Contributions to the bulb flora of Ilias (NW Peloponnese, Greece): *Oxalidaceae, Primulaceae* and *Ranunculaceae* (dicotyledons)

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Abstract. The bulb flora of prefecture (nomos) Ilias in NW Peloponnese, Greece is documented with an emphasis on its distribution within the administrative unit. Families, genera and species are presented in alphabetical order. Each taxon is accompanied by a description, notes on habitat, ecology and a distribution dot map. This is the last contribution of the series and deals with the dicotyledonous families *Oxalidaceae*, *Primulaceae* and *Ranunculaceae*, comprising four genera — *Oxalis*, *Cyclamen*, *Anemone* and *Ranunculus*.

Key words: *Oxalis*, *Cyclamen*, *Anemone*, *Ranunculus*, distribution maps, Greece, NW Peloponnese

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Introduction

Bulb plants adapt well to survive the hot dry summers and cool winters of southern Greece. We had decided to investigate the distribution of these plants in the prefecture (nomos) of Ilias. Strictly speaking, bulb plants are Monocotyledons with a single cotyledon and floral parts in threes or multiples of three. However, we treat as bulb plants those plants which die down in the hot dry months to an underground storage organ and thus include all plants with corms, tubers and rhizomes, i.e., geophytes. Dicotyledons with two cotyledons and floral parts often in fours or fives, and having such underground organs are included. The numerous hardy terrestrial orchids (12 genera and *ca*. 45 species *fide Flora Hellenica Database*) are temporarily excluded as their distribution in Greece appears to be fairly well-recorded by professional and amateur orchidologists who however, are not always in agreement regarding taxonomic delimitation of a species, e.g., Pedersen & Faurholdt (2007) on *Ophrys*, and Kretzschmar & al. (2007) on *Anacamptis*, *Orchis* and *Neotinea*.

According to our original estimate approximately a hundred species of bulb plants belonging to 14 families occur in nomos Ilias (excluding *Orchidaceae*).

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On completion of the investigation we found 96 taxa are present. They have been presented in alphabetical family order in a series of articles. This is the last contribution in the series (Giannopoulos & al. 2021a, b & Giannopoulos & Tan 2021a, b, Tan & Giannopoulos 2022a, b) and deals with the families *Oxalidaceae*, *Primulaceae* and *Ranunculaceae* which comprise four genera, viz., *Oxalis*, *Cyclamen*, *Anemone* and *Ranunculus*. The presentation in alphabetical order follows that adopted in the first six publications.

Material and methods

Field studies have been carried out in the prefecture (nomos) of Ilias. Keys to the species, photographs, short descriptions, habitat, ecology, and distribution maps are provided for the taxa which are listed in alphabetical order. The general range within and without the prefecture is also indicated. For external distribution, reference is made to Floras of the neighbouring countries and Plants of the World online (Kew Science). Chromosome counts are based on Greek material; if from nomos Ilias, the locality is provided. Descriptive terminology is as used in English language Floras, e.g., *Flora Europaea* (Tutin & al. 1980), *Mountain Flora of Greece* (Strid & Tan 1991). Unqualified measurements refer to length or height. One Greek endemic (*Cyclamen graecum* subsp. *graecum*) is restricted to southern Ilias.

Results and discussion

OXALIDACEAE

Oxalis L.

Oxalis pes-caprae L. [syn.: *O. cernua* Thunb.] (Figs. 1 & 3)

Perennial with slender underground stem arising from a deep-seated tuber; bulbils present at base. Aerial stem absent. Leaves petiolate, 3-foliolate; leaflets obcordate, deeply emarginate. Scape with umbellate cyme of 2–8 flowers. Sepals 5, lanceolate. Petals 5, bright yellow or suffused red. Stamens 10. Capsule loculicidal, rarely developed or seeds sterile.

Common and widespread in Ilias especially on cultivated ground. Coastal *Pinus* woodland, sandy beaches, *Quercus coccifera* – *Cistus* scrub, olive groves, cultivated and fallow fields, roadside vegetation, on limestone and other substrates, sea level to 750 m. Flowering April to June. Native to South Africa, an invasive weed naturalized in the Mediterranean region, W Europe and elsewhere with similar climate type. Forming conspicuous yellow carpets in open habitats in early spring (Fig. 1), propagating vegetatively by fragmentation of tubers. Populations with double flowers (*flore pleno*) often occur.

PRIMULACEAE

Cyclamen L.

Tuberous perennial herbs. Leaves simple, long-petiolate, glabrous. Flowers axillary, solitary, nodding. Calyx 5-lobed. Corolla with short basal tube and 5 lobes auriculate at base. Anthers connivent. Capsule globose or ovoid.

1. Leaf blade crenulate to denticulate, beaded at margin. Fruiting pedicel coiling from middle or base of tuber ……..……..…….*graecum*
– Leaf blade shallowly lobed or angular, never beaded at margin. Fruiting pedicel coiling from apex ……..……..……*hederifolium*

Cyclamen graecum Link subsp. ***graecum*** [syn.: *C. mindleri* Heldr.] (Figs. 1 & 3)

Resembling *C. hederifolium*, but growing in drier and more open, rocky habitats; tuber subglobose, with roots from base and lower centre; leaves developing with or just after the flowers; blade ovate-cordate, usually crenulate to denticulate with a beaded margin; fruiting pedicel coiling spirally from the middle or base of tuber. – $2n$ = c. 80 (Samaropoulou & al. 2010), 84 (Liveri & al. 2021).

Southern part of Ilias. Open stony slopes, phrygana, olive groves, on limestone, 50–1210 m. Flowering in autumn from October to November. Endemic. *C. graecum* has recently been divided into three subspecies: subsp. *anatolicum* Ietsw. ex Grey-Wilson which occurs in Rodos, SW Anatolia and N Cyprus; subsp. *candicum* Ietsw. ex Grey-Wilson in W & C Kriti, and subsp. *graecum* on the Greek mainland including Peloponnese.

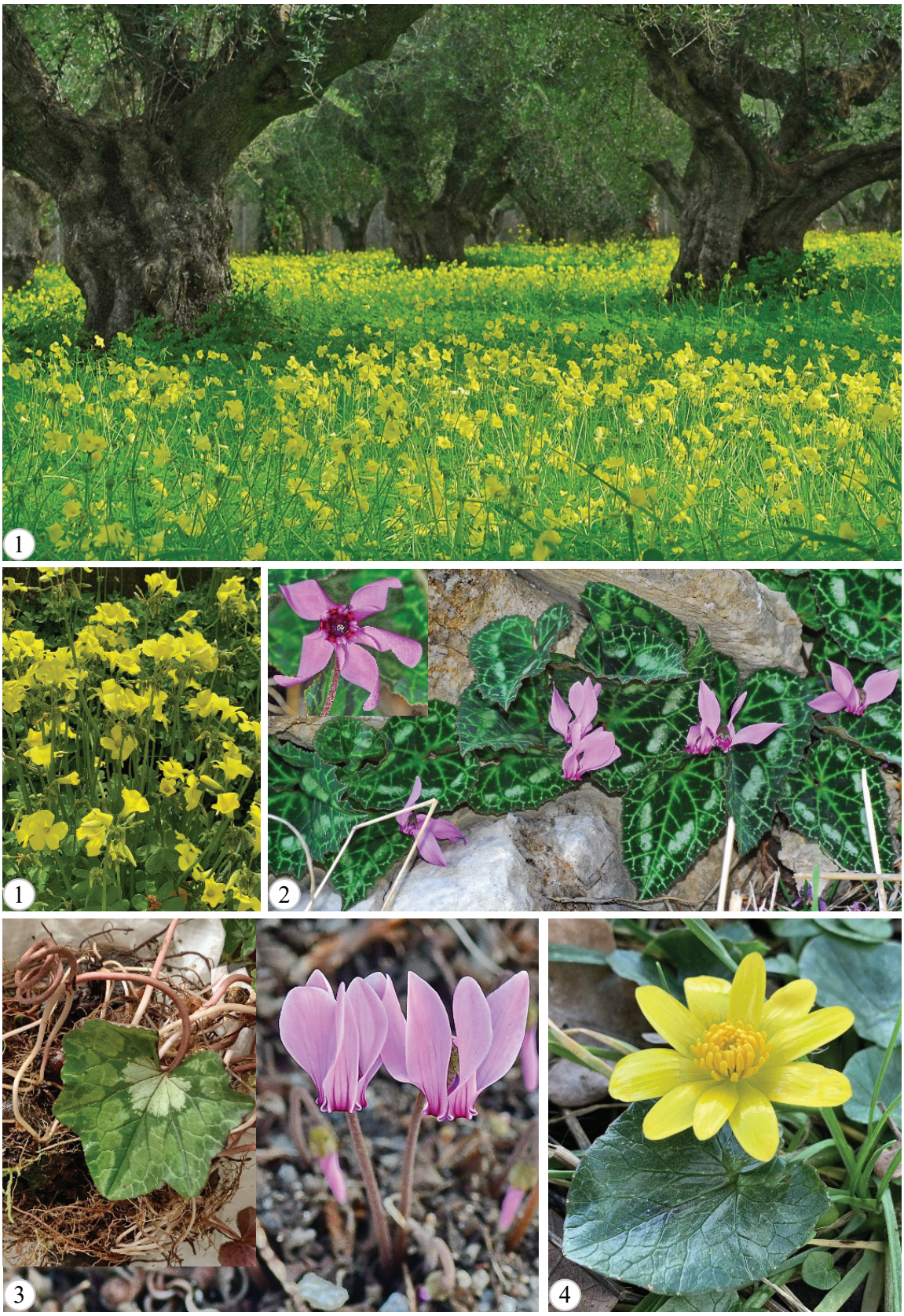

Fig. 1. Tuberous perennials in nomos Ilias: 1, *Oxalis pes-caprae* 2, *Cyclamen graecum* subsp. *graecum* 3, *C. hederifolium* 4, *Ranunculus ficaria* subsp. *ficariiformis*.

Cyclamen hederifolium Sol. ex Aiton [syn.: *C. neapolitanum* Ten.] (Figs. 1 & 3)

Tuber depressed-globose, up to 10(–25) cm in diam., with roots both from the sides and upper surface. Leaf blade ovate-cordate, shallowly and angularly lobed, never beaded at margin, dark green or variously blotched grey or silver above, usually reddish-purple beneath. Pedicels long, slender, coiling spirally from apex of tuber. Corolla pink to purplish-pink, with conspicuous and often darker-coloured auricles; lobes oblong-obovate, often twisted. Capsule ripening the following summer. – $2n$ = 34 (Samaropoulou & al. 2010), 68 (Kriemadi & al. 2002).

South and eastern parts of Ilias, less common in the north and west. *Quercus* woodland, *Laurus-Quercus* scrub, phrygana, shaded rocky slopes, fields, on limestone, sea level to 1260 m. Flowering in autumn from September to November, usually before the leaves. S Europe (France) to Turkey. Very variable, especially in cultivation.

RANUNCULACEAE

1. Flowering stem with a single whorl of 3 leaves some distance below the flower. Inner perianth segments without basal nectary ……*Anemone*
– Cauline leaves alternate, sometimes few and reduced. Inner perianth segments with basal nectary.……*Ranunculus*

Anemone L.

Rhizomatous or tuberous perennial herbs with ternately or palmately-lobed leaves. Flowering stem erect, unbranched. Cauline leaves 3, in a single whorl. Flowers terminal, solitary. Perianth segments petaloid. Stamens and carpels numerous. Achenes glabrous to lanate, with straight or curved beak.

1. Cauline leaves petiolate, similar to basal ones. Fruiting heads nodding ……*apennina*
– Cauline leaves sessile, not similar to basal ones. Fruiting heads erect ……2
2. Cauline leaves laciniate, much divided …. *coronaria*
– Cauline leaves entire or slightly toothed at apex …… *pavonina*

Anemone apennina subsp. ***blanda*** (Schott & Kotschy) Nyman [syn.: *A. blanda* Schott & Kotschy] (Figs. 2 & 3)

Rhizome tuberous, irregularly lobed. Basal leaves 1–3(–5), long-petiolate; blade rounded-triangular in outline, biternate with subobtuse lobes, glabrous or subglabrous beneath. Flowering stem(s) slender, flexuous below ground. Cauline leaves resembling basal leaves but shortly petiolate. Perianth segments 9–18, linear-oblanceolate to narrowly elliptical, glabrous, deep blue, purple to almost white. Anthers pale yellow. Fruiting head nodding, globose.

Southern and eastern parts of Ilias. Stony slopes, open *Pinus halepensis* or deciduous forest, macchie, olive groves, 160–1450 m. Flowering March to May (June). SE Europe eastwards to Turkey, Caucasus and W Syria.

Replaced in the W Balkan Peninsula and Italy by subsp. *apennina* (leaves pubescent beneath, with subacute lobes; fruiting head erect). The latter occurs in Sterea Ellas, S and N Pindos, North Central but not in the Peloponnese.

Anemone coronaria L. [syn.: *A. messarensis* Coust. & Gand.] (Figs. 2 & 3)

Rhizome tuberous, woody. Blade of basal leaves shorter than petiole, broadly triangular in outline, with 3 much dissected primary segments. Flowering stems 1–3 from each tuber, elongating in fruit. Cauline leaves sessile, deeply laciniate. Perianth segments usually 6, elliptical to narrowly obovate, usually pale purplish-blue, sometimes white or bright red. Anthers dark purple or smoky blue. Fruiting head erect, ovoid to shortly cylindrical, very dense. Achenes numerous, lanate.

Widespread, less common in the northeast. Phrygana, archaeological sites, by old castles, drained areas, limestone quarries, disturbed ground, sea level to 610 m. Flowering January to April. Mediterranean area to SW Asia (W and SW Iran). Pink-flowered and purplish-blue forms often occur in the same population.

Anemone pavonina Lam. [syn.: *A. fulgens* auct.; *A. hortensis* subsp. *pavonina* (Lam.) Arcang.] (Figs. 2 & 3)

Fig. 2. *Anemone* species in nomos Ilias: 1, *Anemone apennina* subsp. *blanda* 2, *A. coronaria* 3, *A. pavonina*.

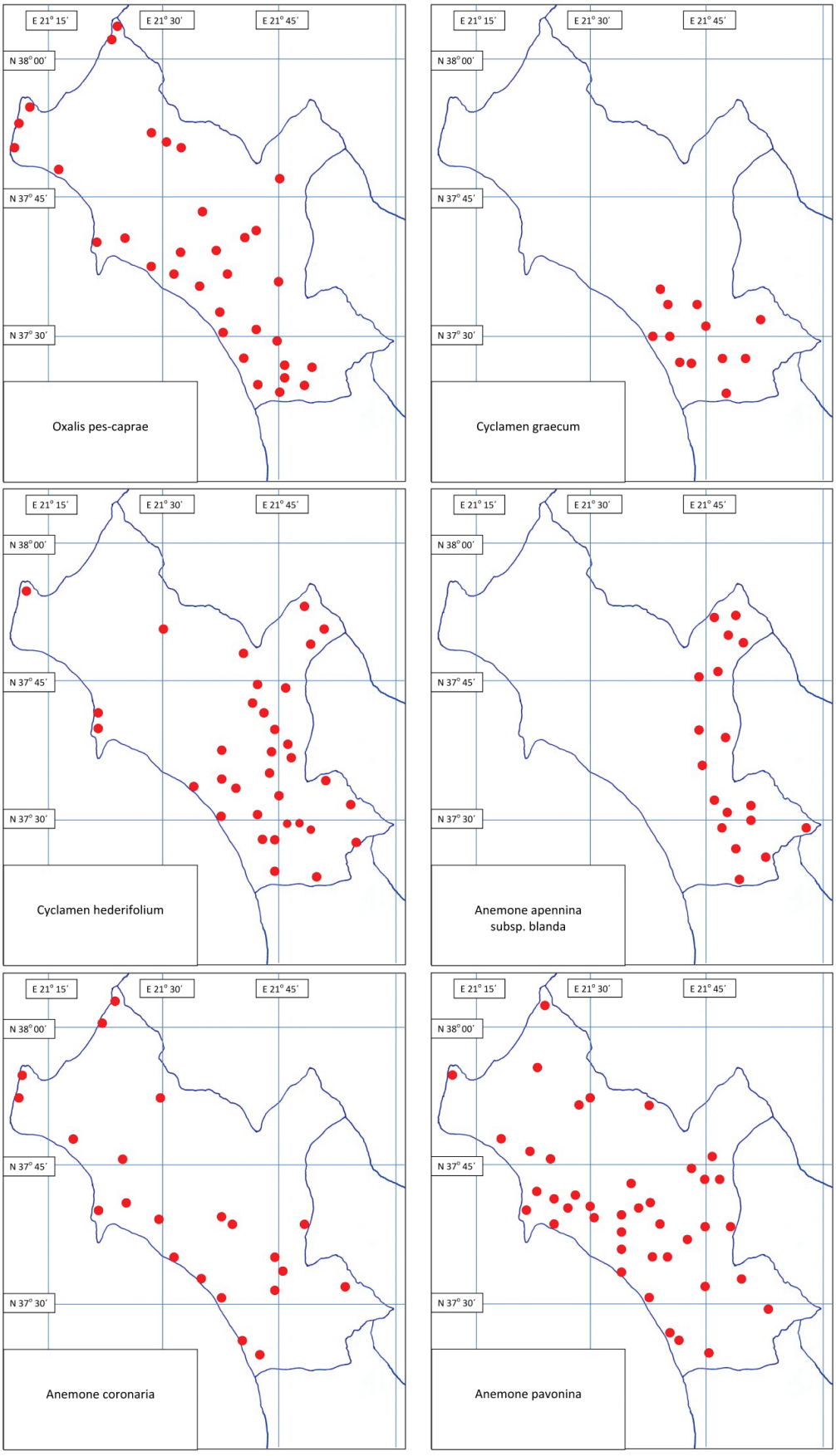

Fig. 3. Distribution of *Oxalis, Cyclamen* and *Anemone* in nomos Ilias.

Differing from *A. coronaria* by the following characters:

Blade of outer basal leaves 3-lobed nearly to base; segments shallowly divided; cauline leaves narrowly elliptical, acute, entire or occasionally lobed; perianth segments 7–11, narrower, variable in colour but usually purplish-pink or scarlet, with or without a paler base. – 2*n* = 16 (Samaropoulou & al. 2010).

Widespread and more common inland than *A. coronaria*. *Pinus halepensis* forest, *Quercus coccifera* macchie, *Cistus* phrygana, damp meadows, archaeological sites, olive groves, cultivated terraces, fallow fields, roadsides, 30–720 m. Flowering March to early May. Balkan Peninsula to W Anatolia. Forms with deep scarlet flowers cream at base are often locally abundant in olive groves.

Ranunculus

A large genus with c. 450 species worldwide and c. 55 species in Greece. Perennials often with swollen root tubers mixed with slender fibrous roots. Leaves entire or divided. Sepals usually 5. Petals (inner perianth segments) with basal nectary. Stamens and carpels numerous, spirally arranged. Achenes compressed, with straight or curved beak.

1. Blade of basal leaves ovate to cordate-reniform, margin ± entire. Sepals 3 .....*ficaria*
– Blade of basal leaves divided to 1/3 or more. Sepals 5 ……..…… ……..……2
2. Stem persistently fibrous at base ……*paludosus*
– Stem not fibrous at base ……..…… ……3
3. Blade of basal leaves 2–3-pinnatisect; lobes linear-lanceolate ……..……*millefoliatus*
– Blade of basal leaves 3–5-partite; lobes obtuse-crenate ……..……..… *sprunerianus*

Ranunculus ficaria L. subsp. ***ficariiformis*** Rouy & Foucard [syn.: *Ficaria verna* Huds.] (Figs. 1 & 4)

Subglabrous patch-forming perennial with cluster of fusiform to clavate root tubers mixed with fibrous roots. Stems decumbent to erect, sometimes rooting at the lower nodes. Basal leaves long-petiolate; blade broadly ovate to cordate-reniform, subentire to slightly crenate, shiny green above. Flowers solitary, long-pedicellate. Sepals 3. Petals 6–12, oblong-elliptical, deep or pale yellow above, greenish yellow beneath. Fruiting head subglobose or undeveloped. Achenes pubescent. – 2*n* = 32 (based on *Runemark* & *al*. 40569, LD).

Mainly eastern and northeastern parts of Ilias. Damp openings in deciduous forest, meadows, olive groves, abandoned fields, calcareous ground, 10–1259 m. Flowering February to April. Mediterranean area to SW Asia.

A widespread and variable species. The differences between subsp. *ficariiformis* and subsp. *chrysocephalus* P.D. Sell are unclear.

Ranunculus millefoliatus Vahl (Fig. 4)

Subglabrous or sparsely pubescent perennial with ovoid, acute root tubers mixed with longer fibrous roots. Stem erect, usually simple. Blade of basal leaves triangular-ovate in outline, 2–3-pinnatisect with numerous, linear-lanceolate segments c. 1 mm wide. Cauline leaves few and reduced. Petals usually 5, obovate, bright yellow. Fruiting head cylindrical. Achenes minutely pitted, narrowly winged, with hooked, 1–1.5 mm beak.

South and northeastern parts. Stony limestone slopes, 50–650 m. Flowering April and May.

N Africa, C and SE Europe to SW Asia. Described from Tunisia where the plants have much more finely dissected leaves.

Ranunculus paludosus Poir. [syn.: *R. chaerophyllus* sensu Boiss., non L.; *R. flabellatus* Desf.; *R. rhodensis* Boiss.] (Fig. 4)

Perennial with ellipsoid to broadly cylindrical root tubers mixed with longer fibrous roots. Stem erect, pilose, fibrous at base. Petiole of basal leaves densely pilose; blade flabellate or shallowly crenate-dentate in outer leaves and more dissected, with lanceolate lobes in the inner. Petals 5(–8), obovate, bright yellow. Fruiting head cylindrical. Achenes with straight or slightly hooked, 1–1.5 mm beak. – 2*n* = 32, 40 (Baltisberger & Widmer 2005).

Mainly west and central, scattered. Olive groves, damp meadows, uncultivated fields, 120–350 m. Flowering April. Occurring in the Mediterranean area.

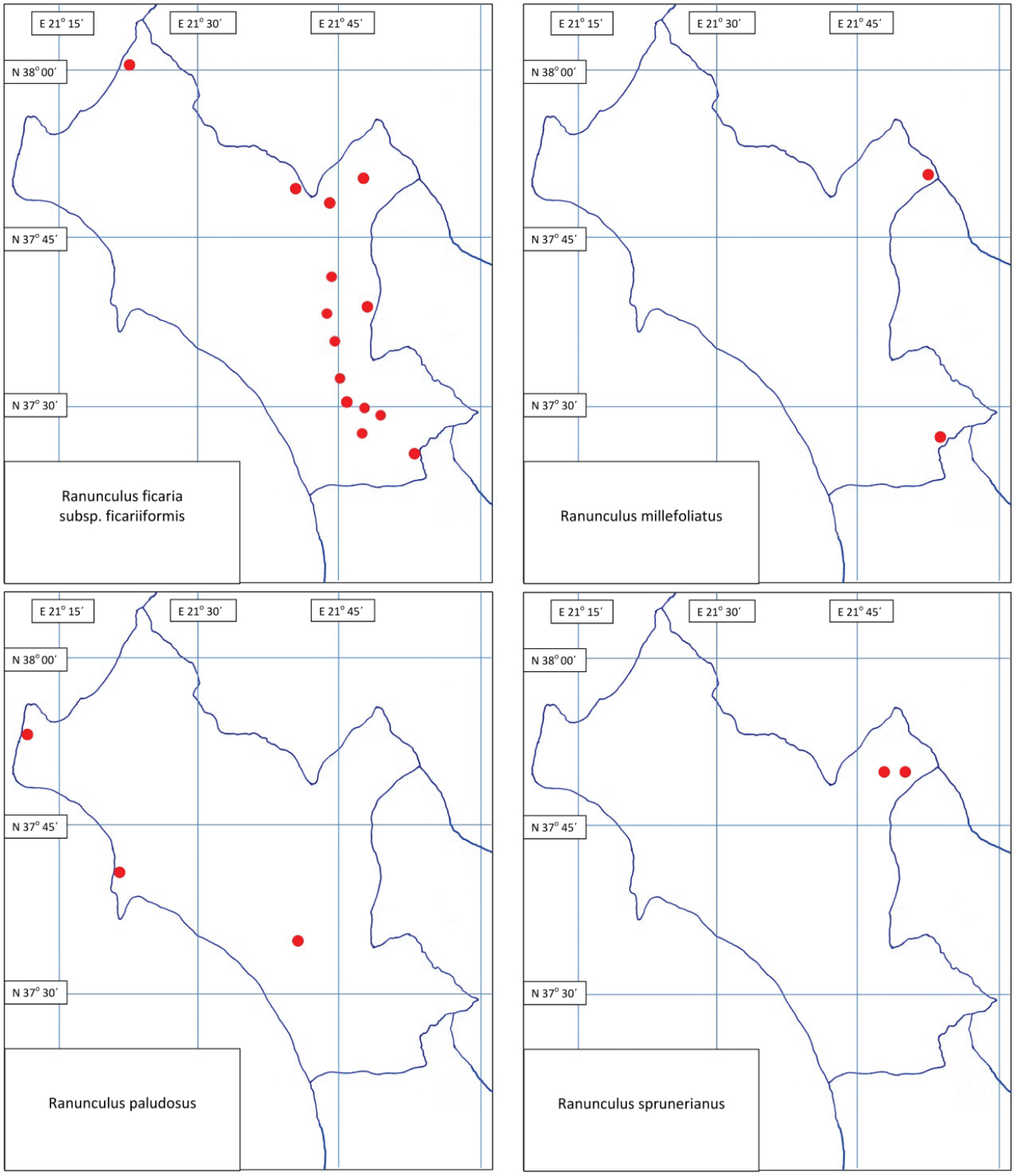

Fig. 4. Distribution of *Ranunculus* in nomos Ilias.

Ranunculus sprunerianus Boiss. (Fig. 4)

Perennial with fusiform-cylindrical tubers or thickened roots. Stem erect, divaricately branched above, pilose, rarely subglabrous. Petiole of basal leaves patent-pilose; blade orbicular in outline, deeply 3–5-partite, with short crenate lobes. Cauline leaves reduced, subsessile. Petals 5, broadly obovate, bright yellow. Fruiting head cylindrical. Achenes with tuberculate bristles, keeled or narrowly winged, with falcate beak as long as body. – 2*n* = 16 (based on *Runemark* & *Snogerup* 5423, LD).

Northeastern part of Ilias. Open limestone slopes, *Quercus coccifera* scrub, c. 1220 m. Flowering May and June. SE Europe to Turkey, W Syria and Libya.

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