SHORT COMMUNICATION

Occurrence of European field pansy (Viola arvensis) in Orestiada, Greece

C.A. Damalas¹, S.D. Koutroubas¹ and S. Fotiadis¹

Summary
The European field pansy (Viola arvensis Murray), an annual broadleaf weed, occurs with increasing frequency over the last few years in arable land of the Farm of Democritus University of Thrace in Orestiada. Naturally-occurring weed populations were observed in densities from 5 to 20 plants per m² mostly in irregular patches, in the margins (edges) of a winter wheat field and at points of the field with low wheat density, in minor spring-sown legumes such as lentils, faba beans, lupine, and winged vetchling, and in parts of the fields without crop. The occurrence of the species in the area is probably associated with the absence of chemical weed control (no use of herbicides) coupled with the increased nitrogen availability in the soil, which favors the overall productivity of plants (i.e. biomass accumulation, seed production and seed dispersal) in subsequent generations. In this report, basic morphological traits at different stages of the life cycle of the species are presented.

Additional keywords: identification, morphology, Viola arvensis

The European field pansy (Viola arvensis) occurs with increasing frequency over the last few years in arable land (at an acreage of 15 ha) of the Farm of Democritus University of Thrace in Orestiada. Increasing densities of plants were confirmed by systematic visual observations in the area. According to the literature, this species is mentioned as an annual weed mainly of cereals and oilseed rape in northern Europe (Vanaga et al., 2010; Salonen et al., 2011; Andreasen and Stryhn, 2012; Hanzlik and Gerowitt, 2012), in New Zealand (Bourdôt et al., 1998), and in Canada (Degenhardt et al., 2005a, 2005b, 2005c). It appears that this weed is considered to be a minor threat in agroecosystems (Degenhardt et al., 2005c) and a rather easy weed species to tackle, particularly with the use of herbicides, depending on the available herbicides and the crop management system (Huggenberger and Gueguen, 1987; Degenhardt et al., 2005a, 2005b; Becker et al., 2008; Koo and Caseley, 2008; Richardson and Zandstra, 2009). In general, identification of a weed is the first step towards finding potential practices for effective management (Dekker, 1997). However, information about the performance of this weed under Greek conditions does not exist. Thus, the aim of this study was the depiction of basic morphological traits of European field pansy to assist correct identification and also to provide basic information on its occurrence from the area of Orestiada in Greece. To our knowledge, European field pansy has been reported previously as a minor weed of wheat fields in Greece (Damanakis, 1983) and it is also mentioned as a herb in FILOTIS database, a Greek information system for the natural environment of Greece (FILOTIS DATABASE, 2014). However, further information lacks in the Greek literature.

A field survey was conducted in 2011 at the Farm of Democritus University of Thrace in Orestiada, Greece (41°30’N latitude, 26°32’E, 22 m asl), where the species was initially recorded. The soil was silty...
clay loam (Typic Xerofluvent) with organic matter 1% and pH 6.68. Because of the uneven spatial distribution of the weed plants in the previous year, an area of 1.5 ha was defined for the observations and the measurements. The area was cultivated mainly with winter wheat and spring-sown legume crops. Shortly after weed emergence in the defined area in late March, 30 solitary plants of the same growth stage were selected and their position was marked by long wooden stakes. The stakes remained until the end of the survey (i.e. until maturity of the plants in early July) to indicate easily the selected plants. Plants that emerged both inside and outside cultivated area were selected (15 plants from each area). Morphological traits at different growth stages of the life cycle of the weed were visually recorded and measured. Measurements concerned the thickness of the central stem, the length and width of the lower and the upper leaves, the length and width of the open flower, the diameter of the closed capsule at maturity, the number of seeds/capsule, and the plant height. The above morphological parameters were determined with a portable digital caliper (of measuring range 0-150 mm and measurement increments of 0.01 mm).

Identification of the weed was based on keys and illustrations provided in the book of Hanf (1983) and in the guide of Cowbrough and Smith (2009), which are often used for weed identification. According to our own observations, the cotyledons are petiolate, almost round, with entire margins, smooth and fleshy surface, and with a shallow notch (indentation) at the tip. The lower leaves are simple, petiolate (mostly with large stalks), oval, with small incisions in the leaf margins (toothed margins), and smooth with brightly shiny surface (Figure 1). The upper leaves are simple, petiolate (mostly with short stalks), narrowly lanceolate to ovate, with margins coarsely to regularly crenate-serrate, hairy veins on the leaf underside and large leafy stipules at the base of the leaf stalks.

The European field pansy is morphologically similar to and can be often confused with the species V. bicolor (syn. V. rafinesquei) and V. tricolor, but in V. bicolor the color of the flower is pale blue-violet to pale yellow in the centre, while the species V. tricolor has larger flowers, in which the upper pair of petals are dark blue or purple from the middle to the edges (Doohan and Monaco, 1991).
At low temperatures in the early growth stages, juvenile stems are acaulescent, bearing a rosette of leaves at the ground level (rosette form), which may complicate identification (Figure 2). With rising temperatures, the central stem is expanded, becoming erect, ramose, and angular (Figure 3). The flowers are bilaterally symmetrical, chasmogamous, and complete (Figure 4). They consist of a calyx, auricled at the base, with five lanceolate, acute sepals, and a corolla of five petals, which are shorter than or equal in length to the sepals. The lower petal is white, with a small, conspicuous yellow spot at the throat. The upper petals are creamy white, occasionally tinged with some pink or mauve. Flowers arise in leaf axils and are borne singly on slender pedicels. Fruits are 3-valved capsules, which dehisce upon drying at maturity to expel the seed (Figure 5). Mean values of basic morphological traits are shown in Table 1.

Natural infestations of the weed were observed in an open area of arable land (annually disturbed environment or land in temporary fallow) in densities ranging from 5 to 20 plants per m² mostly in irregular patches. The weed populations were found mainly in the margins (edges) of the winter wheat field and at localities of the field with low wheat density, in minor spring-sown legumes crops such as lentils, faba beans, lupine, and winged vetchling (a type of traditional Greek fava), and in parts of the field without crop. In all these localities of the defined area, there was no strong competition for light. The occurrence of the species in the area is probably associated with the absence of chemical control (no use of herbicides) coupled with the increased nitrogen availability in soil, which favors the overall productivity of plants, including seed pro-

![Figure 4. Plant of Viola arvensis at the flowering stage.](image1)

![Figure 5. Fruit (capsule) of Viola arvensis.](image2)

<table>
<thead>
<tr>
<th>Trait</th>
<th>Mean</th>
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<th>Max</th>
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</thead>
<tbody>
<tr>
<td>Plant height (maturity) (cm)</td>
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<td>Thickness of main stem (mm)</td>
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<td>2.2</td>
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<td>Length of basal leaves (mm)</td>
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<td>Length of upper leaves (mm)</td>
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<td>Width of upper leaves (mm)</td>
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<tr>
<td>Length of open flower (mm)</td>
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<td>20.6</td>
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<td>Width of open flower (mm)</td>
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<td>Capsule diameter (mm)</td>
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<td>Seeds per capsule</td>
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Table 1. Mean values of basic morphological traits of Viola arvensis (n = 30).
duction and seed dispersal in subsequent generations.

The information reported in this study concerns basic morphological traits of Viola arvensis as a guide for correct identification of this species. Our observations indicate that the species is rather easy to identify since there are adequate diagnostic characters in morphology, even for non-experts. Complicating factors could be the occurrence of hybrids (as reported in the literature) and the unpredictable phenological plasticity of individuals growing outside their normal habitat. Supplementary research is under way to assist in acquiring detailed knowledge on the biology of the species and in the selection of appropriate weed control practices.

Literature cited


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ΣΥΝΤΟΜΗ ΑΝΑΚΟΙΝΩΣΗ

Εμφάνιση του κοινού αγριοπανσέ (Viola arvensis) στην Ορεστιάδα

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Περίληψη Ο κοινός αγριοπανσές (Viola arvensis Murray), ένα ετήσιο πλατύφυλλο ζιζάνιο, εμφανίζεται με αυξανόμενη συχνότητα τα τελευταία έτη στη καλλιεργήσιμη γη του Δημοκριτείου Πανεπιστημίου Θράκης στην Ορεστιάδα. Φυσικοί πληθυσμοί του ζιζανίου παρατηρήθηκαν σε πυκνότητες που κυμαίνονταν από 5 έως 20 φυτά ανά m² συνηθέστερα σε ακανόνιστες κηλίδες, στις άκρες (περιθώρια) αγρού με καλλιέργεια μαλακού σίτου και σε σημεία του αγρού με χαμηλή πυκνότητα φυτών, σε καλλιέργειες ανοιξιάτικων ψυχανθών, όπως φακές, κουκιά, λούπινο και λαθούρι, καθώς και σε έδαφα χωρίς καλλιέργεια. Η εμφάνιση του είδους στην περιοχή πιθανώς σχετίζεται με την απουσία χημικού ελέγχου των ζιζανίων (μη χρήση ζιζανιοκτόνων) σε συνδυασμό με την αυξημένη διαθεσιμότητα αζώτου στο έδαφος, συσκευασίας για τη συνολική παραγωγικότητα των φυτών (π.χ. συσσώρευση βιομάζας, παραγωγή και διάδοση σπόρου) στις επόμενες γενεές. Σε αυτή την αναφορά, παρουσιάζονται βασικά μορφολογικά χαρακτηριστικά του ζιζανίου σε διάφορα στάδια του βιολογικού κύκλου.
