Article

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Studies on the genus *Dysphania* (*Amaranthaceae*) in North Africa: *Dysphania pumilio*, a neophyte new for the Tunisian flora

Abstract

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Dysphania pumilio (*Dysphanieae*, *Chenopodioideae*, *Amaranthaceae*) is here reported for the first time to North Africa in northeastern Tunisia, based on floristic surveys, analysis of literature, and examination of herbarium specimens. Morphology, distribution, current status of naturalization, and ecological features of this alien in Tunisia are presented.

Key words: Alien plants, Tunisia, *Caryophyllales*, *Chenopodium pumilio*, new records.

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Introduction

First introductions and first records in the wild of alien plant species are well documented in North Africa (see e.g., Rebbas 2018; Mahklouf 2023; Khamar & al. 2024). In Tunisia, these findings include taxa belonging mainly to *Asteraceae* (El Mokni & Iamonico 2018; El Mokni & al. 2022), *Cactaceae* (El Mokni & al. 2020; El Mokni & Verloove 2021a; El Mokni & al. 2024), *Asparagaceae* (El Mokni & Verloove 2022), *Agavaceae* (El Mokni & Verloove 2021b), *Aizoaceae* (El Mokni & Iamonico 2019; El Mokni & al. 2022), *Amaranthaceae* (El Mokni & Iamonico 2019), *Crassulaceae* (El Mokni & al. in Sukhorukov & al. 2018; El Mokni & Sáez 2019; El Mokni 2024), *Euphorbiaceae* (El Mokni 2023) and *Bignoniaceae* (El Mokni & Iamonico 2024).

As concern the subfamily *Chenopodioideae* Burnett (*Amaranthaceae*, *Caryophyllales*), a recent study by El Mokni & al. (2024) pointed out the first occurrence of *Dysphania cristata* (F.Muell.) Mosyakin & Clemants in the Mediterranean basin. Traditionally the genus *Dysphania* R. Br. comprises 7–10 aromatic plant species endemic to Australia (Aellen 1930; Scott 1978; Wilson 1983). Owing to molecular studies (Fuentes-Bazan & al. 2012a, 2012b), *Dysphania* R.Br. has been amended to include the glandular-hairy species of the formerly large genus *Chenopodium sensu*

lato and counts more than 50 species (Uotila & al. 2021). All the *Dysphania* species were earlier included in the subgenus *Ambrosia* A.J.Scott of the genus *Chenopodium* (see Fuentes-Bazan & al. 2012b and literature therein). Later, a worldwide phylogeny and systematics of *Dysphania* was elaborated (Uotila & al. 2021). Representatives of the genus are mainly ruderal and weed plants (except for Australian species growing on the sands within the natural vegetation types), more common in the tropics, subtropics, and warm-temperature zones of the world. Most of them reached Europe by the import of wool and agricultural products from Australia, South America, and Africa. Several authors (e.g., Aellen 1960; Uotila & Suominen 1976; Dostálek 1985; Kühn 1993; Uotila 2001, 2021; Sukhorukov 2012a, 2012b; Sukhorukov & Zhang 2013; Sukhorukov & al. 2015) highlighted the high great morphological variability in the genus, especially in the leaf blade, as well as in seed morphology and anatomy. Thus, the similar fruits, rarely exceeding 1 mm, and the dimensions of the generative organs very often make their distinction not easy.

In North Africa, four species of *Dysphania* are currently recorded [11 species are known in the Euro-Mediterranean area according to Uotila (2011+) and Iamonico (2011a)]: *D. ambrosioides* (L.) Mosyakin et Clemants [Sect. *Adenois* (Moq.) Mosyakin & Clemants], *D. botrys* (L.) Mosyakin & Clemants [Sect. *Botryoides* (C.A.Mey.) Mosyakin & Clemants], *D. carinata* (R. Brown) Mosyakin & Clemants [Sect. *Dysphania* Uotila, Sukhorukov, Bobon, McDonald, Krinitsina & Kadereit], *D. multifida* (L.) Mosyakin & Clemants [Sect. *Adenois* (Moq.) Mosyakin & Clemants].

In this paper the presence of *Dysphania pumilio* (R. Br.) Mosyakin & Clemants [Sect. *Dysphania* Uotila, Sukhorukov, Bobon, McDonald, Krinitsina & Kadereit] in Tunisia (Fig. 1) is reported for the first time as a new record for the non-native vascular flora also of North Africa. Distribution, status of naturalization and notes on its morphology and ecology are provided. The work is part of an ongoing study on updating the checklist of the non-native Tunisian chenopodiaceous flora (see e.g. Sukhorukov & al. 2018; El Mokni & Iamonico 2019; El Mokni & Debruille 2021; El Mokni & al. 2024), undertaken since almost two decades.

Material and Methods

The present research is based on field surveys carried out in Tunisia over the last 14 years. Collected specimens are part of the personal collection of the author (Herb. El Mokni) housed in the Herbarium of Monastir University (not yet listed in *Index Herbariorum*). Analysis of relevant literature dealing with morphological features and distributive areas of different collected material were carried out together with examination of specimens (sub *Chenopodium pumilio* R. Br.) preserved at AV, MPU, P, and STR (herbarium codes follow Thiers (2024) [continuously updated]). The morphological description of the species is mainly based on personal data, as well as on data from Iamonico (2011), Kambhar & al. (2017) and Bogosavljević & Zlatković (2017). Nomenclature follows Uotila & al. (2021).

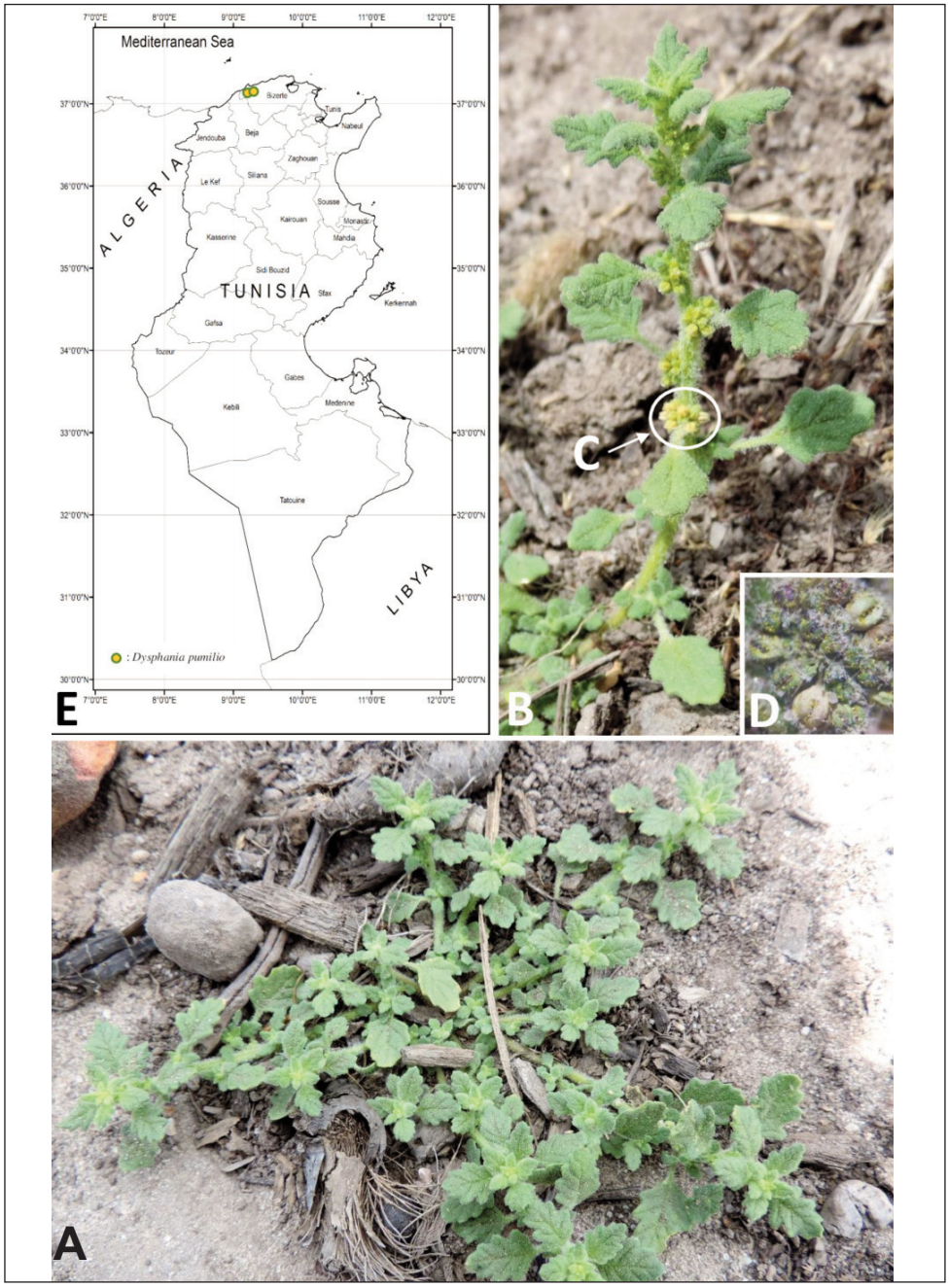

Fig 1. *Dysphania pumilio* in Tunisia: **A**) Habit with prostrate branches in its habitat; **B**) Lateral ascending branche in flowering/fruiting period; **C**) Inflorescence/infrutescence in axillary glomerule; **D**) Details of tepals with eglandular hair on the apex; **E)** Known localities of first records in North Eastern Tunisia (North Africa). Photographs R. El Mokni, Mai-June 2024.

Results and discussion

Dysphania pumilio (R. Br.) Mosyakin & Clemants, Ukrayins'k. Bot. Zhurn. (Ukr. Bot. J.) 59: 382, 2002 º *Chenopodium pumilio* R. Br., Prodr. Fl. Nov. Holl. 1: 407. 1810.

Morphology – (Fig 1). An annual prostrate or ascending plant, up to 80 cm long with malodorous leaves, densely covered with elongated non-glandular and short glandular trichomes. A detailed description is available in Grozeva (2007), Iamonico (2011b), Kambhar & al. (2017) and Bogosavljević & Zlatković (2017).

Chorology – Native to southern Australia; introduced with wool shipments and naturalized in New Zealand, central and southern Africa, Americas and Europe, Caucasus, Syria, South Korea, New Guinea, and Japan (Dostálek & al. 1990; Akeroyd 1993; Uotila & Tan 1997; Iamonico 2011b; Bogosavljević & Zlatković 2017; Sukhorukov & al. 2018; POWO 2024).

Occurrence and habitat in Tunisia – *Dysphania pumilio* grows on the peripheric of ponds in clayey-loamy soils within communities of thermophilous herbs. Its occurrence is restricted to two localities (one within the pond of 'Majen Chitana' at 170–180 m above sea level and one near the port of 'Sidi Mechrig' at 10–13 m above sea level) in Sejnane, Bizerta governorate (northeastern of Tunisia, Fig. 1.E). Historically, the taxon has never been reported in or around these two localities before 2024 (the area was under annual prospections of the author for the last ten years).

Up to now, this neophyte can be considered as casual to Tunisia and North Africa (following Pyšek & al. 2004). Further studies are needed to verify its presence in other Tunisian regions and neighboring countries for its distributive range in North Africa.

Notes on the main associated species – Reported populations of more than a hundred individuals were observed in the wild over an area of about 300 m^2 (for 'Majen Chitana') and another of about 100 m^2 (for port of 'Sidi Mechrig'), together with several species, characteristic of clayey-loamy soils merged with water during rainy seasons, thermophilous herbs and grasses, mainly: *Baldellia ranunculoides* (L.) Parl., *Corrigiola littoralis* L., *Crassula helmsii* (Kirk) Cockayne (locally invasive!), *Glinus lotoides* L., *Juncus pygmaeus* Rich. ex Thuill., *Lythrum borysthenicum* (Schrank) Litv, and *Parapholis incurva* (L.) C.E.Hubb.

Phenology – Flowering and fruiting from Mai to June (in Tunisia), elsewhere in the word from July to September (in Bulgaria, Grozeva 2007; in India, Kambhar & al. 2017), from July to October (in Croatia, Bogosavljević & Zlatković 2017).

Taxonomic notes – Macromorphologically, *Dysphania pumilio* could be confused to *D. botrys* due to almost similar leaves shape. The former could be easily distinguished by its habit (prostrate to ascending *vs*. erect) and its malodorous leaves (*vs*. aromatic leaves).

Specimens examined (new records) – Tunisia. Bizerta: Sejnane, Sidi Mechrig 09 Mai 2024, *El Mokni s.n.* (Herb. El Mokni!), ibidem, 22 Mai 2024, *El Mokni s.n.* (Herb. El Mokni!), ibidem, 13 June 2024, *El Mokni s.n.* (Herb. El Mokni!).

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