

Odissea Seminum

GENMEDA Newsletter

Mission accomplished: Seeds from all 10 Greek plants of the Top 50 Mediterranean Island Plants are now stored in seed banks

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Almost two decades ago, in 2005, the Mediterranean Islands Plant Specialist Group of IUCN (IUCN/SSC) published “The Top 50 Mediterranean Island Plants - Wild plants at the brink of extinction and what is needed to save them” (Montmollin, de & Strahm 2005). The aim of that campaign was to help save plant species that face a high risk of extinction by providing information to and raising awareness among decision makers, conservation practitioners and the general public. The publication was updated in 2017 (Pasta et al. 2017) with the additional goal to assess the impact of the original effort on the conservation status of the plants selected. This initiative has proven of immense value as a driving force together and behind many other conservation initiatives, such as the Biodiversity Treaty (CBD) and the Habitats Directive (Council Directive 92/43/EEC) and numerous relevant projects. In particular, regarding the field of ex situ conservation, Seed Banking gained prominence with two iconic projects: ENSCONET and GENMEDOC/SEMCLIMED, which eventually led to the present day European and Mediterranean networks of Seed Banks (ENSCONET and GENMEDA, respectively).

Among the plants included in the Top 50 Mediterranean Island Plants, 10 species were selected to represent the Island flora of Greece: 4 from Crete and 6 from other Greek islands (Figure 1). Due to the high diversity of the Greek flora, it would be very difficult to make an entirely fair and representative decision: 4 of the plants selected-#3, 4, 6, 7- are from Crete (KK floristic region), 3 from West Aegean (WAe, #2 & 8 from Euboea Island and #1 from Skyros Island), 2 from the islands off southern Peloponnese (Pe, #9 & 10) and 1 from East Aegean (EAe, #5 from Samos Island) while the island floristic regions (Dimopoulos et al. 2013) of Ionian Islands (Iol), North Aegean Islands (NAe) and Kiklades (Kik) were left unrepresented.

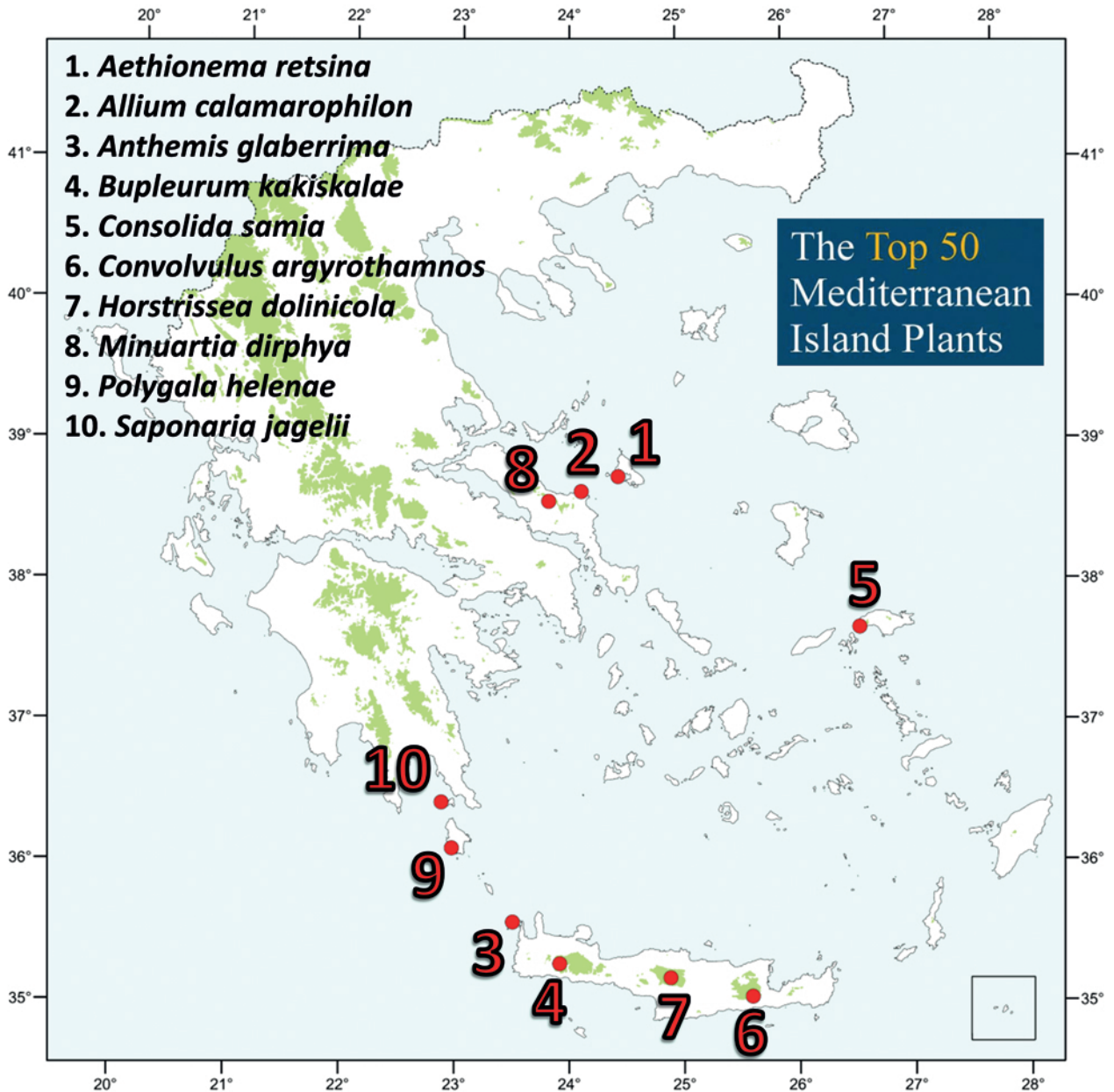


FIGURE 1. Greek plants included in the TOP 50 Mediterranean Island Plants.

Table 1 shows a compilation of important information, based in part on the Flora of Greece Web Project (Hellenic Botanical Society, 2017-2023). Except for *Allium calamarophilon* which was initially assessed as DD, due to the lack of population data for the entire period between 1980 and 2023, all other 9 plants have been assessed CR since 2005; however, some of these may change risk category as a current extensive project (implemented by HBS in collaboration with IUCN) of conservation status assessments will conclude by the end of 2023.

TABLE 1. The 10 Greek Island plants of the TOP 50 Mediterranean Island Plants

	Taxon	Family	CS	END	LF	HAB	HD	BRN	PD	SAC	BANK	COL	SEEDS
1	<i>Aethionema retsina</i> Phitos & Snogerup	BRASSICACEAE	CR	YES	C	C	NO	NO	YES	GR2420006	NKUA	2007-08-22 (3)	2,000
2	<i>Allium calamarophilon</i> Phitos & Tzanoud.	ALLIACEAE ¹	DD	YES	G	C/P ²	NO	NO	NO	NO	NKUA	2023	1,000
3	<i>Anthemis glaberrima</i> (Rech. f.) Greuter	ASTERACEAE	CR	YES	T	M	YES*	YES	YES	GR4340001	MAICH	2000-23 (12)	70,000
4	<i>Bupleurum kakiskalae</i> Greuter	APIACEAE	CR	YES	C	C	YES*	YES	YES	GR4340008	MAICH	2000-23 (12)	30,000
5	<i>Consolida samia</i> P.H. Davis	RANUNCULACEAE	CR	YES ³	T	P	YES*	YES	YES	GR4120003	NKUA	2023	1,000
6	<i>Convolvulus argyrothamnos</i> Greuter	CONVOLVULACEAE	CR	YES	C	C	YES*	YES	YES	GR4320002	MAICH	2003-23 (9)	600
7	<i>Horstrissea dolinicola</i> Greuter, Gerstb. & Egli	APIACEAE	CR	YES	G	H	NO	NO	NO	GR4330005	MAICH	2000-20 (8)	17,000
8	<i>Minuartia dirphyha</i> Trigas & Iatrou	CARYOPHYLLACEAE	CR	YES	H	P	NO	NO	NO	NO	NKUA	2022	1,000
9	<i>Polygala helenae</i> Greuter	POLYGALACEAE	CR	YES	H	P	NO	NO	YES	NO	NKUA	2023	300
10	<i>Saponaria jagelii</i> Phitos & Greuter	CARYOPHYLLACEAE	CR	YES	T	M	NO	NO	NO	GR2540002	NKUA	2022-23 (2)	1,500

CS: Conservation Status (2023 assessment is pending); END: Greek Endemic; LF: Life Form (C: Chamaephyte, G: Geophyte; T: Therophyte; H: Hemicryptophyte);

HAB: Habitat Type (C: Cliffs, rocks etc; P: Xeric Mediterranean Phrygana and grasslands; M: Coastal habitats; H: High-mountain vegetation);

HD: Habitats Directive 92/43/EEC (YES*: priority species); BRN: Bern Convention (1979); PD: Presidential Decree (Greece) 67/1981; SAC: Special Area of Conservation;

COL: year(s) of collection(s) (in parenthesis: total # of collections); SEEDS: Total seeds currently banked

¹ AMARYLLIDACEAE according to PoWO;

² New findings: we add P Xeric Mediterranean Phrygana and grasslands (Mediterranean dwarf shrub formations, annual rich pastures and lowland screes);

³ The occurrence in Manisa, Turkey (Minareci et al. 2011) is not proven unequivocally

Most (7 out of 10) of the plants are legally protected within the NATURA 2000 network and 3 of these are further protected by an established Plant Micro-Reserve. Figure 2 shows the 10 plants in flower – 2 of these (#2 & 5) were rediscovered after 42 and 61 years, respectively, and photographed in the field for the first time ever. Figure 3 shows the seeds of all 10 plants (some of them never seen before) which are now collected and stored in our two Seed Banks (NKUA and MAICH). It should be noted that seeds from 5 of these plants were collected for the first time within the framework of the NKUA-RBG Kew joint project “Conserving the Flora of the Balkans: Native Plants of Greece” (2022-2025).

In conclusion, it is evident that the Top 50 Mediterranean Island Plants project has been quite successful in selecting a group of emblematic species and drawing on them significant attention for both in situ and ex situ conservation measures. Nowadays, it is ripe time for a new list of “decorated” TOP plants for the entire Mediterranean Region and we look forward to the launch of this new initiative (Thanos 2023b).

The 10 Greek plants of the Top 50 Mediterranean Island

01

Aethionema retsina

A small cushion plant, up to 20 cm tall, growing in cliff crevices, endemic to Skyros and Skyropoula Islands. It is found in four (4) subpopulations with very few individuals (less than 100 in total) at dry rocky places near the sea, between 50 and 450 m asl. The major threat for this species seems to be grazing. The plant falls within a SAC (NATURA 2000 network) and in the framework of LIFE09NAT/GR/000323 project (2010-16) "Demonstration of the Biodiversity Action Planning approach, to benefit local biodiversity on an Aegean island, Skyros", a monitoring plan for the species was elaborated but no concrete in situ conservation actions have been undertaken. Occurrence and distribution studies along with some careful seed collections of this species have been implemented within the framework of two projects, namely "SEMCLIMED – Impact du Changement Climatique sur la Flore Méditerranéenne et Actions de Conservation" (2006-2008) and "Conserving the Flora of the Balkans: Native Plants of Greece" (2022-2025, http://users.uoa.gr/~cthanos/NKUASB_SeedConservationoftheFloraofGreece/). Laboratory germination experiments have elucidated its ecophysiology of germination and have led to the elaboration of a germination protocol.

02

Allium calamarophilon

A small wild garlic, up to 30 cm tall, growing in maritime cliffs (where it was initially discovered in 1980) but also in open rocky spaces within a dry, phryganic (low shrub) vegetation, adjacent to the locus classicus, at altitudes ranging from sea level to 350 m asl. Within the framework of the project "Conserving the Flora of the Balkans: Native Plants of Greece" (2022-2025), this ghost plant was rediscovered in 2022 (after 42 years) and photographed in the wild for the first time in 2023 (Kaltsis 2023). The single population of this plant is composed of no less than 1000 individuals while grazing seems to exert a considerable pressure. The population unfortunately is not lying within a SAC of the NATURA 2000 network and therefore some in situ conservation measures are urgently needed. Seeds of this species were also collected recently, and germination experiments are currently in progress.

03

Anthemis glaberrima

It is a small (up to 30 cm tall) therophyte, endemic to the uninhabited islets of Agria Gramvousa and Imeri Gramvousa (located off the north-western tip of the island of Crete). It is usually growing together with other halophytes, within cavities of coastal, calcareous rocks and its population shows large interannual fluctuations, estimated between 50,000 and 100,000 individuals, the largest part of which, ca. 80%, occurring in Agria Gramvousa (where a Plant Micro-reserve has been established, Thanos 2008). The germination ecophysiology of the species has been extensively studied and a germination protocol has been devised (Fournaraki 2010). The major threat for the species is the obliteration of its habitat by the rise of the sea level due to climate change as well as by sea pollution (solid waste and oil spills).

04

Bupleurum kakiskalae

A short-lived monocarpic perennial, endemic to the Lefka Ori (Chania, Crete), known until recently only from its locus classicus (Linoseli, Kakiskala), where a Plant Micro-reserve has been established (Thanos 2008). Recent field surveys have led to the discovery of another five (5) localities (Kaltsis et al. 2013, Thanos et al. 2015, Kaltsis A. and Koutsovoulou K. pers. comm.), at an altitude ranging between 1450 and 1850 m asl. Apart from the locality of Malemou, in the rest four of them (Kalokampos, Petrade, Avlimanakou and Zaranokefala), most individuals grow on unreachable cliffs and can be observed only with a telescope or binoculars. The species is extensively grazed and therefore marginalised to a habitat of vertical, inaccessible cliffs (a quite inhospitable and unpredictable environment for seed dispersal and seedling establishment) which we consider as the major threat for this plant. Only a few individuals are observed flowering each year (fluctuating roughly between 50 and 300) while the plants at vegetative stage are estimated to less than 1000 individuals. The germination ecophysiology of the species has been extensively studied and a germination protocol has been devised (Fournaraki 2010).

05

Consolida samia

A small, up to 10 cm tall therophyte, with astounding pale lilac flowers, a local endemic to Mt. Kerketefs (Kerkis), Samos Island. It has remained a ghost plant since 1962, when it was initially collected and described as a new species for Science. In the framework of the projects “Quest to rediscover *Consolida samia*- exploring the screes of Mt Kerketefs (Samos, Greece)” funded by Mohamed bin Zayed Species Conservation Fund (2022-2025) and “Conserving the Flora of the Balkans: Native Plants of Greece” (2022-2025) implemented by NKUA Seed Bank, the species was eventually rediscovered (and photographed alive for the first time) in the steep SW slopes of Mt Kerkis in May 2023, at an altitudinal range between 800-850 m, in a locality that perfectly matches the locus classicus (Thanos 2023a). The total population covers almost 2 ha of stony, scree-like surface and was tallied up to about 1200-1500 individuals, a number expected to undergo considerable yearly fluctuations (Kaltsis et al. 2023). Mature seeds have been collected and germination experiments are currently in progress.

06

Convolvulus argyrothamnos

A chasmophytic, silvery shrub, up to 80 cm tall. The species is endemic to Crete, where it is known from its locus classicus, a single limestone cliff (in Psoriaris Gorge, near Ierapetra, Lassithi, at 450 m asl) and a second locality in the northwestern part of the island (Rokka Gorge, Chania, at 150 m asl). A few (5-6) mature individuals are also cultivated in the MAICh Botanic Garden. The two confirmed subpopulations of the species are very small (only 14 mature individuals at Psoriaris Gorge and 60 at Rokka Gorge were recorded in 2015) and are vulnerable to several pressures and threats, such as grazing. The germination ecophysiology of the species has been extensively studied and a germination protocol has been devised (Fournaraki 2010).

07

Horstrissea dolinicola

A dwarf, perennial geophyte, belonging to a monotypic genus, endemic to Crete. It is known from a single population in a restricted surface of limestone sinks (dolines) on Mt Ida (ca 1,500 m asl). A Plant Micro-reserve was recently established in the area and several monitoring studies of the species, and its habitat are being implemented by the Mediterranean Plant Conservation Unit of MAICh in the framework of funded projects since 2019 (Fournaraki et al. 2021a, 2021b). The population amounts to 17,000 flowering individuals (Fournaraki et al 2022) but it is still subjected to overgrazing. Prior to the recent, intensive studies, it was estimated that less than 100 mature individuals were left in the wild (Pasta et al. 2017). The complicated germination ecophysiology of the species has been studied in detail and a germination protocol has been devised (Fournaraki 2010).

08

Minuartia dirphyra

Short (up to 20 cm tall) plant, woody at the base, growing on ophiolithic substrate, in a north-western slope of Mt Dirfys, Euboea Island, at 950 m asl. It forms a single population with less than 500 individuals, in a very small surface of scarce, thorny vegetation. The major threats for this species are both grazing and road/building constructions. In addition, this species does not fall within a SAC (NATURA 2000 network) and no actions have been undertaken for its in situ conservation. Field studies and seed collections have been implemented within the framework of two projects, namely “SEMCLIMED – Impact du Changement Climatique sur la Flore Méditerranéenne et Actions de Conservation” (2006-2008) and “Conserving the Flora of the Balkans: Native Plants of Greece” (2022-2025, http://users.uoa.gr/~cthanos/NKUASB_SeedConservationoftheFloraofGreece/). Laboratory germination experiments have elucidated its ecophysiology of germination and have led to the elaboration of a germination protocol.

09

Polygala helenae

Small (up to 30 cm tall) perennial herb with woody base, an endemic of Kythera Island, where it grows in two low-altitude subpopulations, 20 km apart from each other. It is probably very susceptible to grazing and thus it finds shelter within larger thorny or compact shrubs of the xeric Mediterranean vegetation, where it is difficult to be spotted. It is also threatened by habitat loss from touristic and road building pressures, particularly in Kalamos, its locus classicus, in the south of the island. Its total population (as recorded in 2023, Stefi et al. 2023a) does not exceed 250 individuals (50 in Kalamos and 200 in Myrtydia, in the central-west part of the island). Unfortunately, this species does not fall within a SAC (NATURA 2000 network) and no actions have been undertaken for its in situ conservation. The seeds of the plant bear an elaiosome, therefore they are dispersed by ants (myrmecochory); a small number of seeds were collected recently, and germination experiments are currently in progress.

10

Saponaria jagelii

Small (up to 10 cm tall) annual, found only on a single sandy beach in the small island of Elafonissos, off the southeastern coast of Peloponnese. The population covers a very small surface (0.2 ha) and although seemingly stable (ca 1500 individuals, according to the 2019, 2022 and 2023 censuses), it is under constant threat of touristic development and other anthropogenic disturbances. A second subpopulation (250 individuals in 2019), located in a nearby, quite frequented beach, is now eliminated (Thanos et al. 2022; Stefi & Thanos 2023). Recently, the presence of the species was reported from a sandy beach of Limnos Island in the north Aegean, more than 400 km away (in straight line) from Elafonissos; however, this record lacks further documentation and needs to be confirmed. Seed collections have been implemented within the framework of the project “Conserving the Flora of the Balkans: Native Plants of Greece” (2022-2025). Laboratory germination experiments have elucidated the ecophysiology of germination of this species and have led to the elaboration of a germination protocol (Stefi et al. 2023b).



FIGURE 2. The 10 Greek Island plants of the TOP 50 Mediterranean Island Plants, shown in flowering. Numbering according to Figure 1 and Table 1. (© A. Kaltsis & NKUA Seed Bank [1, 2, 5, 8], © CI-HEAM-MAICh MPCU [3, 4, 6, 7], © A. Stefi & NKUA Seed Bank [9, 10])

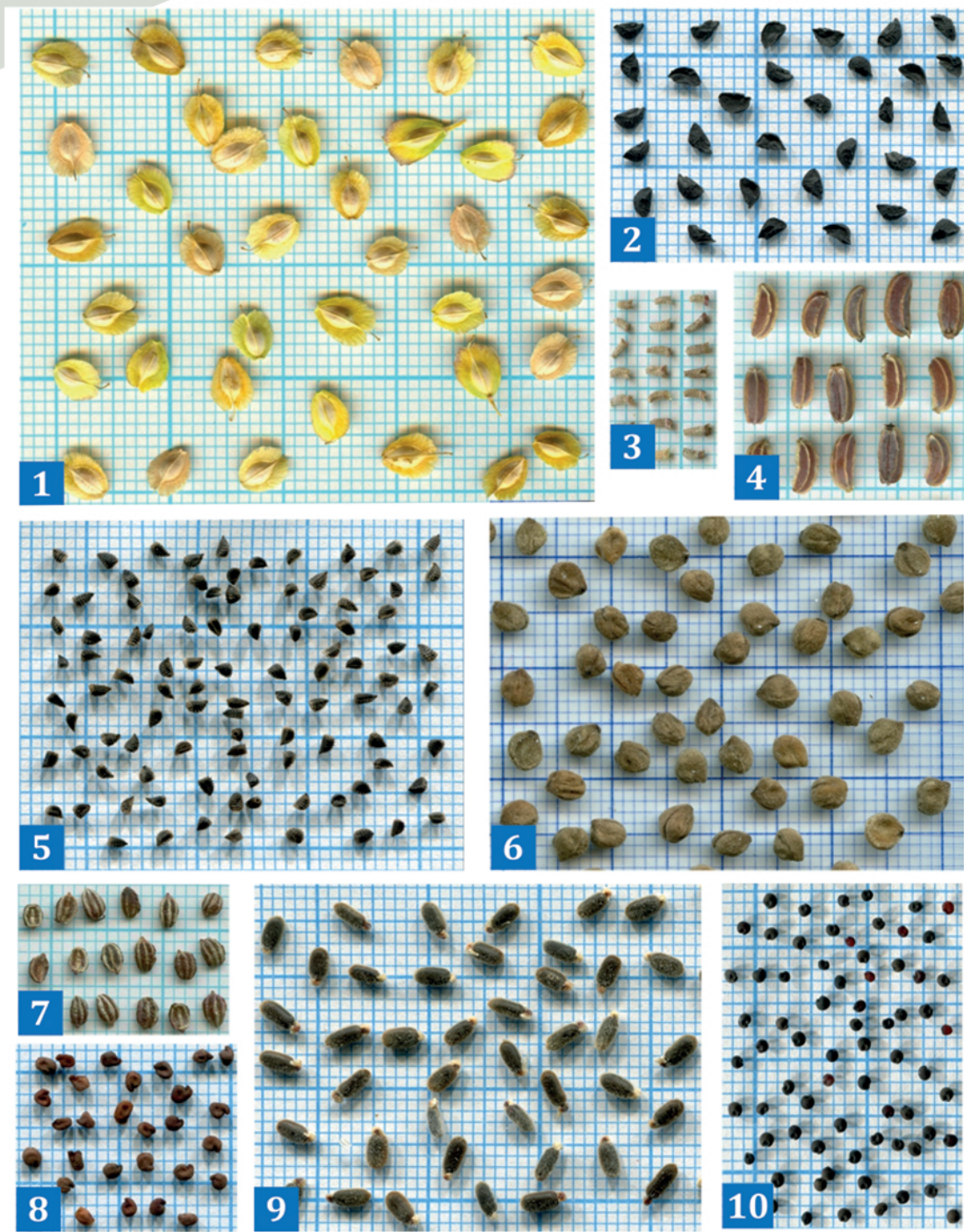


FIGURE 3. Scans of the seeds of the 10 Greek Island plants of the TOP 50 Mediterranean Island Plants. Numbering according to Figure 1 and Table 1. 1: one-seeded capsules; 3: achenes; 4 & 7: meristocarps. The side of the small square is 1 mm long. (© NKUA Seed Bank: 1, 2, 5, 8, 9, 10; © CIHEAM-MAICh MPCU: 3, 4, 6, 7)

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