

EUPHORBIA ANTHULA, A NEW LOCALLY ENDEMIC SPECIES  
FROM MT ATHOS

by

G. LAVRENTIADES and K. PAPANICOLAOU

(Department of Systematic Botany and Phytogeography, Aristotelian University of Thessaloniki).

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**Abstract:** A new locally endemic species, *Euphorbia anthula* G. Lavrentiades & K. Papanicolaou, is described from the Agion Oros Peninsula. It is perennial with a cylindrical or conical tuber. It is related to *E. apios* which has a distribution range in SE part of Balkan Peninsula, Aegean region and SE part of Italy. For comparison we collected material from adjacent areas v.z. mt Pangeon, mt Rhodopi, mt Chortiutis and mt Cholomon, which is cultivated under the same practically ecological conditions in the experimental field of the Copenhagen Botanical garden.

The chromosome number was found  $2n = 14$  in all populations from various localities. A schematic karyotype is given.

INTRODUCTION

During our investigations on high Greek mountains (our Institute belongs to a group of Institutes and Fellows, which has planned to study the Greek Mountain Flora) we collected dry and living material of various taxa, which is kept in cultivation in the experimental field of the Copenhagen Botanical garden. Sixty tubers of *Euphorbia apios* and ten tubers of the new species are included in the above mentioned material. All these are cultivated under the same practically ecological conditions.

They come from seven populations (two from Mt Pangeon, two from Mt Rhodopi, one from Mt Chortiatis, one from Mt Cholomon and the new one from Mt Athos). All the individuals of *Euphorbia apios* are practically identical each other but the ten ones, coming from an altitude of 1600 m of Mt Athos, look quite different concerning the habit, leaf size and morphology, raylet-leaf size and morphology, tubercle morphology, tuber morphology and size and finally the number and the length of the umbel rays (Fig. 3).

## MATERIAL AND METHODS

Ten individuals from each population were cultivated under the same practically ecological conditions in order to observe the morphological differences. Three of them were used for cytological observations. The origin of the material is given in Table 1.

The usual squash method with Feaulgen staining was used. The root tips were pretreated in a mixture of 2mM 8-hydroxyquinoline and 0,2% Colchicine for three hours.

*Euphorbia anthula* G. Lavrentiades & K. Papanicolaou, sp. nov. (Figs 1, 2, 3, 4). Typus: Lavrentiades & Papanicolaou 862 (Thessaloniki, Copenhagen).

*Planta perennis herbacea, dense hirsutus, caules procumbentes purpurei, 1-15 cm. Folia exstipulata plerumque alterna, oblonga vel obovato-lanceolata, basi truncata, sessilia, obtusa serrata, dense hirsuta, 1,5 - 1,7 cm longa et 3,5 - 5,0 mm lata. Capsula globoso-obovata verrucosa, 3,0 - 3,2 mm. Verrucae cylindricae. Radii umbellae 7-8, simplices, 1,0 - 1,5 cm longae. Rhizoma bulboso-incrassatum cylindricum, subterraneum, 6-12 cm.*

Perennial herb up to 15 cm with a subterranean cylindrical or conical tuber, 6-12 cm, softly and densely hairy all over; leaves mostly alternate, very close each other, sessile, oblong or obovate-lanceolate, base truncate, obtuse, serrulate, 1,5 - 1,7 cm long and 3,5 - 5,0 mm broad without conspicuous lateral nerves, increasing in size upwards, the lower soon becoming reflexed; leaves below the umbel (ray-leaves), forming a whorl, always equal to the stem leaves; raylet-leaves suborbicular cuneate; umbel rays usually 5 - 7,1, 0 - 1,5 cm with axillary branches below it; peduncles 1,0 - 1,2 cm long; involucre glabrous margined with 4 semi-moonlike glands; female flower with a single glandular warted ovary; capsule glandular-warted with cylindrical tubercles; seeds smooth, light brown.

In rocky place of southern side of Mt Athos, above the church called Panagia, 1600 m.

## DIFFERENCES FROM EUPHORBIA APIOS

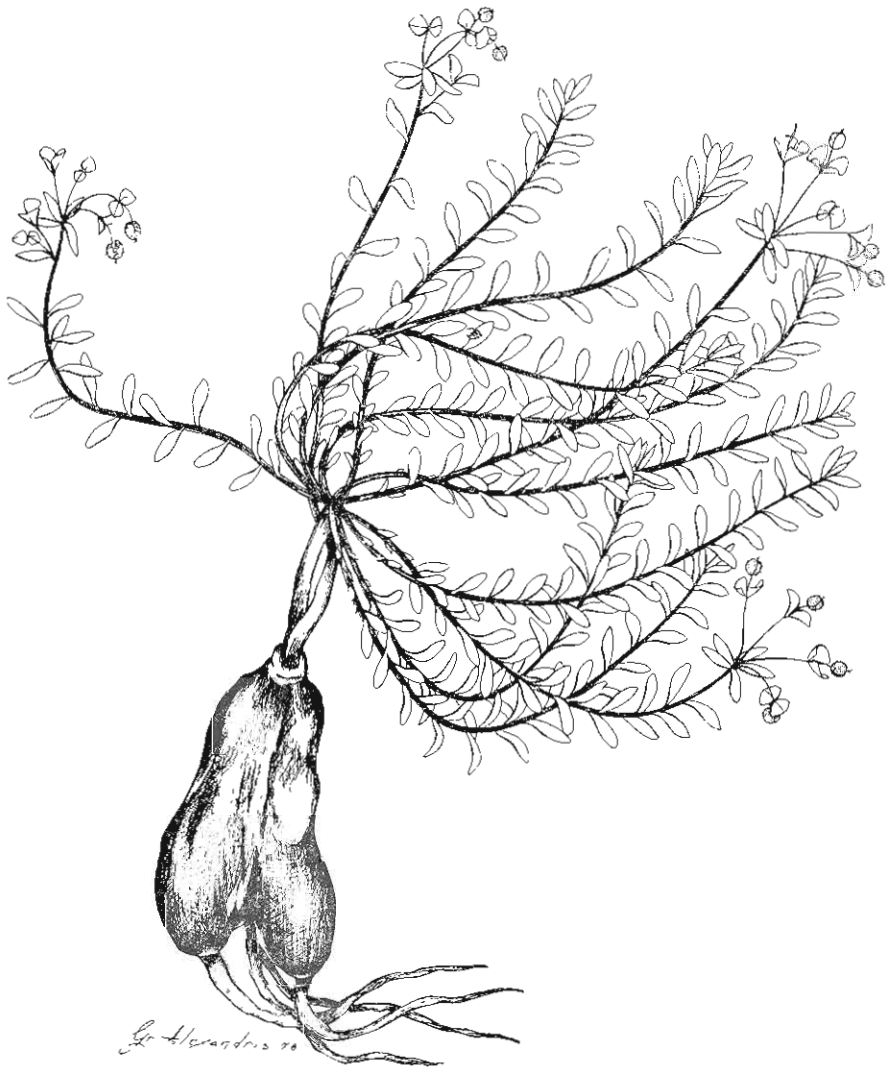
We compared the sixty cultivated individuals of *E. apios*, which were practically identical, with the ten ones of *E. anthula*. The latter differs in having: a) very dense hair, b) smaller raylet-leaves and always

cuneate, e) seeds always cylindrical, d) capsule smaller with cylindrical always tubercles, e) leaves smaller with 1,5 - 1,7 cm long and 3,5 - 5,0 mm wide, f) shorter rays, 1,0 - 1,2 cm and g) the size of tuber 6-12 cm, instead of 2-7, and tuber shape cylindrical or conical.

TABLE 1.

*Chromosome number and localities of investigated spontaneous material of Euphorbia.*

Species	2n	Collection no	Locality
<i>Euphorbia apios</i>	14	PA 4551	Mt Pangeon: S. side, above the village of Akrovounion, along the road to the top, 900 m.
»	14	PA 4552	Mt Pangeon: N. side, above the village of Palaeochorion, 400 m.
»	14	PA 4553	Mt Rhodopi: District of Drama, above the village of Prasinada, 1100 m.
»	14	PA 4554	Mt Rhodopi: District of Xanthi, above the village of Dimarion, 1250 m.
»	14	PA 4555	Mt Cholomon: Above the village of Arnea, along the road, 600 m.
»	14	PA 4556	Mt Chortiatis: E. side, 500 m, before the village of Peristera, on road sides.
<i>Euphorbia anthula</i>	14	PA 4557	Mt Athos: S. side, above the church called Panagia, 1600 m.



*Fig. 1. Euphorbia anthula. Flowering specimen, X1. Type collection.*

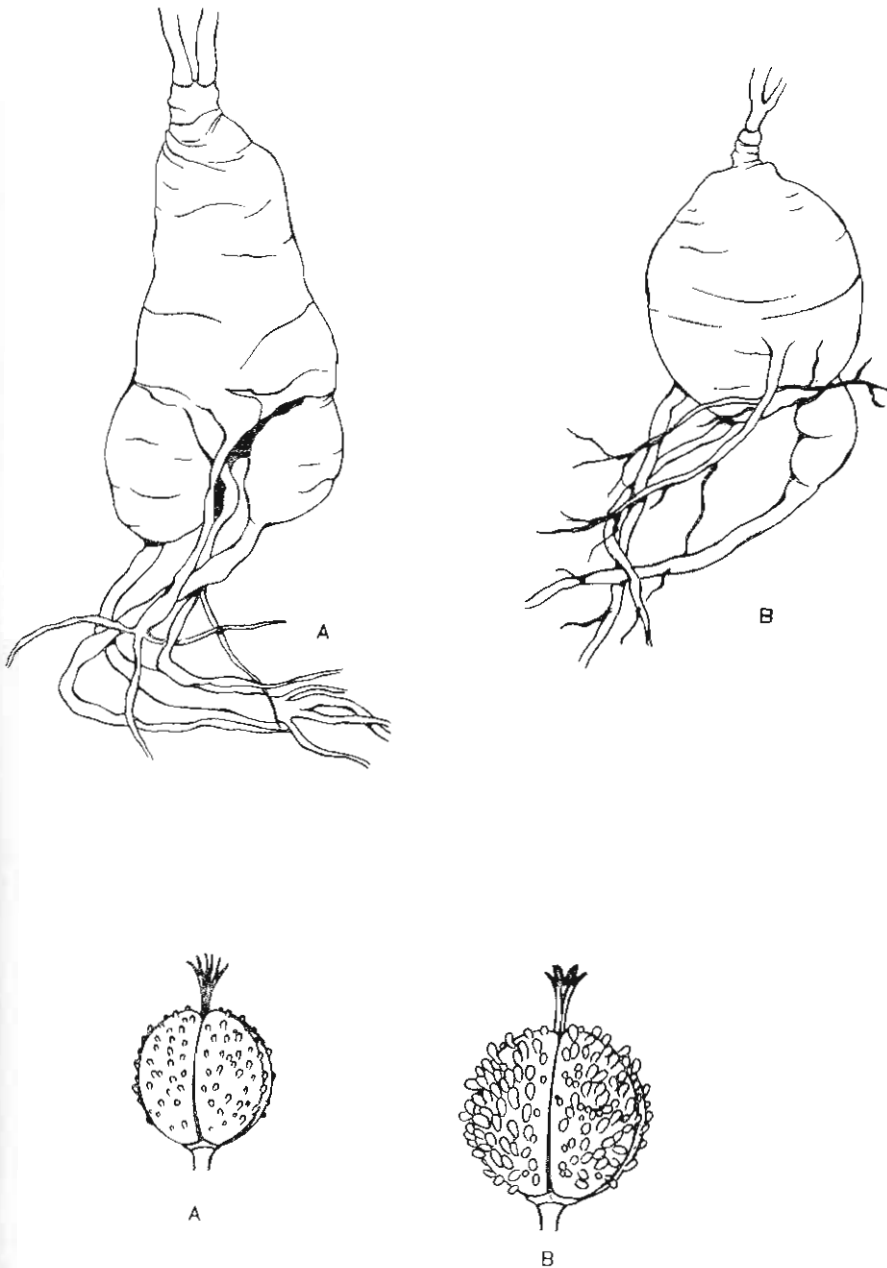


Fig. 2. Tuber, X1 and capsule, X6 of A: *Euphorbia anthula* & B: *E. apios*.

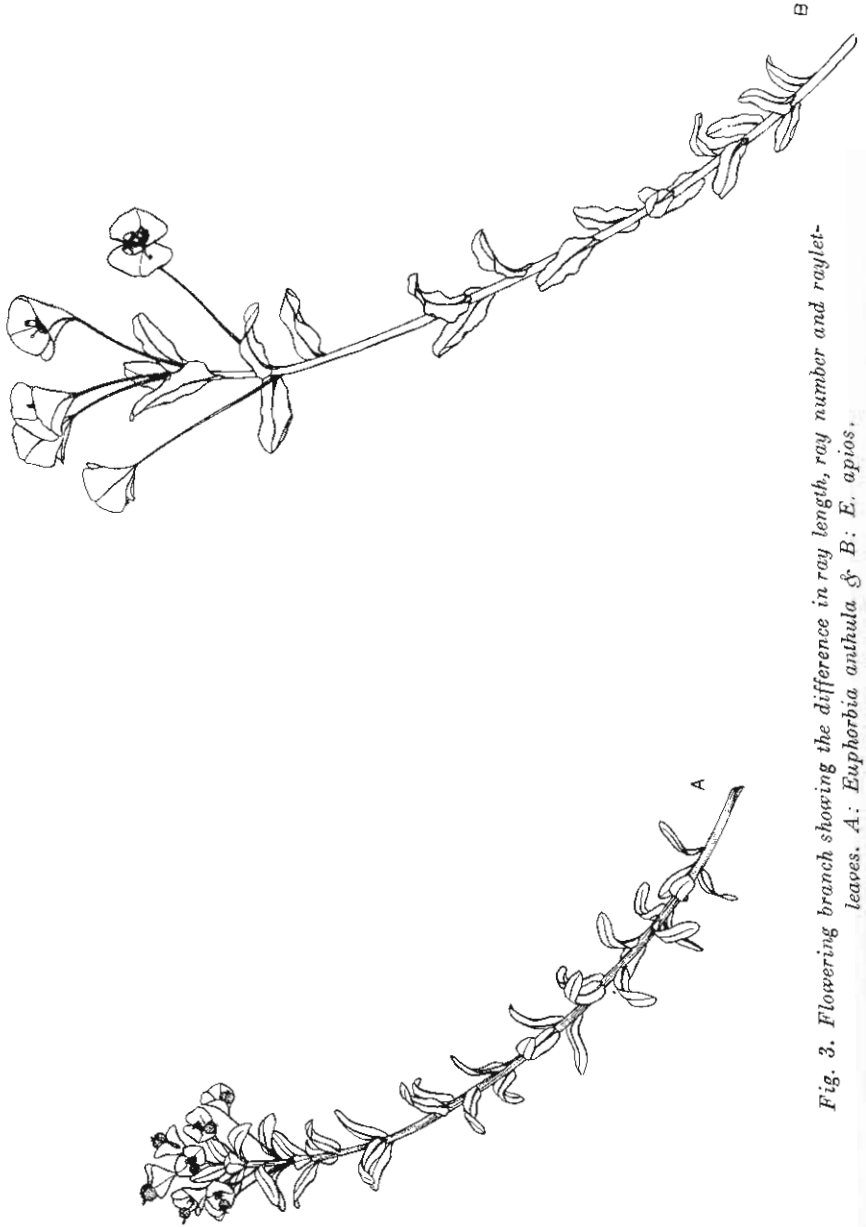


Fig. 3. Flowering branch showing the difference in ray length, ray number and raylet-leaves. A: *Euphorbia anthula* ♂; B: *E. apios*.

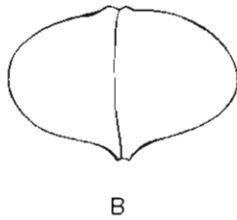
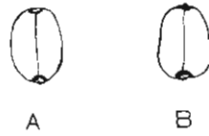
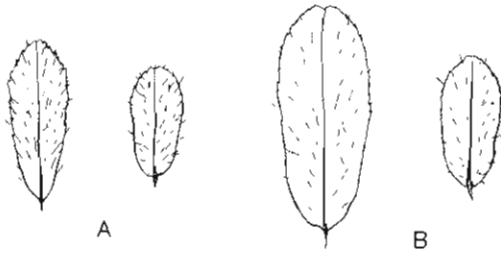


Fig. 4. Leaves, X2, seeds, X6 and raylet-leaves, X4 of A: *Euphorbia anthula* & B: *E. apios*.

## CYTOLOGY

Using the above mentioned method, described by Östergren and Heneen (1962), we ended in the following results. The chromosome number of *Euphorbia anthula* and *E. apios*, as well, was found to be  $2n = 14$ . All the chromosomes, for both taxa, are metacentric and the length varies between 3,8 and 1,7  $\mu$ . The karyotype of *E. anthula* is illustrated in Fig. 5B. No chromosomes with satellites have been observed in the material studied.

Because no difference in chromosome morphology was found the Writers supposed that the morphological differences were caused by gene mutations, which have been fixed because of isolation. We have not to forget that there are above forty endemic taxa on Mt Athos.

The chromosome number of *E. apios* was known before as  $2n = 12$  Kozuharov & Kuzmanov (1964), but later was found  $2n = 14$  (Phitos - Kamari, 1974).

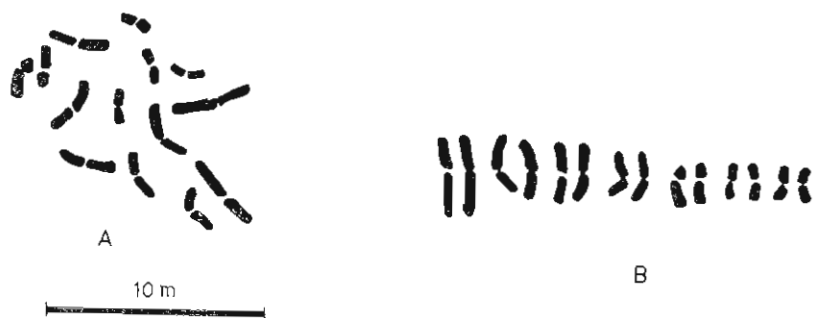


Fig. 5. *Euphorbia anthula*. Chromosomes from root tip mitosis. A: Metaphase plate. B: Schematic karyotype. Further explanation in the text.

## ACKNOWLEDGMENTS

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ΠΕΡΙΛΗΨΗ

EURHORBIA ANTHULA, ENA NEO TOΠΙΚΟ ΕΝΔΗΜΙΚΟ ΕΙΔΟΣ  
ΑΠΟ ΤΟ ΒΟΥΝΟ ΑΘΩΣ ΤΗΣ ΧΕΡΣΟΝΗΣΟΥ ΤΟΥ ΑΓΙΟΥ ΟΡΟΥΣ

Ἄπο

Γ. ΛΑΥΡΕΝΤΙΑΔΗ καὶ Κ. ΠΑΠΑΝΙΚΟΛΑΟΥ

(Ἐργαστήριο Συστηματικῆς Βοτανικῆς καὶ Φυτογεωγραφίας Πανεπιστημίου Θεσσαλονίκης)

Ἐνα νέο τοπικὸ ἐνδημικὸ εἶδος, τὸ *Euphorbia anthula* G. Lavrentiades & K. Papanicolaou, περιγράφεται ἀπὸ τὴ χερσόνησο τοῦ Ἁγίου Ὄρους. Εἶναι πολυετές, μὲ κυλινδρικὸ ἢ κωνικὸ ρίζωμα. Συγγενὲς μὲ τὴν *E. arios*, ποὺ ἡ φυτογεωγραφικὴ τῆς ἐξάπλωση βρίσκεται στὸ ΝΑ τμήμα τῆς Βαλκανικῆς Χερσονήσου, στὴν περιοχὴ τοῦ Αἰγαίου καὶ στὴ ΝΑ Ἰταλία. Γιὰ νὰ κάνουμε σύγκριση, συγκεντρώσαμε ζωντανὸ ὕλικὸ ἀπὸ γειτονικὲς περιοχὲς (Παγγαῖο, Χορτιάτης, Ροδόπη & Χολομών), ποὺ τὸ καλλιεργήσαμε κάτω ἀπὸ τὶς ἴδιες περίπου οἰκολογικὲς συνθῆκες στὸ Βοτανικὸ κῆπο τοῦ Πανεπιστημίου τῆς Κοπεγχάγης.

Ὁ χρωμοσωμικὸς ἀριθμὸς βρέθηκε ὅτι εἶναι  $2n = 14$  σ' ὅλους τοὺς πληθυσμοὺς ποὺ μελετήσαμε. Δίνεται ἐπίσης σχηματικὴ παράσταση τοῦ καρυοτύπου.