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Autor: Yannitsaros, Artemios

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Tagetes minuta L. in Greece

Artemios Yannitsaros

RÉSUMÉ

YANNITSAROS, A. (1979). Tagetes minuta L. en Grèce. *Candollea* 34: 99-107. En anglais, résumé français.

Tagetes minuta a été récoltée pour la première fois en Grèce en 1972. L'auteur fournit une description de la plante et des caractères morphologiques et biologiques ainsi que les localités où cette espèce est naturalisée.

ABSTRACT

YANNITSAROS, A. (1979). Tagetes minuta L. in Greece. *Candollea* 34: 99-107. In English, French abstract.

Tagetes minuta L. has been collected first in Greece in 1972. Description, morphological and biological characters are given together with the localities where this species is naturalized.

Introduction

The tropical and subtropical American genus *Tagetes* L. of the Compositae was until recently known in Greece only from some cultivated ornamental species *(T. erecta* L., *T. patula* L.*).* Otherwise this genus was unknown in Greece.

But in recent years a species of *Tagetes* has been discovered growing spontaneously in a few localities. This species is *Tagetes minuta* L. which is a xenophyte for Greece (GREUTER, 1971; YANNITSAROS & ECONOMIDOU, 1974). This xenophyte seems to have become well-established at least in two localities. There are also indications that in some other cases the plant is in a stage of naturalization. In one or two cases only, this species has been observed in Greece as an ephemerophyte in the sense of THELLUNG (1910) and KORNÁS (1968).

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Description

Descriptions of the genus *Tagetes* L. and the species *T. minuta* L. exist in some European "floras" (HAYEK & MARKGRAF, 1931, under *T. glandulifera* Schrank; FOURNIER, 1961; HANSEN, 1976). I am giving below a revised description of the species *T. minuta* L. because I have observed in the studied material some differences from the descriptions in the above "floras". This description has been made mainly on fresh material.

Tagetes minuta L., Sp. Pl.: 887 (1753).
= *T. glandulifera* Schrank, *T. glandulosa* Link.

Illustrations: Yannitsaros (present study, Fig. 1).

Erect, glabrous, strong-smelling annual up to 300 cm, with short branches. Leaves 3-25 × 2-14 cm pinnatisect; segments 3-17(-23), 0.5-8 × 0.1-1 cm, linear-lanceolate, acute, serrate. The lower leaves opposite. Capitula numerous in dense terminal corymbiform inflorescences. Involucre 6-13 × 1.5-4 mm, cylindrical, of 3-4 yellowish-green bracts. Tubular florets 4-8 with a corolla 3-5 mm yellowish-green. Ligulate florets 2-4 with a corolla 5-7 mm. Ligules usually 1-2 mm long and 1.5-3 mm broad transversely elliptic to obovate spathulate, yellowish. Achenes 7-12 in each capitulum, 4-8 × 0.5-1 mm, linear, black with appressed white hairs. Pappus of 4-7, usually 5 whitish unequal scales 0.5-3 mm, one, three or, usually, two of them much longer than the rest and deeply serrate to ciliate.

Morphological observations

Tagetes minuta L. is a handsome annual plant. HANSEN (1976) in his description gives the height of the plant as up to 100 cm. I have observed plants in Krētē up to 200 cm and Koumpli (pers. comm.) in Delfoi up to 300 cm. The usual height of the plant is 100-200 cm.

The stem and its ramifications

The stem of the plant is cylindrical, glabrous, green mixed with red-brown with a diameter in the lower part usually of about 10-12 mm.

The relatively short branches 15-30 cm long make an angle of 15°-35° with the stem, the angle diminishing towards the apex.

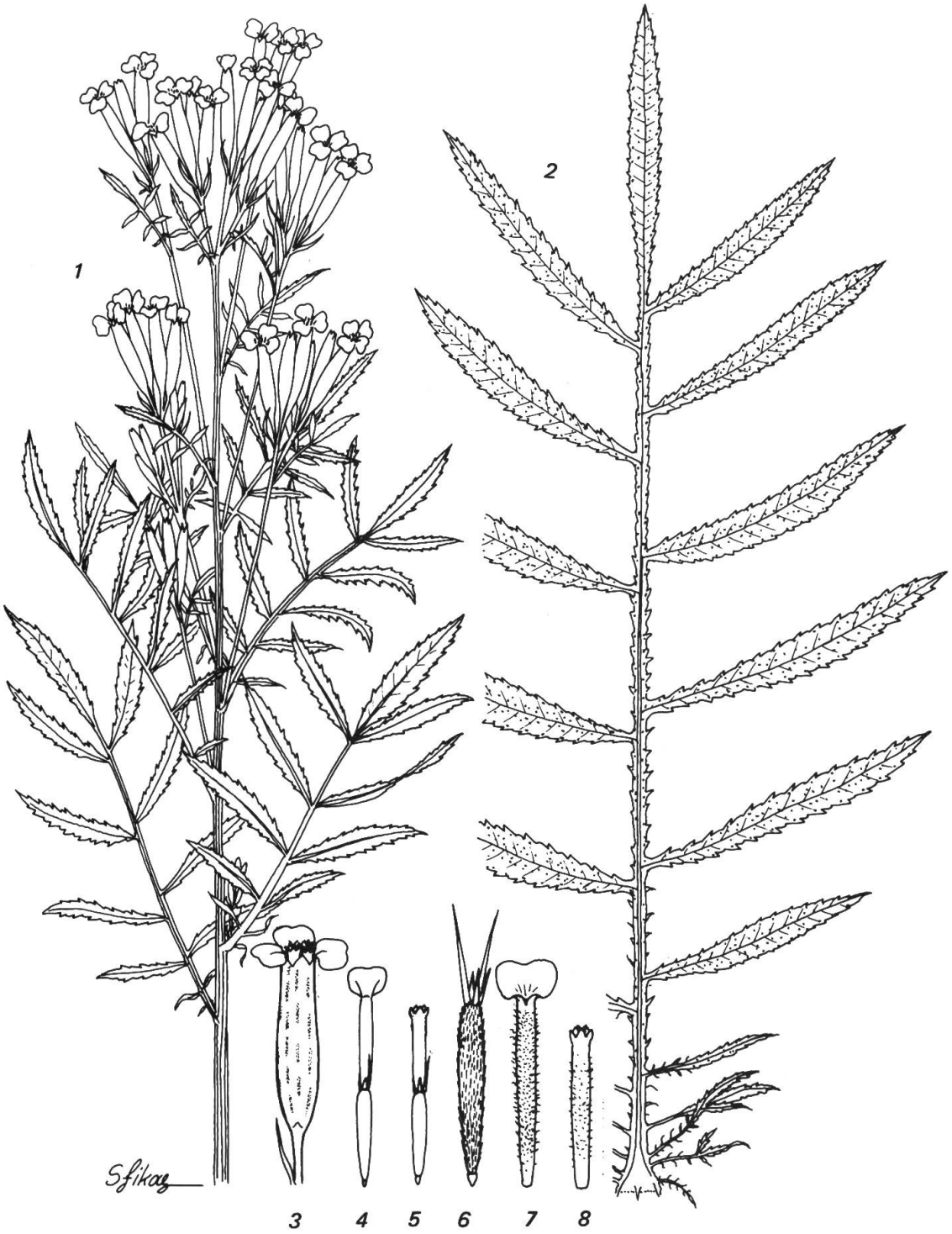

Fig. 1. — *Tagetes minuta* L.
1. Flowering branch, 1×; *2.* Leaf from the middle of the stem, 1×; *3.* Capitulum, 2×; *4.* Ligulate floret, 2×; *5.* Tubular floret, 2×; *6.* Achene, 4×; *7.* Corolla of a ligulate floret, 4×; *8.* Corolla of a tubular floret, 4×.

The leaves

The leaves are deeply pinnatisect with a lanceolate outline and 3 to 23 segments, linear-lanceolate, acute, serrate with small lens-like brown glands. In the middle leaves the number of segments is usually 13-17. The lower stem leaves are always opposite, while the upper leaves are usually alternate but sometimes opposite.

The inflorescence

The inflorescence is compound. The heads are arranged in dense corymbiform terminal inflorescences. The flowers are arranged in an oblong capitulum with a cylindrical involucre with 3-4 teeth. This involucre is yellow-green in colour with yellow-brown linear spots.

The florets

The florets are of two kinds, tubular and ligulate. The ligulate are usually 3, rarely 2 or 4. The ligules are usually transversely-elliptic in shape, according to the terminology proposed by the Systematics Association Committee for descriptive Biology (cf. STEARN, 1966), slightly emarginate and pale yellow in colour. The tube of the ligulate florets is about 0.5 mm broad with many patent hairs.

The tubular florets have 5 small triangular teeth and are covered in the lower part by small hairs.

The fruit

The achenes are black, linear, usually with many appressed white hairs, seldom with few. Sometimes the hairs are whitish-brown in colour. The pappus is usually of 5 white, or whitish, or whitish-brown unequal scales.

Geographical distribution

Tagetes minuta L. originates from South America. It is an adventive locally naturalized in some European countries. It has been recorded from France (FOURNIER, 1961; HANSEN, 1976), Italy (POLDINI, 1963; LUCIANI, 1968; CONTARDO, 1969; VIEGI & al., 1974; HANSEN, 1976) and Jugoslavia (HAYEK & MARKGRAF, 1931; MALY, 1935; MICEVSKI, 1970; HANSEN 1976).

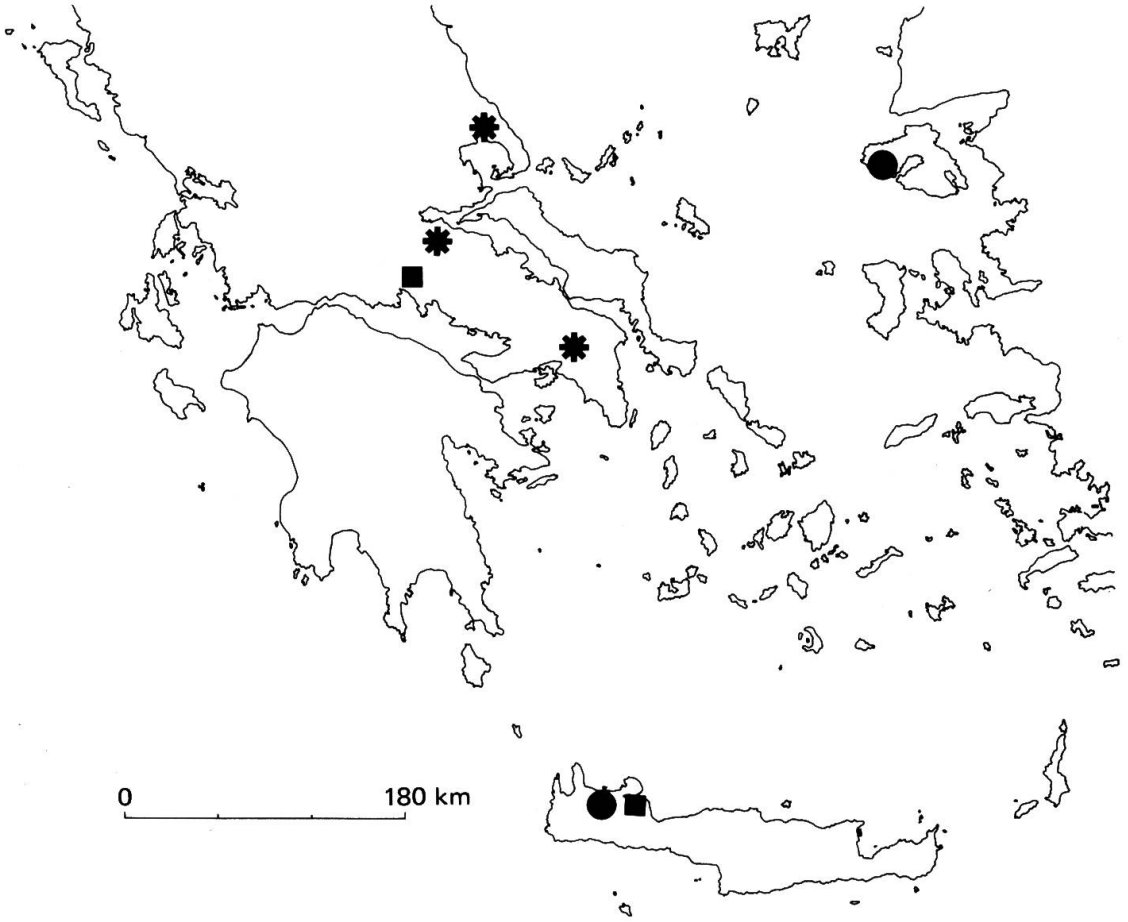

Fig. 2. — Known localities of *Tagetes minuta* L. in Greece.
Circles indicate localities where the species is completely naturalized. Squares indicate localities where the species is in the stage of naturalization. Asterisks show localities where the status of the plant is unknown. Localities where the plant has been observed as a casual are omitted.

It was first reported in Greece from the East Aegean island of Lesbos (YANNITSAROS & ECONOMIDOU, 1974). In recent years it has been observed or collected in some localities of mainland Greece (Sterea Ellas and Thessalia) and in two localities of the island of Krētē (Fig. 2). Thus as far as we know, it is new for these areas. Perhaps this species is more common in Greece today than the above records show. It is little known possibly because of its recent introduction or because it is autumn-flowering, at a time when there is little botanical field activity, especially in disturbed habitats, where this species is growing.

Ecology

Tagetes minuta L. in Greece grows mainly in low altitudes in warm and humid habitats. Thus it has been found as a weed in vegetable gardens, orange plantations and other irrigated biotopes, as well as on moist and shady sides of roads.

In Krētē, in the district of the village of Alikianos, *Tagetes minuta* L. was found growing abundantly in orange plantations, together with the following species: *Conyza bonariensis* (L.) Cronq., *Eupatorium adenophorum* Sprengel, *Phytolacca americana* L., *Amaranthus hybridus* L., *Conyza canadensis* (L.) Cronq., *Lepidium virginicum* L., *Paspalum distichum* L., *Setaria viridis* (L.) P. Beauv., *Portulaca oleracea* L. subsp. *oleracea, Eragrostis minor* Host and others. Most of these species are adventives and constitute the characteristic summer flora of the orange plantations of the district of Alikianos.

Of these the species *Lepidium virginicum* L., according to CARVALHO E VASCONCELLOS (1964), has been introduced and naturalized in many countries of Europe. As far as I know, this species has not been recorded until now from Krētē and generally from Greece and is new for the area.

Also *Eragrostis minor* Host, to my knowledge, has not been reported until now from Krētē and is new for the island.

In another locality of W. Krētē, in the village of Armenoi, *Tagetes minuta* L. was found growing together with *Setaria viridis* (L.) P. Beauv., *Amaranthus retroflexus* L. and *Convolvulus arvensis* L.

This species has also been observed in the village of Anakasia near Bolos, growing together with another hygrophilous species, *Helianthus tuberosus* L. (Economidou, pers. comm.).

Biological characters

Life form

Tagetes minuta L. is an annual plant. Its vegetative period in Greece extends from the spring or the summer months to November or December.

Flowering and fruiting period

The flowering of *Tagetes minuta* L. in Greece starts from the end of September or the beginning of October and extends in some localities until the beginning of December. The fruiting period starts immediately after the flowering period and the fruits mature very early.

Reproduction and dispersal

The fruits of *Tagetes minuta* L. are achenes with a characteristic shape and each of them constitutes also a diaspore. They are thin, subulate, compressed longitudinally, 4-8 mm long and 0.5-1 mm broad, with a pappus of 4-7 deeply serrate to ciliate scales. The base of the achenes is very acute thus having the ability to penetrate with ease clothing, seams of shoes, baggage, etc., and the hairy coats of animals. Thus it is probable that the main method of dispersal in *Tagetes minuta* L. is by anthropochory. Zoochory is of smaller importance and mainly effective for short distances.

In a plant of *Tagetes minuta* L. of medium size I have been counted over 500 heads. Each head carries 7-12 achenes. Thus any such individual must produce about 3500-6000 achenes.

The date and method of introduction in Greece

It is very difficult to express an opinion with certainty about the date and method of introduction of *Tagetes minuta* L. in Greece.

This plant was collected first in Greece in a locality called "Mallionda" W. of the village of Mesotopos on the island of Lesbos in 1972 (YANNITSAROS & ECONOMIDOU, 1974). According to information gathered from some of the inhabitants of this village, *Tagetes minuta* L. appeared as a weed in vegetable gardens and cultivations of *Medicago sativa* L. subsp. *sativa* in the above mentioned locality about 1966 or 1967.

In W. Krētē, according to information given by inhabitants of the village of Alikianos, this plant has been well established there at least since 1970.

In the village of Armenoi which is the second known locality of *Tagetes minuta* L. in Krētē, a small population of the plant was first observed during 1977 on the margin of the main road. In 1978 I had observed that the plant had spread extensively into gardens and yards and along roadsides.

Tagetes minuta L. has almost certainly been introduced into Greece mixed with seeds of cultivated plants or carried in the baggage or on the

clothing of tourists and other visitors to this country. The last method was perhaps responsible for the establishment of this species in Delfoi where a few individuals have been first observed by L. Koumpli in 1974 on roadsides (pers. comm.)

Localities

Thessalia. N. Magnēsia. Anakasiá: on moist margins of the central road. Many individuals together with some plants of *Helianthus tuberosus* L. 28.10.1976, *E. Economidou, obs.*

Sterea Ellas. N. Fthiotis. Xulikoi: in abandonnèd field, about 10 individuals. 30.9.1973, *G. Sfikas, s.n.* (Herbarium A. Yannitsaros).

N. Folis. Delfoi: weed of vegetable gardens. Small population. 31.10.1976, *L. Koumpli, s.n.* (ATHU and Herbarium A. Yannitsaros), and 16.10.1978, *L. Koumpli, s.n.* (Herbarium A. Yannitsaros).

N. Attikē. Between Aharnai and the Eastern foot of the mount Parnēs: on the side of the central road, a population of about 50 individuals. 25.10.1978, *E. Economidou, obs.* Agioi Apostoloi: on the edge of a garden. 1974 and 1976, *E. Economidou, s.n.* (Herbarium E. Economidou). The plant was not observed in this locality in 1978 (ephemerophyte). Anō Ilisia: on the edge of a garden. 1975, *A. Yannitsaros, obs.* The plant was not observed in the next years (ephemerophyte). Agios Ioannis Kaxeas: weed of a garden, small population. 21.11.1978, *G. Sfikas, obs.*

East Aegean Islands. Lesbos. Place "Mallionda" W. of the village of Mesotopos: in vegetable gardens. 25.11.1972, *G. Yannitsaros, s.n.* (Herbarium A. Yannitsaros) and 7.12.1974, *A. Yannitsaros 5727* (ATHU and Herbarium A. Yannitsaros).

Island of Krētē. N. Hania. Alikianos: in orange plantations, abundant. 22.7.1976 (without flowers and fruits), *A. Yannitsaros 6018* (Herbarium A. Yannitsaros), 5.10.1976, *E. Protopapadakis, s.n.* (ATHU and Herbarium A. Yannitsaros), 6.10.1976, *S. Vidinakis, s.n.* (Herbarium A. Yannitsaros) and 9.8.1978, *A. Yannitsaros 6263* (Herbarium A. Yannitsaros). Armenoi: on gardens and on moist and shady sides of the main road. 11.8.1977, *A. Yannitsaros 6175* (without flowers and fruits, Herbarium A. Yannitsaros). *E. Protopapadakis* has collected flowers of this plant from the same locality in October 1977 which were sent to me for determination. 27.8.1978, *A. Yannitsaros 6294,* abundant (without flowers and fruits, Herbarium A. Yannitsaros) and 9.10.1978, *S. Mavrakis, s.n.* (ATHU and Herbarium A. Yannitsaros).

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Address of the author: Institute of Systematic Botany and Botanical Museum, University of Athens, Panepistimioupolis, Athens 621, Greece.