

ON THE FLORA OF THE ATHOS PENINSULA

I. BIOSYSTEMATICS OF VIOLA ATHOIS

by

KOSTAS PAPANICOLAOU

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

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Abstract: The present biosystematic study refers to the taxonomic status of the *Viola athois* W. Becker, which was described as a new species, for science, in 1902, and was considered as an endemic of Agion Oros Peninsula. It has been proved that it is an ecophene of the *Viola gracilis* species, because seeds, collected from 19 various populations of the Greek-macedonian mountains, which were sown in the experimental field of the Botanical garden of the University of Copenhagen, gave individuals in complete identification.

Some comments, on chromosome number and morphology, have been made.

INTRODUCTION

Viola athois is included in the *Viola gracilis* group, which belongs to the section *Melanium*, a part of which occurs in Balkan peninsula. In Macedonia, as well as in Albania, we can find groups which consist of plenty of microtaxa, frequently local ones. The taxonomic status of those groups is quite difficult because of slight morphological differences within taxa.

Hayek (1918, 1925) published the descriptions of some taxa of the genus *Viola*, but, since ever, their number was increased.

Cytological studies on Balkan *Viola* taxa, concerning a taxonomic revision, are in starting, because of difficult way of supplying living material from mountain areas, very far situated from each other. Some cytological studies have been made for gardening purpose. Clausen (1926, 1927, 1931) studied cytologically *Viola declinata* W. et K. and *Viola elegantula* Schott and found to have, both, $2n = 20$. Clausen (1929, 1930, 1931), also, found to have, both, *Viola orphanidis* Boiss and *V. cornuta* $2n = 20-22$. Some more chromosome numbers of Balkan species

we can find in Griesinger (1937): *Viola orbelica* Panc. $2n = 20$, *V. perinensis* W. Becker $2n = 20$, *V. «Samothraki»* $2n = 20$ and *V. dacica* $2n = 26$.

During our botanical excursions on Agion Oros peninsula, we realized much variability of the *Viola athis* vegetative characters in various populations, especially in the size of basal leaves, of lateral petals and the number of stems. That phenomenon shoved us to think of it as not a distinct species with stable characters, so we decided to get living material of both, *Viola gracilis* and *V. athis*, from the Greek-macedonian mountains.

HISTORICAL SURVEY

Until 1902, when W. Becker described the *Viola athis* as a new species for science, it was called in various names. Griesebach (1843) used to call it *V. calcarata*; Halacsy (1892), who confirmed the collection of Sintenis and Bornmüller, was wrong in determining it as *V. macedonica*; Bornmüller (1894) named it *V. gracilis*.

Younger Writers viz., Hayek (1918, 1925), Turril (1937) and Re-chinger (1943) agree with W. Becker to be *V. athis* a new species for science.

MATERIALS AND METHODS

Seeds of 19 *Viola* populations from 8 Greek mountains were collected in 1975 and 1976 and shown in the experimental field of the Botanical garden of the University of Copenhagen. A list of localities and code number for all populations, presented in this paper, is given in Table I. Each population was represented by 10 living individuals. Four of them have been pressed for morphological investigation and three have been used for cytological ones.

The squash technique described by Östergren and Heneen (1962) has, with some modifications, been used in this investigation. Instead of using pure 8-hydroxyquinoline solution at 40 C as the pretreatment, a mixture of 2 mM 8-hydroxyquinoline solution and 0.2% colchicine solution (1 : 1) was used. As fixative Carnoy (absolute ethylalcohol and acetic acid 3 : 1) was used. After staining with the Feulgen reagent the roots were treated with a 10% water solution of pectinase for about two hours.

TABLE I.

Chromosome numbers and localities of investigated material of Viola.

Species	2n	Collection no	Locality
<i>V. athois</i>	20	PA 1001	Ag. Oros: Above Karyes, 600m
<i>V. athois</i>	20	PA 1054	Ag. Oros: Around M. Xiropotamou
<i>V. athois</i>	20	PA 1081	Ag. Oros: Above Daphni, 150m
<i>V. athois</i>	20	PA 1052	Ag. Oros: Kerasia, 700m
<i>V. athois</i>	20	PA 1031	Ag. Oros: To Panagia, 1150m
<i>V. athois</i>	20	PA 1060	Ag. Oros: Above Panagia. 1650m
<i>V. athois</i>	20	PA 1058	Ag. Oros: To the top, 1950m
<i>V. athois</i>	20	PA 1068	Ag. Oros: Just on the top, 2020m
<i>V. athois</i>	20	PA 1075	Ag. Oros: Around Panagia, 1500m
<i>V. gracilis</i>	20	PA 501	Mt Pangeon: Trikorfon, 1850m
<i>V. gracilis</i>	20	PA 550	Mt Pangeon: Avgo, 1800m
<i>V. gracilis</i>	20	PA 1522	Mt Vermion: Tsanaktsis, 1900m
<i>V. gracilis</i>	20	PA 1826	Mt Olympos: Before refuge A, 1850m
<i>V. gracilis</i>	20	PA 1827	Mt Olympos: Refuge A to Ag. Antonios
<i>V. gracilis</i>	20	PA 2028	Mt Voras: Above vil. Syssandra, 1150m
<i>V. gracilis</i>	20	PA 2029	Mt Voras: Above kalyvia Giannakoula
<i>V. gracilis</i>	20	PA 809	Mt Rhodopi: Drama, zagradaenia
<i>V. gracilis</i>	20	PA 1810	Mt Smolikas: Above Samarina
<i>V. gracilis</i>	20	PA 2452	Mt Kissavos: Summit area

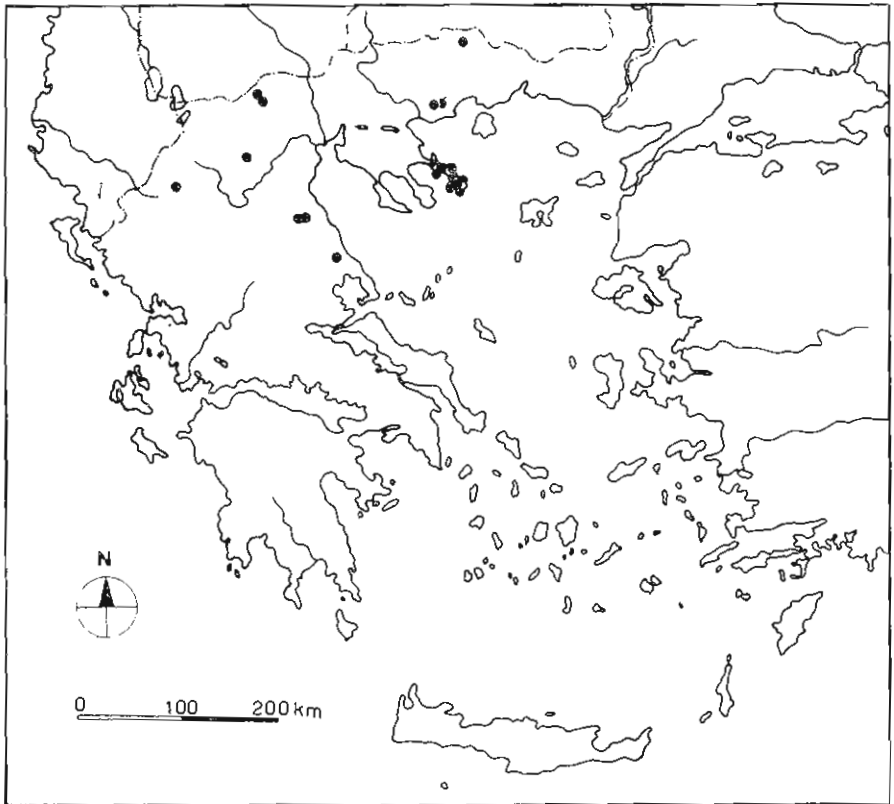


Fig. 1.

The geographical origins (dots) of material of V. athois and V. gracilis kept in cultivation.

RESULTS

The 76 pressed individuals (4 from each population), which have been investigated morphologically appear to be identified: Puberulent, perennial with an elongated rhizome, up to 20 cm. Basal leaves orbicular-ovate, 3 cm long, the upper oblong crenulate. Stipules 4-to 8-partite pinnately divided to the base; lateral segments linear to oblong, short; central segment larger, leaf-like, crenate. Open flowers 2.5 cm, violet; lateral petals directed upwards, spur 7 mm, straight, 2.5 times as long as calycine appendages. Style geniculate at the base, capitate with wide stigmatic aperture. Capsule erect at maturity, glabrous.



Fig. 2.

Viola alhois from Ag. Oros, 1500 m (population PA 1075). Natural size.
(Drawing by Grigoris Alexandris).

The chromosome number was counted in 10 plates of each individual and found $2n = 20$ (Fig. 3). Satellite-chromosomes have not been found. The size is more or less the same in all chromosomes and in all populations (more details in next paper).

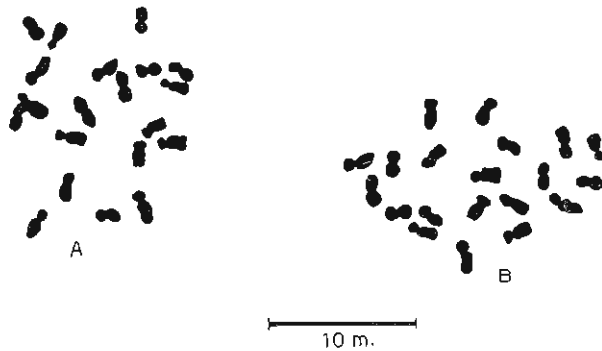


Fig. 3.

Somatic metaphases, in root-tips, of: A, V. atois, B, V. gracilis.

DISCUSSION AND CONCLUSION

All living individuals, of all populations, were cultivated under the same ecological conditions.

If their distinctness was not due entirely to environmental influences, then, all characters would be stable in the cultivation. However, according to our observations, all the differences between populations disappeared.

According to R. F. Daubenmire «Plants and environment, 1974, p. 361» *Viola atois* is an ecophene «These are plants differing, especially in the size of vegetative parts, number of stems, erectness and reproductive vigor, but belonging to essentially homogeneous genetic stock. Their distinctness is due entirely to environmental influences, for when different ecophenes are transplanted into the same habitat their differences disappear» of *Viola gracilis* because of disappearing of all differences in cultivation.

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ΠΕΡΙΛΗΨΗ

ΜΕΛΕΤΕΣ ΕΠΙ ΤΗΣ ΧΛΩΡΙΔΟΣ ΤΟΥ ΑΘΩ

I. ΒΙΟΣΥΣΤΗΜΑΤΙΚΗ ΤΗΣ VIOLA ATHOIS

Υπό
ΚΩΣΤΑ ΠΑΠΑΝΙΚΟΛΑΟΥ

(Εργαστήριο Συστηματικής Βοτανικής και Φυτογεωγραφίας Πανεπιστημίου Θεσσαλονίκης)

Η *Viola athois* περιγράφηκε σαν νέο είδος για την Έπιστήμη το 1902 από τον W. Becker. Μέχρι τότε οι έρευνητές τής έδιναν διάφορα όνόματα, όπως *Viola gracilis*, *V. calcarata* και *V. macedonica*, πράγμα που δείχνει τη μεταβλητότητα τών χαρακτήρων.

Συγκεντρώσαμε σπέρματα 19 πληθυσμών (9 τής *V. athois* και 10 τής *V. gracilis*) από διάφορα βουνά τής Ελλάδας, όπως Παγγαϊον, Βόρας, Σμόλικας, Όλυμπος, Κίσαβος, Ροδόπη και Άθως. Τα καλλιεργήσαμε στο πειραματικό τμήμα του Βοτανικού κήπου του Πανεπιστημίου τής Κοπεγχάγης, κάτω από τις αυτές οικολογικές συνθήκες. Ο κάθε πληθυσμός αντιπροσωπευόταν από 10 άτομα. Τέσσερα απ' αυτά μελετήθηκαν μορφολογικώς και τρία κυτταρολογικώς.

Βρέθηκε ότι τα μελετηθέντα άτομα όλων τών πληθυσμών είχαν την αυτήν έξωτερική μορφολογία, καθώς και την αυτή μορφολογία χρωμοσωμάτων (χρωμοσωμικές μετρήσεις θα δημοσιευθούν σε επόμενη μελέτη).

Σύμφωνα με τον R. F. Daubenmire (Plants and environment, σελ. 361), η *Viola athois* είναι ένας οικοφαινότυπος τής *V. gracilis*, διότι καλλιεργούμενη κάτω από τις αυτές συνθήκες, παρουσιάζει τον ίδιο άκριβώς φαινότυπο.

Ο Πίνακας I δείχνει τον αριθμό χρωμοσωμάτων και τις τοποθεσίες απ' όπου μαζέψαμε το υλικό μας. Για περισσότερη κατατόπιση, με κηλίδες στο σχέδιο 1, δείχνουμε τη γεωγραφική προέλευση τών δύο ειδών τής *Viola* που αναφέρουμε στο κείμενο.