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Contribution to the flora of Greece: a new species of *Arundo* (*Poaceae*)

Abstract

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The new species *Arundo hellenica* is described from Greece. It is related to *A. plinii* but differs in smaller size of all morphological structures and in the configuration of the lemma, which, below the awn, is entire at the apex, not bifid as usually in the genus *Arundo*. The new species, probably a Greek endemic strongly confined to disturbed habitats, behaves as an aggressive weed and may become invasive in other countries.

Introduction

It was a strange looking shrubby grass that, in 2000, caught the attention of the first author along the coastal roads on both sides of the Gulf of Corinth (South Central Greece). Already years before, Prof. M. Damanakis (University of Iraklion) and the third author were astonished at the presence of two apparently distinct *A. plinii* taxa on Crete and elsewhere in southern Greece. All these circumstances led us to closer investigations resulting in the present paper.

Arundo hellenica Danin, Raus & H. Scholz, **sp. nova**

Holotype: Greece, [Sterea Ellas, Nomos of Viotia], 2 km W of Livadia, 10 m off the road, clayey rock outcrop, 3.11.2000, *Danin G2000/09/16N* (HUJ; isotype: B).

Gramen suffruticosum rhizomatosum *A. plinii* simile, sed omnibus fere partibus minus: culmis 0.5-2 m (non 1.5-5 m) altis, foliorum laminis minus quam 20 cm (non usque ad 100 cm) longis et 3-7 mm (non 10-15 mm) latis, spiculis unifloris rarissime bifloris 6-8 mm (non 8-10 mm) longis; lemmatibus apice infra setam acutis integris (non bifidis).

Additional specimens seen. – GREECE: Sterea Ellas, Nomos of Etolia-Akarnania, c. 2 km NE of Agrilia by Mesolongion, 38°26'N, 21°28'E, in river valley, gregarious, c. 1 m tall on average (but from less than to almost 2 m), 100 m, 25.10.1995, *Nielsen 10734* (B); id., near Mesolongi, roadside, flowering plants 50-70 cm high, 20.10.2000, *Danin* (B, HUJ); Nomos of Evvia (Euboea), Küste bei Paralia Kimis, 22.3.1991, *Scholz* (B); id., near Ag. Georgios, Pontzans River, 25.9.

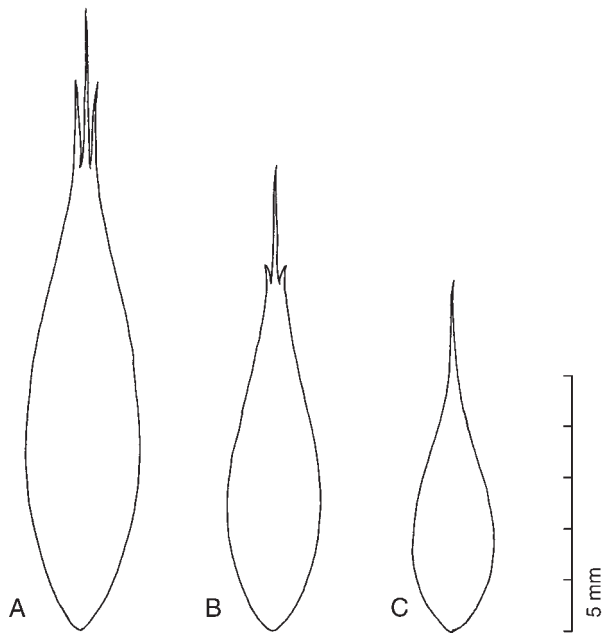


Fig. 1. Comparative diagnostic lemma features (nervature and indumentum omitted, apex spread) of *Arundo* – A: *A. donax* (Kriti, Kastelli, *Böhling & Scholz* 9247, B); B: *A. plinii* (Kriti, Siva, *Scholz*, B); C: *A. hellenica* (type collection). – Drawings by Th. Raus & M. Rodewald.

1999, *Kokmotos* (B); Peloponnisos, Nomos of Achaia, Patras, in declivibus ambitu castellum, 20.4.1926, *Bornmüller* 1560 (B); id., Patras, in and around the city, 29.5.1995, 25.9.1997 & 18.5.1998, *Jogan Gr* 724, *Gr* 747 (herb. Jogan); id., Patras, 38°16'57"N, 21°44'58"E, auf Ruderalstellen am höher gelegenen Rand von ausgedehntem *Phragmites australis*-Röhricht östlich des Hafens, c. 2 m, 10.1.2000, *Böhling* 10657 (B); Nomos of Ilia, Pírgos, roadside, 20.9.1983, *Damanakis* 1460 (B); id., Olympia, 14.4.1971, *Scholz* (B); Nomos of Lakonia, W of Githio, 36°46'16"N, 22°32'07"E, Straßengraben, 70 m, 13.11.1998, *Böhling* 9267 (B); Kriti (Crete), Nomos of Chania, Eparchia of Kissamos, Sirili, 35°30'03"N, 24°49'02"E, Straßenrand bei kleiner Müllkippe, 50 m, 29.6.1999, *Böhling* 10289 (B); id., Eparchia of Apokoronos, oberhalb Dramia, 25.4.1996, *Scholz* (B); Nomos of Rethimnon, Eparchia of Milopotamos, Perama, roadside, 11.5.1983, *Damanakis* 973 (B); Nomos of Iraklion, Eparchia of Temenos, Ag. Irini, 35°17"N, 25°10"E, Straßensaum im Tal, beim Pumpenhäuschen, 120 m, 3.3.1999, *Böhling* 9548 (B); Nomos of Lasithi, Eparchia of Ierapetra, Males, 35°04'06"N, 25° 35'13"E, Kalksteingeröll im Bachbett, 450 m, 1.11.1999, *Böhling & Raus* 10512 (B).

Description and species delimitation. – Rhizomatous shrubby grass. Culms erect, 50-200 cm tall, 5-7 mm in diameter at base, smooth and glabrous, branches numerous. Leaf blades narrow (3-10 mm), up to 20 cm long, scabrous at margins with antrorse sharp teeth; sheaths not tight. Panicle 40-50 × 3-6 cm. Spikelets 1(-2)-flowered; pedicels 1-2 mm. Glumes oblong-lanceolate, glabrous, hay-coloured or purple, 5-7(-8) mm long, usually the lower longer than the upper (rarely slightly invers). Lemma 4.5-5 mm long, with c. 4 mm long pappus-like hairs on back above base, apically entire, gradually tapering into the up to 5 mm long awn. Anthers c. 2 mm long. – Fl. c. August to December.

The Greek *Arundo hellenica* can be distinguished from the Mediterranean *A. plinii* Turra (*A. pliniana* Turra; *A. donax* subsp. *plinii* [Turra] G. Mateo Sanz & Figuerola Lamata) by its lesser

Table 1. Diagnostic characters of <i>Arundo hellenica</i> and <i>A. plinii</i> .		
	<i>A. hellenica</i>	<i>A. plinii</i> (Conert 1961 and the authors)
Plant height [cm]	50-200	100-500
Culm diameter at base [mm]	5-8	6-15
Lamina width [mm]	3-10	10-15
Lamina length [cm]	10-20	up to 100
Flowers per spikelet	1(-2)	1-3
Longest pedicel [mm]	1-2	3-6
Lower glume length [mm]	5-7(-8)	8-10
Upper glume length [mm]	5-6	7.5-8.5
Lemma length [mm]	4.5-5	5-7
Lemma hair length [mm]	3-5	5-8
Lemma apex	entire	setulose-bifid
Palea length [mm]	4	4-5

culm height, more shrubby habit, and smaller spikelets and florets (Table 1). *A. plinii* is somewhat intermediate between the very robust *A. donax* L. and the much less robust *A. hellenica*.

An important characteristic of *A. hellenica* is the entire lemma apex (Fig. 1), which is found in no other member of the genus *Arundo*, *A. plinii* included. They all exhibit two lateral setae (setiform lobes) at the lemma apex, which are very pronounced and 0.8-1.5 mm long in *A. donax*, less so and only 0.3-0.8 mm long in *A. plinii*. Between these lateral setae the short median awn inserts (Tzvelev 1976, Conert 1961, 1983). The only exception so far was known from *A. formosana* var. *gracilis* Hack. (Hackel 1899, Conert 1961), a rare variant of *A. formosana* Hack., which is endemic to Taiwan (Formosa) and with no closer affinities to *A. hellenica* notwithstanding the absence of lateral lemma setae. Illustrations of the bifid lemma apex in *A. donax* are presented by Conert (1983: 125, fig. 53 a & c) and Ryves & al. (1996: fig. 14 E). Surely in error, Tutin (1980) ascribes to *A. plinii* an entire lemma apex. The apical lemma setae of *A. plinii* are indeed very minute and therefore easily overlooked but always visible when the arista is being bent aside.

Some features of *A. hellenica* vary considerably, e.g. the leaf sheath margins are either ciliate, sometimes up to the top terminating in an 2-4 mm long bulk of crisp hairs, or glabrous.

Concluding remarks. – Roshevits (1980, English translation of the Russian ed. 1937) writes on *Arundo donax*: “In all probability, it was derived from its allied wildly growing species, *A. plinii* Turra whose area of distribution lies entirely in the area where *A. donax* L. is cultivated.” Actually, the first author’s field experience in the Levant strongly contradicts Roshevits’s speculation on the origin of *A. donax* from *A. plinii*. Most places where both species grow in Israel, Jordan and Sinai are their natural habitats, whereas the cultivation of *A. donax* is rather rare in that region. There are large wadis in the desert (e.g. Wadi Isla, SW Sinai) where *A. donax* grows much beyond and far away from any possible cultivation by man. There are no intermediates between the two.

Arundo hellenica even less belongs in the ancestry of *A. donax*, not even of *A. plinii*. A great phenotypic (and genotypic) plasticity, the reduction in size of all vegetative and reproductive structures and, therefore, a lower energy input and shorter life-cycle enables *A. hellenica* more than the rather uniform and bigger *A. plinii* to colonise man-made, disturbed habitats very successfully and expand rapidly along highways in many regions of Greece. Being a potential invasive species, its, so far unrecognised, occurrence in neighbouring countries is to be expected. In accordance with its ecological behaviour observed in Greece, a recent in situ origin of *A. hellenica*, and a status as an anecophyte (obligatory weed; for definition see Wagenitz 1996: 34 and Zohary 1962: 219) is certainly a serious hypothesis worth of further discussion.

A shortcoming is that none of us collectors (since Bornmüller, in 1926) went on purpose to clay outcrops in the mountains above the modern asphalt roads, e.g., between Delphi and Livadia, or beyond and above the urban area of Patras (see Bornmüller 1928: 328), in order to eventually reveal primary habitats of *A. hellenica*. It is not at all mandatory, or may be even unlikely, that this plant is an anecophyte, as shows the example of, e.g., *Dittrichia viscosa* (L.) Greuter (s.l., incl. *D. orientalis* Brullo & De Marco, see Brullo & De Marco 2000), which grows as a roadside colonizer all over the Mediterranean, also – sympatrically with *A. hellenica* – abundantly so between Antirrhion and Delphi in central Greece. Driving along asphalt roads one may get the impression that *D. viscosa* is confined to these habitats, but this is not true. *D. viscosa* is a hydrophyte, which grows in places with available water in summer. Under primary conditions, this kind of environment is met in the Mediterranean region either by springs or river banks. Along roadsides, namely of newly constructed roads, during the few years before the regular flora of the area returns to the site, masses of *D. viscosa* enjoy the water left in the ground through the summer, because winter vegetation was removed through the hard disturbance of the ground in the process of road construction.

An alternative, discussable hypothesis therefore is that *A. hellenica* is adapted to moist clay and marl outcrops in its present distribution area. When such habitats become open for colonization at roadsides *A. hellenica* invades and establishes itself there. Unfortunately, the present authors could not search for its supposed primary habitats, and discovered the new species in its secondary habitats along the roads. Hence we call for search of this plant by local botanists who may have facilities for better, detailed access to clay and marl outcrops in the mountains around the Gulf of Corinth.

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