

# *Ammannia coccinea* (Lythraceae), a new record for the Flora Iranica area

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**Abstract.** Within the framework of phytosociological investigations on the aquatic ecosystems of northern Iran, *Ammannia coccinea* is reported for the first time here from the *Flora Iranica* area. It was collected in wet and muddy habitats of submontane water bodies and in rice fields along the Haraz road, on the way to Amol, Iran. An identification key is provided for the five species already reported from Iran. Migratory birds are considered the main agents of distribution, as noted for other plant species in northern and northwestern Iran.

**Key words:** *Ammannia*, aquatic flora, Hyrcanian region, new record

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## Introduction

*Ammannia* L. is a genus of about 80–95 species of aquatic or marsh-inhabiting herbs distributed in both the temperate and tropical zones, starting from the sea level and up to 1500 m a.s.l. (Graham 1985; Immelman 1991; Cook 1996; Graham & al. 2011; Graham & Gandhi 2013). According to recent phylogenetic assessments, *Ammannia* is primarily diversified in Africa (Graham & al. 2011). The genus is confined to standing water or shallow fresh or brackish marshes in the summer rainfall areas and roadside ditches, river banks, and other intermittently wet areas. Some species are regarded as weeds in rice paddies but they do not pose a serious problem in these areas (Graham 1985; Immelman 1991).

Many species of the genus *Ammannia* are distinguished from one another by seemingly minor qualitative differences that are difficult to recognize in practice (Graham 1985). The morphology and ecology of the related species of this genus is very similar, and commonly they are found mount-

ed in the same herbarium sheets, e.g. *A. coccinea* with either *A. auriculata* Willd. or *A. robusta* Heer (or all three species together). Possible reasons for the great variability in *Ammannia* are that the species are autogamous, or that they may hybridize (Immelman 1991).

Within the framework of phytosociological investigation on aquatic ecosystems of northern Iran, substantial populations of *Ammannia coccinea* Rottb. were discovered in parts of the Hyrcanian region, Amol, Mazandaran province. Here we report this species as a new record for Iran and the *Flora Iranica* realm. The range of dispersal of this species is documented, presumably assisted by the migrating birds, as it has been observed several times in northern and northwestern Iran for other plant species (Kukkonen & al. 2001; Naqinezhad & al. 2016).

## Materials and methods

During a floristic and phytosociological investigation of different habitats in the lowland and submontane

Hyrceanian region, populations of aquatic *Lythraceae* were collected with flower and fruits at different times in 2015 and 2016. The specimens were identified by consulting several relevant floristic treatments from Iran and the surrounding regions (Afanas'ev 1949; Polatschek & Rechinger 1968; Webb 1968; Davis 1972, 1978; Graham 1985; Qin & Graham 2007; Yousef Naanaie 2010). All characters of the specimens were surveyed by stereomicroscope. Herbarium materials from three rich herbaria of MPU (Montpellier Herbarium, France), G (Geneva Herbarium, Switzerland) and P (Paris herbarium, France) were checked out for confirmation of the determination. The materials recorded here are deposited in the Mazandaran University Herbarium (HUMZ).

## Results and discussion

***Ammannia coccinea*** Rottb., Pl. Horti Univ. Rar. Progr. (Hafn.), 7. 1773 (Figs. 1 & 2).

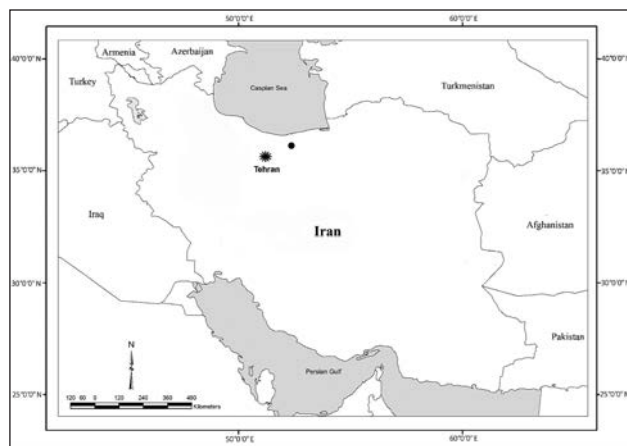
Iran, Mazandaran Province, 30 km to Amol on the Haraz road, Lahash, 36°13'56"N, 52°21'38"E, 462 m a.s.l., 01.08.2015, coll. N. Naseri Larijani 7050 (HUMZ) & 27.08.2015, coll. N. Naseri Larijani 7051 (HUMZ).

## Description

Herbaceous annual, 10–20 cm tall. Stems mostly unbranched or branching above base, with branches shorter than the main stem. Leaves opposite, sessile,



**Fig. 1.** *Ammannia coccinea* and its habitat along Haraz road, Lahash, Amol, N. Iran.



**Fig. 2.** Distribution map of *Ammannia coccinea* in Iran (●).

linear-lanceolate to linear-oblong, elliptic to spatulate, 15–25 × 2–8 mm, glaucous, base cordate to auriculate, clasping. Inflorescences varying from sessile to short pedunculate 1–3-flowered cymes; peduncle absent to 3 mm, sturdy, bibracteolate; pedicels mostly 2 mm or less. Hypanthium urceolate to slightly campanulate, 2 mm; sepals 4, broadly deltate; epicalyx segments thickened, *ca.* as long as sepals. Petals 4, rose-purple, obovate, up to 2 mm. Stamens 4, slightly exerted. Style *ca.* as long as or longer than ovary, well exerted. Capsules globose or subglobose, 3–5 mm in diam., equal to or exceeding hypanthium, seldom included.

## Distribution and habitat

In the study area, populations of *Ammannia coccinea* were found in five phytosociological relevés allocated to the rice fields and water bodies of submontane areas of Amol. The most important accompanying species was *Cyperus difformis* L. Other companion species in the community were: *Lemna minor* L., *Echinochloa colona* (L.) Link, *Alternanthera sessilis* (L.) DC., *Paspalum distichum* L., and *Cyperus glaber* L.

*Ammannia coccinea* is a native plant of North and Central America (Graham 1985). It typically grows both in flooded areas and muddy

habitats, where it can develop extensive populations in fresh water to depths of 0.5 m, but also occurs in moist or saturated soils (Graham 1985). It has been naturalized in the rice fields in Spain and Portugal, Italy (Webb 1968; Graham 1985), SW Taiwan (Qin & Graham 2007) and NW Turkey (Davis 1988).

## Taxonomic remarks

Four species of *Ammannia* were already reported from Iran, namely *A. auriculata*, *A. multiflora* Roxb., *A. baccifera* L., and *A. verticillata* (Ard.) Lam. (Ghahreman & Veiskarami 2000; Yousef Naanaie 2010). Of these species, *A. baccifera* and *A. verticillata* are very common in Iran, especially in the lowland Hyrcanian region, and as weeds in the rice paddies and water bodies.

## Determination key of *Ammannia* species of Iran

1. Style 1–3 mm, cymes mostly pedunculate . . . . . 2
- 1\*. Style less than 0.5 mm, cymes sessile . . . . . 4
2. Peduncle filiform, 2–9 mm long . . . . . *auriculata*
- 2\*. Peduncle stout to 3 mm . . . . . 3
3. Capsule *ca.* 1.5 mm in diameter . . . . . *multiflora*
- 3\*. Capsule 3–5 mm in diameter . . . . . *coccinea*
4. Hypanthium and sepals glabrous, epicalyx absent . . . . . *baccifera*
- 4\*. Hypanthium and sepals pubescent, epicalyx present, the segments exceeding the sepals . . . . . *verticillata*

Introduction of *Ammannia coccinea* through rice culture is recorded from Afghanistan on the basis of a specimen in the British Museum of Natural History, BM (Graham 1985), although it is not included in the recent checklist flora of Afghanistan, the nearest locality to Iran (Breckle & al. 2013). Another report comes from a statement of occurrence of this species under the name of *Ammannia coccinea* subsp. *pubiflora* Koehne ( $\equiv$  *A. pubiflora* (Koehne) D. Sosn.) from the steppes in Shirvan (Republic of Azerbaijan). The subspecies was excluded in the revision provided by Graham as of uncertain identity (1985), due to inadequate description and lacking authentic materials. The description of subsp. *pubiflora* was based on one specimen, *Hohenacher 2948* (B) Koehne provid-

ed a very brief incomplete description and recorded uncertainty about the taxonomic position of the subspecies (Koehne 1881, 1903). The specimen was not seen later by Boissier (1888), Afanas'ev (1949) or Graham (1985) and was assumed to have been destroyed in Berlin.

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