried in from the Caucasus. From a chorological point of view, the migration of the species towards Europe is expected to continue over the Euro-Siberian region of Turkey.

**Acknowledgement.** The authors are grateful to Dr. Emin Zeki Başkent and to the anonymous reviewer for the helpful comments on the manuscript.

## References

Atha, D. 2008. A new species of *Acalypha* (*Euphorbiaceae*: *Acalyphoideae*: *Acalypheae*) from Belize and adjacent Mexico and Guatemala. – *Brittonia*, **60**(2): 185-189.

Byfield, A.J. & Baytop, A. 1998. Three alien species new to the flora of Turkey. – *Turk. J. Bot.*, **22**: 205-208.

Delendick, T.J. 1990. *Acalypha australis* L. (*Euphorbiaceae*): new to the New York State. – *Bull. Torrey Bot. Club*, **117**(3): 291-293.

Deutschewitz, K., Lausch, A., Kühn, I. & Klotz, S. 2003. Native and alien plant species richness in relation to spatial heterogeneity on a regional scale in Germany. – *Global Ecol. Biogeogr.*, **12**: 299-311.

Genovesi, P. & Shine, C. 2003. European Strategy on Invasive Alien Species. Convention on the Conservation of European Wildlife and Natural Habitats, Standing Committee, Strasbourg (Final Report).

Hauxing, Q. & Gilbert, M.G. 2008. *Acalypha* L. – In: Wu, Z., Raven, P.H. & Deyuan, H. (eds), *Flora of China*. Vol. **11**, pp. 251-255. Science Press, Beijing, & Missouri Bot. Garden Press, St Louis.

Levin, G.A., Steinmann, V.W. & Sagun, V.G. 2005. Phylogeny and biogeography of *Acalypha*. – In: Abstracts, XVII Int. Bot. Congr., Vienna. P. 68. Robidruck, Vienna.

Liška, J. & Soldán, Z. 2004. Alien vascular plants recorded from the Barentsburg and Pyramiden settlements, Svalbard. – *Preslia*, **76**: 279-290.

Negi, P.K. & Hajra, P.K. 2007. Alien flora of Doon Valley, Northwest Himalaya. – *Curr. Sci.*, **92**(7): 968-978.

Pax, F. & Hoffmann, K. 1924. *Euphorbiaceae–Crotonoideae–Acalypheae–Acalyphinae*, Additamentum VII. – In: Engler, A. (ed.), *Das Pflanzenreich IV.147.xvi* (Heft 85), pp. 1-231. W. Engelmann, Berlin.

Poyarkova, A.I. 1974. *Acalypha* L. – In: Komarov, V.L. (ed.), *Flora of the USSR*. Vol. **14**, pp. 228-229. Israel Program for Scientific Translation, Jerusalem.

Qin, X.S., Ye, Y.S., Xing, F.W. & Ye, H.G. 2006. *Acalypha chuniana* (*Euphorbiaceae*), a new species from the Hainan Province, China. – *Ann. Bot. Fenn.*, **43**: 148-151.

Sagun, V.G. & Levin, G.A. 2007. Four new species of *Acalypha* (*Euphorbiaceae*) from Malesia. – *Blumea*, **52**: 351-359.

Shen, Y.X., Liu, W.Y., Cao, M. & Li, Y.H. 2007. Seasonal variation in density and species richness of soil seed-banks in karst forests and degraded vegetation in central Yunnan, SW China. – *Seed Sci. Res.*, **17**: 99-107.

Takhtajan, A. 1996. *Diversity and Classification of Flowering Plants*. Columbia Univ. Press, New York.

Terzioğlu, S. & Karaer, F. 2009. An alien species, new to the flora of Turkey: *Lysimachia japonica* Thunb. (*Primulaceae*). – *Turk. J. Bot.*, **33**: 123-126.

Terzioğlu, S., Anşin, R., Kılınç, M. & Acar, C. 2007. Vascular plant diversity in the Solaklı watershed in Northeastern Turkey. – *Phytol. Balcan.*, **13**(2): 213-222.

