Contributions to the bulb flora of Ilias (NW Peloponnese, Greece): *Liliaceae*

Kit Tan[1] & Konstantinos Giannopoulos[2]

[1] Institute of Biology, University of Copenhagen, Universitetsparken 15, DK-2100 Copenhagen Ø, Denmark, e-mail: kitt@bio.ku.dk (author for correspondence)

[2] Dabaki 15, Pyrgos, Ilias 271 00, Greece

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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 photograph, description, habitat, ecology and distribution dot map. This is the sixth contribution of the series and deals with the family *Liliaceae* comprising four genera — *Fritillaria*, *Gagea*, *Lilium* and *Tulipa*.

Key words: *Liliaceae*, *Fritillaria*, *Gagea*, *Lilium*, *Tulipa*, distribution maps, Greece, NW Peloponnese

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Introduction

Approximately a hundred species of bulb plants belonging to 14 families occur in nomos Ilias. This is the sixth contribution in the series (Giannopoulos & al. 2021a, b & Giannopoulos & Tan 2021a, b, Tan & Giannopoulos 2022) and deals with the family *Liliaceae* which comprises four genera, viz., *Fritillaria*, *Gagea*, *Lilium* and *Tulipa*. The presentation in alphabetical order follows that adopted in the first five publications of the series.

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). 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 species is endemic to Greece.

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Results and discussion

LILIACEAE

Bulbous perennials. Flowers terminal on an aerial stem. Perianth segments and stamens 6. Ovary 3-locular, superior. Style 1. Fruit capsular.

1. Anthers dorsifixed, versatile .....*Lilium*
- Anthers basifixed, introrse 2
2. Style very short, stigma ± sessile .....*Tulipa*
- Style well-developed 3
3. Flowers nodding; perianth tessellated or striped purplish-brown .....*Fritillaria*
- Flowers erect or patent; perianth not tessellated, yellow or white .....*Gagea*

Fritillaria L.

Bulbs comprising two swollen 'scales'. Flowers nodding. Nectaries conspicuous. Capsule flat-topped, erect.

1. All leaves linear to narrowly lanceolate. Perianth segments tessellated. Capsule broadly cylindrical.... ..... *messanensis*
– Upper leaves linear-lanceolate, lower broadly ovate-lanceolate. Perianth segments not tessellated or faintly tessellated within. Capsule broadly obovoid.....*graeca*

Fritillaria graeca Boiss. & Spruner subsp. ***graeca*** (Figs. 1:1 & 4)

Bulb globose to subglobose, 2–2.5 cm in diam. Stem 5–20 cm, glabrous. Leaves several, alternate, ± glaucous; upper leaves linear-lanceolate, lower broadly to ovate-lanceolate, 7–15 mm wide, often twisted. Flowers usually solitary. Perianth broadly campanulate, 18–28 mm. Perianth segments elliptical (the outer narrower), subobtuse, brownish-purple with green fascia, not tessellated or faintly tessellated within. Anthers yellow. Nectaries linear to linear-lanceolate, 5–8 mm. Style 6–10 mm, smooth, 3-fid to halfway. Capsule broadly obovoid, unwinged. – 2*n* = 24 (Samaropoulou & al. 2013, sub nom. *F. mutabilis*).

Northeastern and southern parts of Ilias. Grassy slopes, open scrub, on limestone, 900–1400 m. Flowering March to May. Endemic to Greece.

Fritillaria graeca var. *gussichiae* Degen &Dorfl. with ovate, 5–6 mm long nectaries does not occur in Ilias; it is a distinct and separate species (*F. gussichiae* (Degen & Dorfl.) Rix), found in northern Greece.

Fritillaria messanensis Raf. subsp. ***messanensis*** (Figs. 1:2 & 4)

Bulb globose to subglobose, 2–2.5 cm in diam. Stem 20–70 (–100) cm. Leaves several, linear to linear-lanceolate, 2–8 mm wide, all alternate or uppermost in a whorl of 3, glaucous to purplish-green. Flowers 1(rarely 2–3). Perianth campanulate, (25–)30–40(–45) mm. Perianth segments oblong-elliptical, subobtuse or apiculate, greenish to brownish-purple, tessellated, with or without broad green fascia. Nectaries ovate, 6–10 × 4–6 mm. Style 10–13 mm, smooth, 3-fid to 1/3 or more. Capsule broadly cylindrical, unwinged. – 2*n* = 24 (Zaharof 1989, Kamari & Phitos 2006).

Central Ilias. Damp places in open scrub and woodland, phrygana, edge of fields on sandy soil, limestone, 60–100 m. Flowering March to May. Greece and S Italy.

Fritillaria messanensis was first described from Messina in NE Sicily. Olimbos is its northernmost locality in Greece. According to Kamari & Phitos (2006), subsp. *sphaciotica* (Gand.) Kamari & Phitos is endemic to Kriti, whereas subsp. *messanensis* has a disjunct distribution in Peloponnisos, the Olimbos area and S Italy (Sicily and Calabria). *Fritillaria messanensis* subsp. *gracilis* (Ebel) Rix, with smaller (22–30 mm) and obscurely tessellated flowers with or without fascia, occurs in W Greece (Ionian Islands and W Sterea Ellas).

Gagea Salisb.

1. Perianth segments white, veined greenish or purplish-brown. Bulb tunics purplish-red ..... *graeca*
– Perianth segments yellow, with broad green fascia beneath. Bulb tunics greyish or brown 2

2. Pedicels glabrous..... *heldreichii*
– Pedicels villous or pilose..... 3
3. Basal leaves of flowering plants 1.5–2.5 mm broad, with 3–9 vascular bundles..... *villosa*
– Basal leaves of flowering plants 0.5–1.3 mm broad, with 3 vascular bundles..... 4
4. Terminal pedicel slightly longer or shorter than flower after anthesis. Non-flowering plants with a cluster of small (0.2–1 mm) bulbils at top of bulb..... *bohemica*
– Terminal pedicel usually much longer than flower after anthesis. Non-flowering plants with a single, rather large (2–3 mm) bulbil at top of bulb..... *peduncularis*

Gagea bohemica (Zauschn.) Schult. & Schult. f. [syn.: *G. saxatilis* (Mert. & W. D. J. Koch) Schult. & Schult. f.] (Figs. 2:1 & 5)

Bulb ovoid; bulb and bulbils entangled in roots; basal bulbil drop-shaped. Plant 3–10 cm tall, often forming dense clumps. Stem villous or pilose. Basal leaves 2 per bulb, subequal, filiform, usually twisted, exceeding flowers, distally withered at anthesis. Cauline leaves alternate, lanceolate, the lower ones caudate. Flowers 2–5, erect in bud. Pedicels 2–10 mm, not elongating after anthesis, villous or pilose. Perianth segments oblanceolate to spathulate, 10–16 mm, obtuse, bright yellow, with broad green fascia beneath. Capsule obcordate.

Northeastern and southern parts of Ilias. Open grassy slopes, soil pockets in limestone rock, 1040–1250 m. Flowering March. S and C Europe to Mediterranean region (N Africa and Anatolia).

Gagea graeca (L.) Irmisch. [syn.: *Lloydia graeca* (L.) Kunth] (Figs. 2:2 & 5)

Bulb solitary, entangled in roots and covered with soil particles; tunics dark purplish-red; basal bulbil appressed but not adnate to stem. Plant 5–15 cm tall, glabrous except for margins of upper leaves. Basal leaves 2–3, flat, narrowly linear, 1–2 mm wide. Cauline leaves linear. Flowers 1–5, nodding in bud. Perianth infundibular, not spreading widely; segments narrowly oblong, 12–17 mm, obtuse, white veined greenish or purplish-brown. Capsule broadly oblong. – $2n = 16$ (Kapasa & al. 2001).

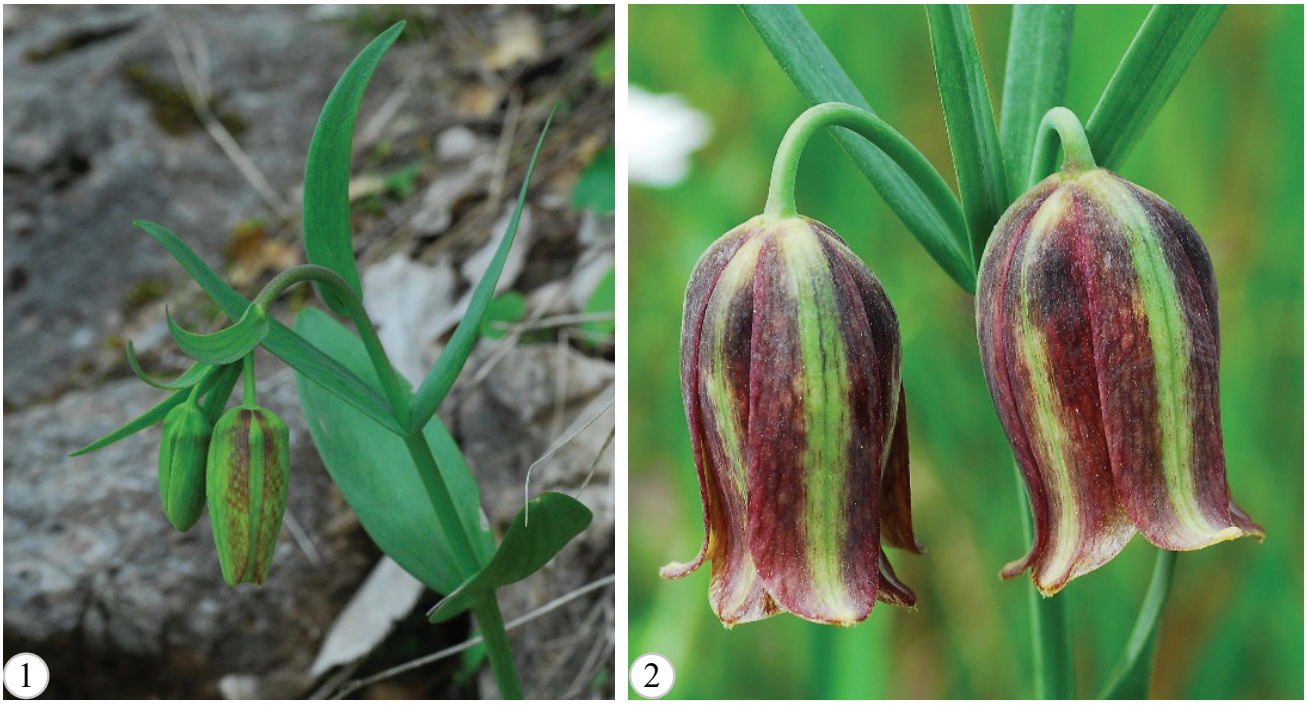

Fig. 1. *Fritillaria* species in nomos Ilias: 1, *Fritillaria graeca* subsp. *graeca* 2, F. *messanensis* subsp. *messanensis*.

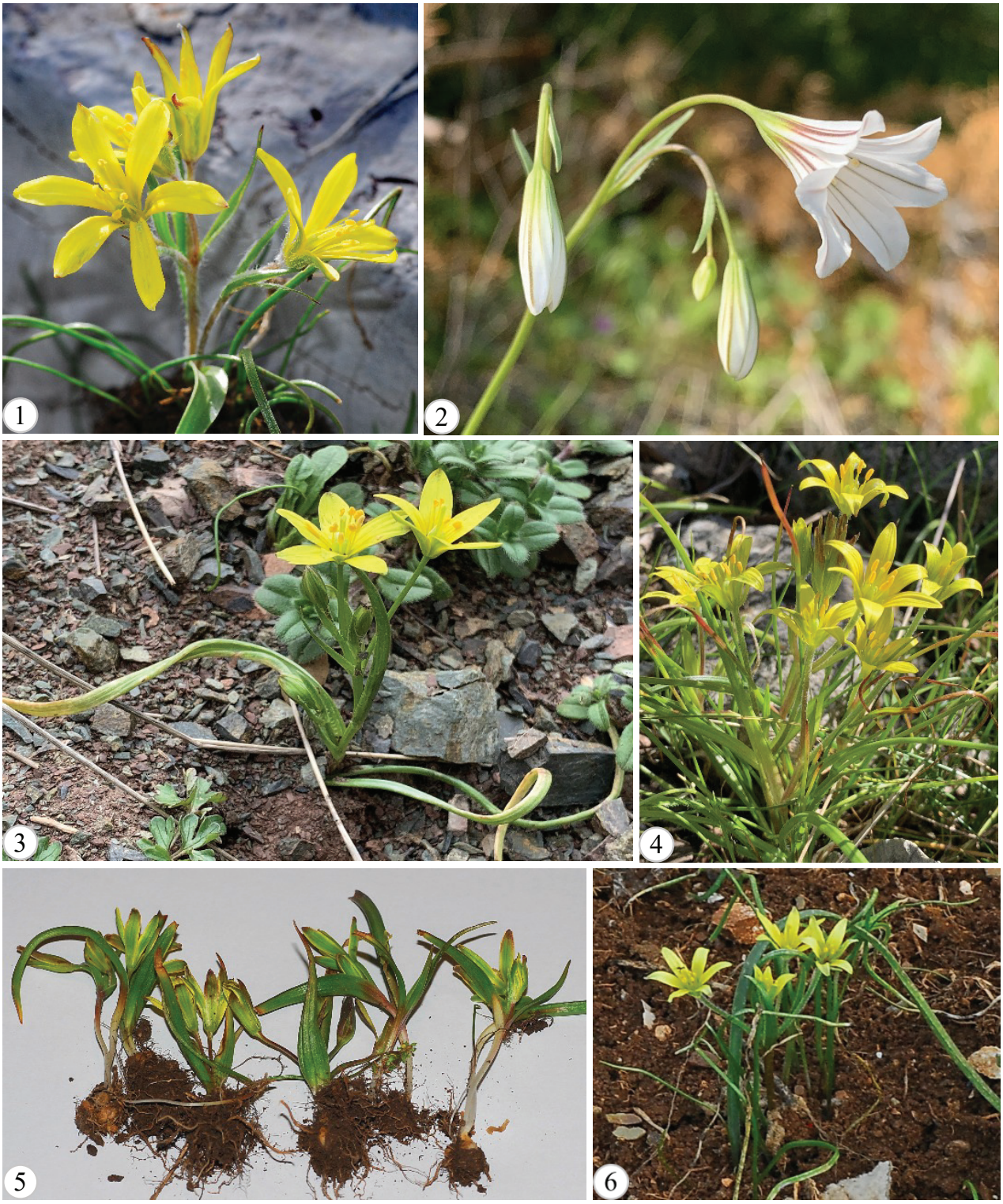

Fig. 2. *Gagea* species in nomos Ilias: 1, *Gagea bohemica* 2, *G. graeca* 3, *G. heldreichii* 4, *G. peduncularis* 5, *G.* sp. nov. 6, *G. villosa*.

Widespread in Ilias. Open woodland, *Quercus-Calicotome* macchie, phrygana, olive groves, damp places in roadside vegetation, gravelly flats, on limestone, 30–300 m. Flowering March to April. East Mediterranean area: Greece to W Turkey, Cyprus and Israel.

Traditionally referred to the genus *Lloydia* but resembling *Gagea* in many features (see Greuter 1970).

Gagea heldreichii (A. Terracc.) Stroh (Figs. 2:3 & 5)

Bulb ovoid to subglobose; tunics brown, ± glossy; basal bulbil decurrent on the peduncle, without oblique ring-like fold. Plant 7–15 cm tall. Basal leaves of flowering plants 2, flat, linear-lanceolate, 2–3 mm wide, with 3 vascular bundles up to 1.2 mm distant. Cauline leaves linear-lanceolate. Flowers several, erect to suberect in bud. Pedicels glabrous. Perianth segments lanceolate, 10–16 mm, acute to subacute, bright yellow, greenish beneath. Capsule obovoid, truncate.

Southern part of Ilias, rare. Open stony and grassy slopes, on limestone, 690 m. Flowering April. Cyprus and W Turkey.

There are few confirmed reports of *G. heldreichii* in Greece due to confusion with other species, e.g., *G. amblyopetala* Boiss. & Heldr.

Gagea peduncularis (J. Presl & C. Presl) Pascher (Figs. 2:4 & 5)

Bulbs 2, within a common, dark brown tunic. Plant 8–15 cm tall; peduncles villous. Basal leaves 2, linear-filiform, exceeding inflorescence, glabrous. Cauline leaves 1–3, narrowly lanceolate-caudate, glabrous or villous at margin. Flowers 1–3(–7). Terminal pedicel pubescent-pilose, much longer than flower after anthesis. Perianth segments elliptic-lanceolate, 11–16 mm, subobtuse, bright yellow, greenish beneath, elongating and curling at margins after anthesis. Capsule broadly obovoid.

Northeastern and southern parts of Ilias. Grassy slopes, on limestone, 690 m. Flowering February to April. S Italy to Cyprus and Anatolia.

Described from Kriti based on a collection by Sieber. *Gagea pseudopeduncularis* J.-M. Tison was recently described from Mt Parnitha and the island of Aegina.

***Gagea* sp. nov.** [syn.: *G. pusilla* auct.graec. p.p.; *G. pratensis* auct. graec. p.p.] (Figs. 2:5 & 5)

Northeastern part of Ilias. Open grassy slopes, on limestone, 1400 m. Flowering March to April.

This species is currently under study by J.M. Tison and will be described by him later.

Gagea villosa (M. Bieb.) Sweet [syn.: *G. arvensis* (Pers.) Dumort.] (Figs. 2:6 & 5)

Bulb solitary, hemispheroidal, c. 10 × 8 mm, not entangled in fibrous roots; tunics coriaceous, dark brown. Plant 8–16 cm tall. Basal leaves 2, linear, 1.5–2.5 mm wide, exceeding inflorescence, glabrous or pubescent. Cauline leaves few, broadly lanceolate, ciliate. Flowers 3–9. Pedicels villous or pilose. Perianth segments oblanceolate to linear-lanceolate, 10–14 mm, acute, yellow, greenish-yellow beneath, elongating and curling at margins after anthesis. Capsule obcordate.

Northeastern part of Ilias. Open grassy slopes, on limestone, 1380–1400 m. Flowering March to April. Europe and SW Asia.

Lilium L.

Perennials with bulb comprising overlapping scales; bulb tunics absent. Anthers dorsifixed, versatile.

1. Perianth segments white. Stamens included; anthers orange-yellow ..... ***L. candidum***
– Perianth segments scarlet; stamens exserted; anthers scarlet ..... ***L. chalcedonicum***

Lilium candidum L. (Figs. 3:1 & 4)

Stem erect, 40–100 cm, green or suffused purple. Leaves alternate, glossy green, glabrous, elliptic to oblanceolate and subobtuse below, smaller, appressed, ovate-lanceolate and acute above. Flowers patent, trumpet-shaped, 3–10 in a short raceme, fragrant. Perianth segments white, greenish within at base, broadly ovate-lanceolate, 5–8 cm, slightly recurved towards apex. Stamens included; filaments white; anthers and pollen yellow to orange-yellow. Style shorter than or equalling perianth segments; stigma 3-lobed. Capsule subglobose-truncate; seeds numerous, flat, reddish-brown, narrowly marginate.

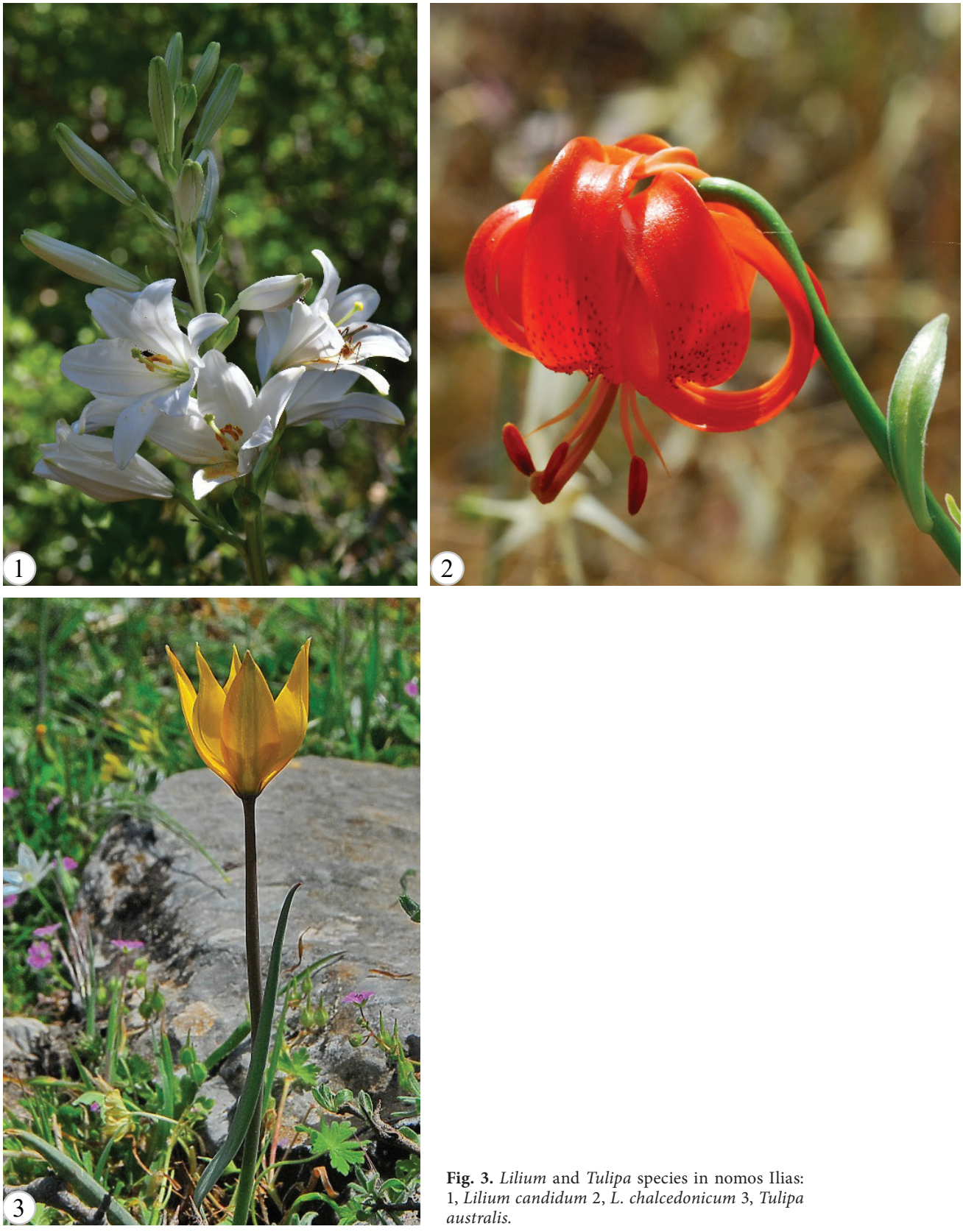

Fig. 3. *Lilium* and *Tulipa* species in nomos Ilias: 1, *Lilium candidum* 2, *L. chalcedonicum* 3, *Tulipa australis.*

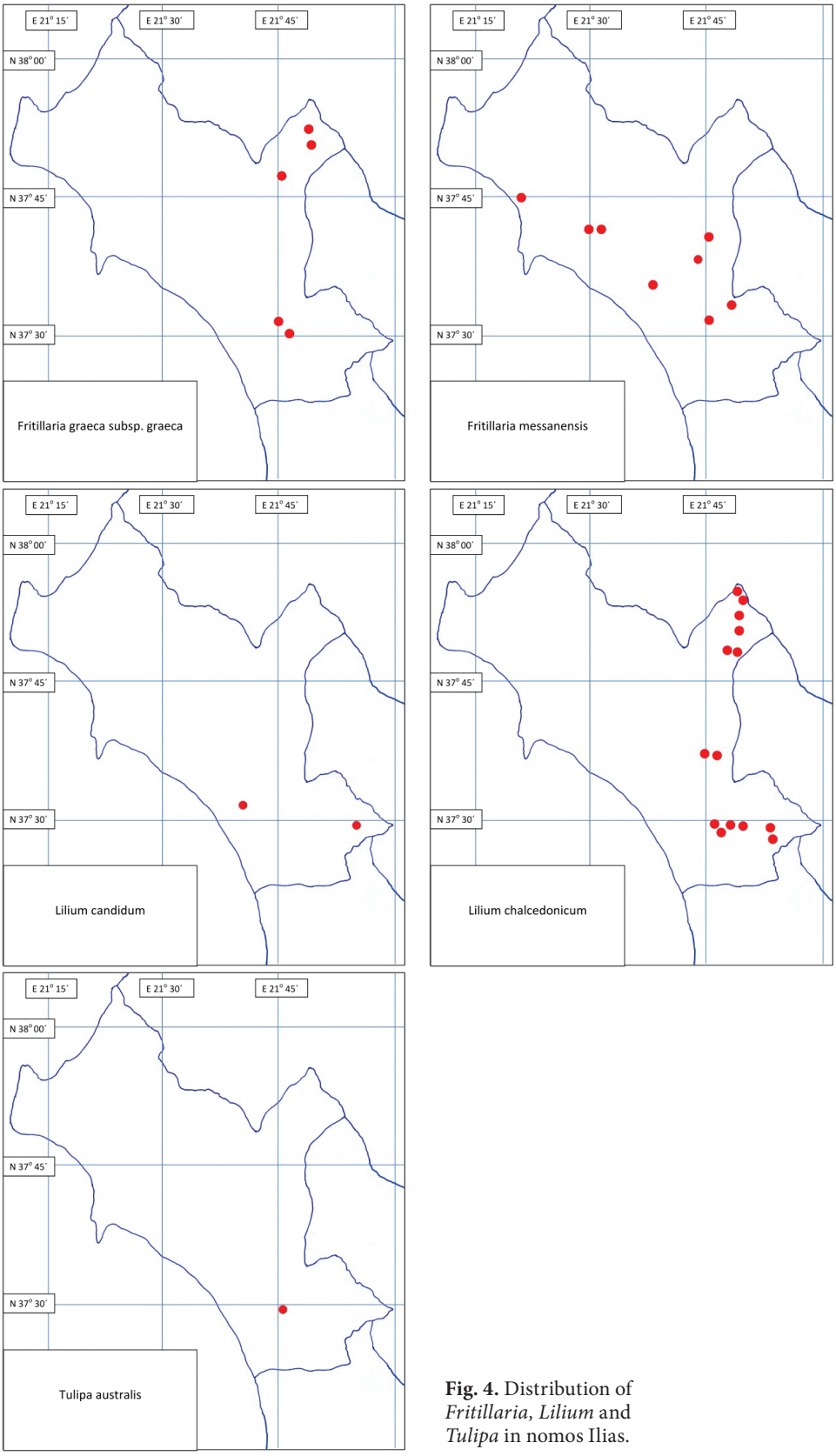

Fig. 4. Distribution of *Fritillaria*, *Lilium* and *Tulipa* in nomos Ilias.

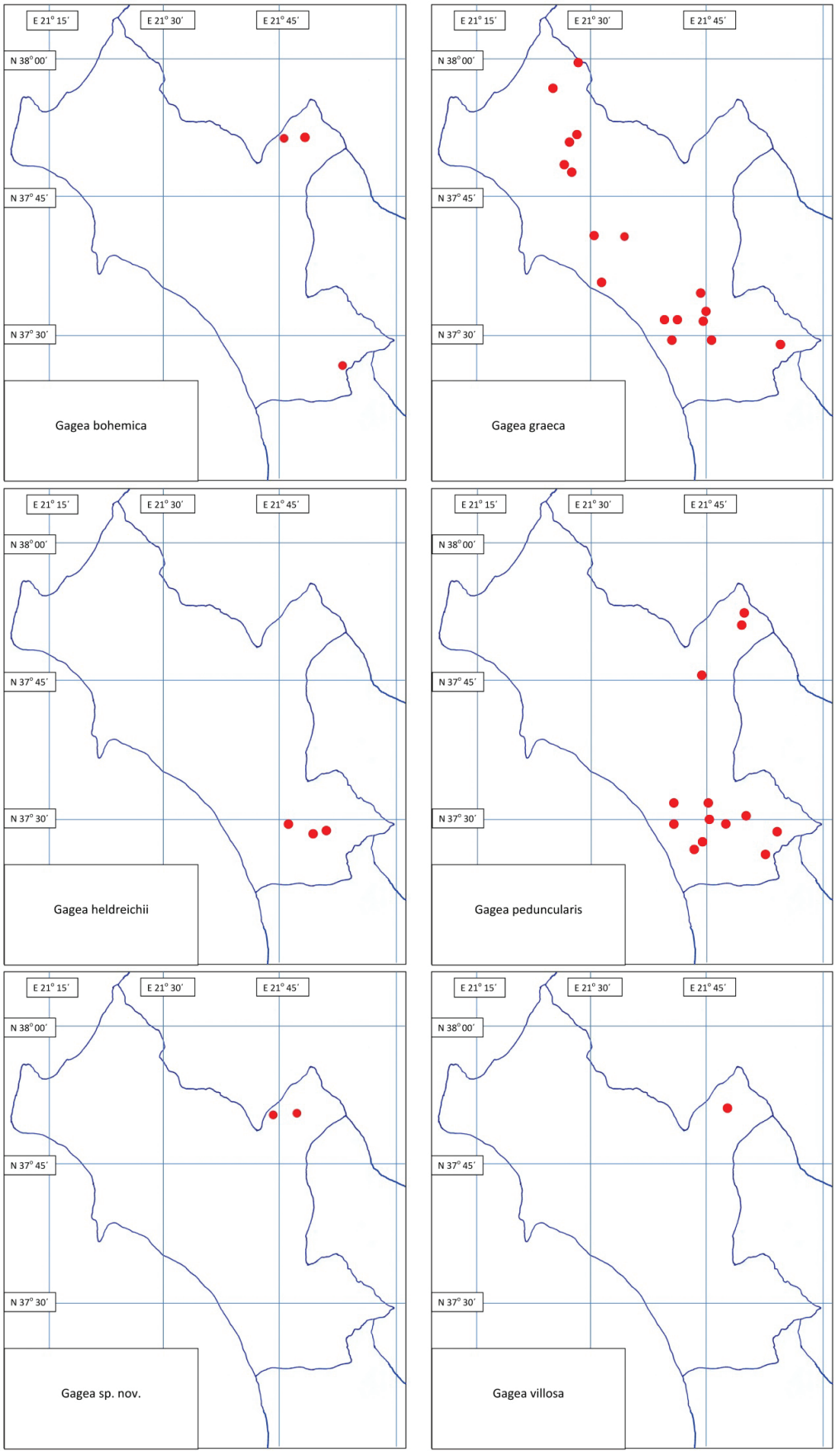

Fig. 5. Distribution of *Gagea* in nomos Ilias.

Southern part of Ilias. At roadsides as escape from cultivation, naturalized near villages, monasteries and churches, on limestone, 740–760 m. Possibly native on cliff ledges and exposed rocky slopes far from habitation. Flowering May to June. S Balkan Peninsula to SW Anatolia, Lebanon and Israel; introduced, widely cultivated as an ornamental (Madonna Lily) and naturalized elsewhere.

The size of basal leaves is variable, as well as time of emergence in autumn or winter.

Lilium chalcedonicum L. [syn.: *L. heldreichii* Freyn] (Figs. 3:2 & 4)

Stem erect, 40–120 cm. Leaves numerous, alternate, lanceolate to obovate, erecto-patent below, smaller and appressed above, white-ciliate. Flowers pendent, turban-shaped, 1–5(–7) in a subumbellate inflorescence. Perianth segments scarlet or orange-red, 5–8 cm, strongly recurved, often papillate within on lower half. Stamens exserted; filaments orange or cream; anthers and pollen scarlet. Style shorter than perianth segments; stigma 3-lobed. Capsule obovoid, apically 6-lobed; seeds numerous, flat, reddish-brown, narrowly marginate.

Northeastern, east central and southern parts of Ilias. Woodland, rocky slopes, along forest paths, on limestone, 180–1290 m. Flowering June to July. Native to S Albania and Greece (mainland and Peloponnese). Establishment as a garden ornamental in Europe is probably from material cultivated in Turkey.

Tulipa L.

A taxonomically difficult genus complicated by the existence of hybridization and polyploidy. A number of species are weeds of cultivation, associated with arable land.

Tulipa australis Link [syn.: *T. balcanica* Velen.; *T. celsiana* DC.; *T. grisebachiana* Pant.; *T. sylvestris* subsp. *australis* (Link) Pamp.] (Figs. 3:3 & 4)

Bulb ovoid, 2–2.5 × 1–1.5 cm, sometimes stoloniferous; tunics dark to reddish-brown, prolonged into a coriaceous neck. Stem 8–20 cm, slender. Leaves 2–3(–4), near ground level but cauline, spreading to ± recurved, linear to linear-oblong, 8–15 mm wide, dull green to slightly glaucous, often purplish-red at margin. Flowers 1(–2), usually nodding in bud, later erect, opening widely in sunshine. Perianth segments narrowly ovate-elliptical, 20–35 mm, acute to acuminate, yellow to reddish-orange without dark basal blotch within, tinged green or purplish beneath. Filaments yellow to greenish-yellow; anthers and pollen yellow. Style short; stigma 3-lobed. Capsule obovoid, shortly apiculate; seeds numerous, flat, papery. – $2n$ = 36 (Athanasiou 1988).

Southern part of Ilias. Stony and gravelly ground at summit area, limestone, 1200 m, Flowering April to May. Mediterranean region, C and E Europe extending to SW and C Asia.

The perianth is more reddish-orange in plants from Mt Minthi than the yellow as frequently observed elsewhere in Greece, somewhat resembling the colour of *T. orphanidea* Boiss. & Heldr., however, without a dark brown basal blotch.

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