

Research article**An addition to flora of Turkey: *Eranthis kurdica* (Ranunculaceae), with contributions to its taxonomy****Mehmet FIRAT**^{ORCID}Van Yüziüncü Yıl University, Faculty of Education, Department of Biology, TR-65080 Van, Turkey
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Abstract: *Eranthis kurdica* Rukšāns (Ranunculaceae), a new record for the flora of Turkey, is described. *Eranthis kurdica* is known from Iran, new added to the Flora of Turkey. The specimens were collected in Hakkari and Tunceli province, east Anatolia, Turkey. Detailed morphological description of the species, vernacular name, photographs in its natural distribution area and the updated map of the distribution area are presented in the study.

Keywords: *Eranthis kurdica*, Hakkari, new record, Ranunculaceae, Tunceli, Turkey

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Introduction

The genus *Eranthis* Salisb. (Ranunculaceae) consists of eight to ten species distributed in southern Europe and temperate Asia (Lee et al., 2012; Park et al., 2019). On the basis of morphology, the genus has been divided into two sections: *E. sect. Eranthis* and *E. sect. Shibateranthis* (Nakai) Tamura (Tamura, 1987). Furthermore, they are geographically separated, with section *Eranthis* occurring in Europe (*E. hyemalis* (L.) Salisb.) and SW & W Asia (*E. cilicica* Schott & Kotschy, *E. longistipitata* Regel) and section *Shibateranthis* distributed in temperate N & E Asia (*E. albiflora* Franch., *E. byunsanensis* B.Y.Sun, *E. lobulata* W.T.Wang, *E. pinnatifida* Maxim., *E. pungdoensis* B.U.Oh, *E. sibirica* DC. and *E. stellata* Maxim. (Park et al., 2019). Four additional species with yellow sepals, *E. bulgarica* (Stef.) Stef. (Stefanoff, 1963), *E. iranica* Rukšāns & Zetterl. (Rukšāns and Zetterlund, 2018), *E. tanhoensis* Erst (Erst et al., 2020) and *E. kurdica* Rukšāns (Rukšāns, 2022) have been described from Bulgaria, Iran and Russia.

In the flora of Turkey, the genus *Eranthis* is known only with *E. hyemalis* (L.) Salisb. and *E. cilicica* Schott & Kotschy is synonym for this species. In a recent study by

Rukšāns, *E. hyemalis* species did not spread in Turkey and *E. cilicica* the spreading in Turkey (Rukšāns, 2022).

Materials and Methods

During During floristic surveys in Hakkari/Şemdinli (Figure 1) in April 2011, 2012, 2016 and 2023, April-May 2022, and Tunceli/Ovacık May 2016 specimens were collected of one unidentified species from genus *Eranthis*, therefore decided to analyze the morphological characters of the species. Then collected some other specimens and examined using a wide range of literature for identification (e.g. Davis et al., 1965, Rukšāns and Zetterlund, 2018, Rukšāns, 2022). As a result of this effort and with the light of new characters observed, the specimens belong to *Eranthis kurdica* Rukšāns which is a new record for the Flora of Turkey.

Images of the living material were taken with a Sony DSCR1 digital camera. Geographical positions were identified using a Magellan eXplorist 710 GPS, and insert in the Fig. 1. A total of 10 herbarium specimens of the new species were collected from three adjacent localities and deposited in the herbaria VHLV (acronyms according to Thiers, 2022), and in the personal herbarium of the author (Herb. Firat).

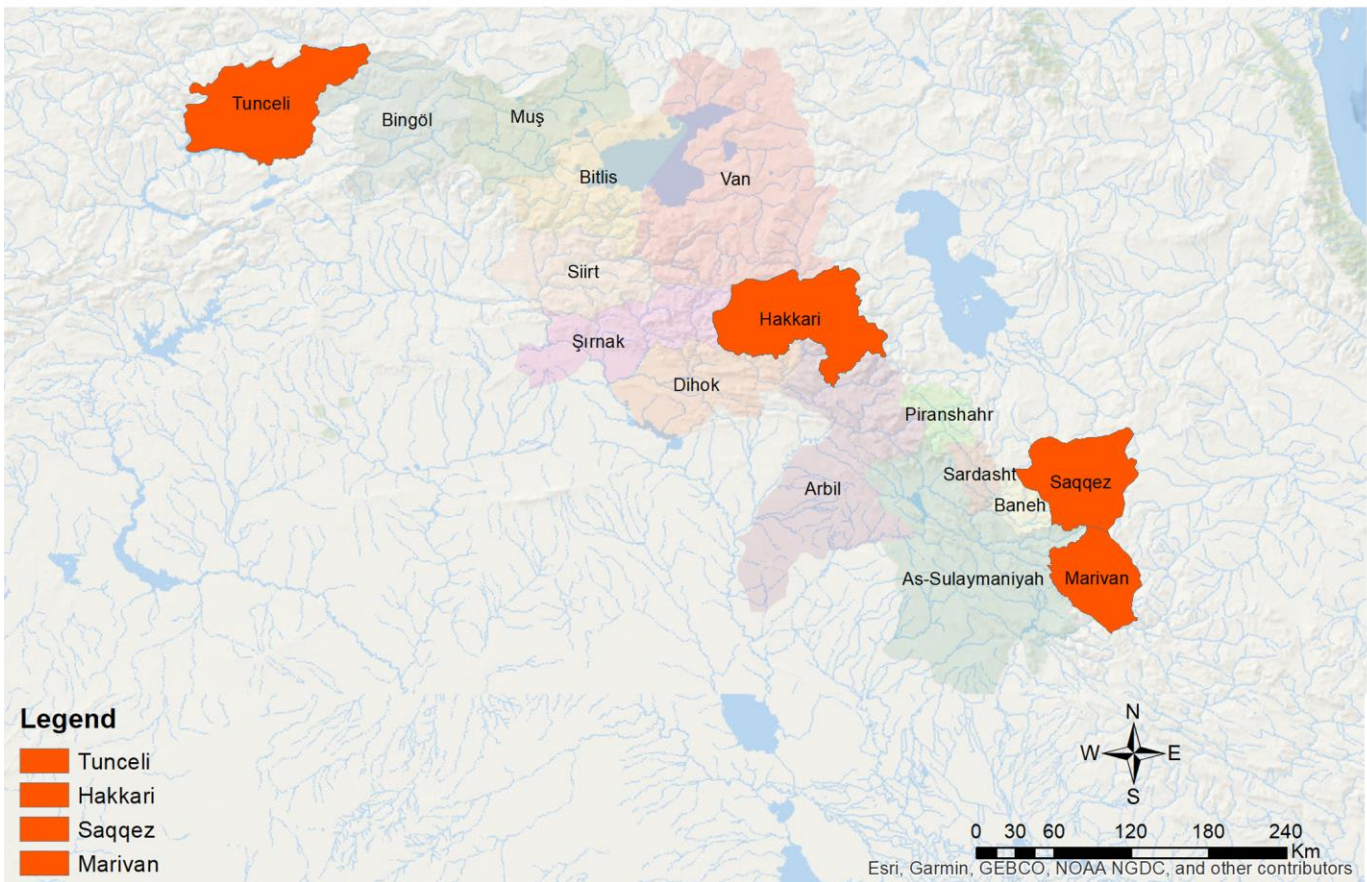
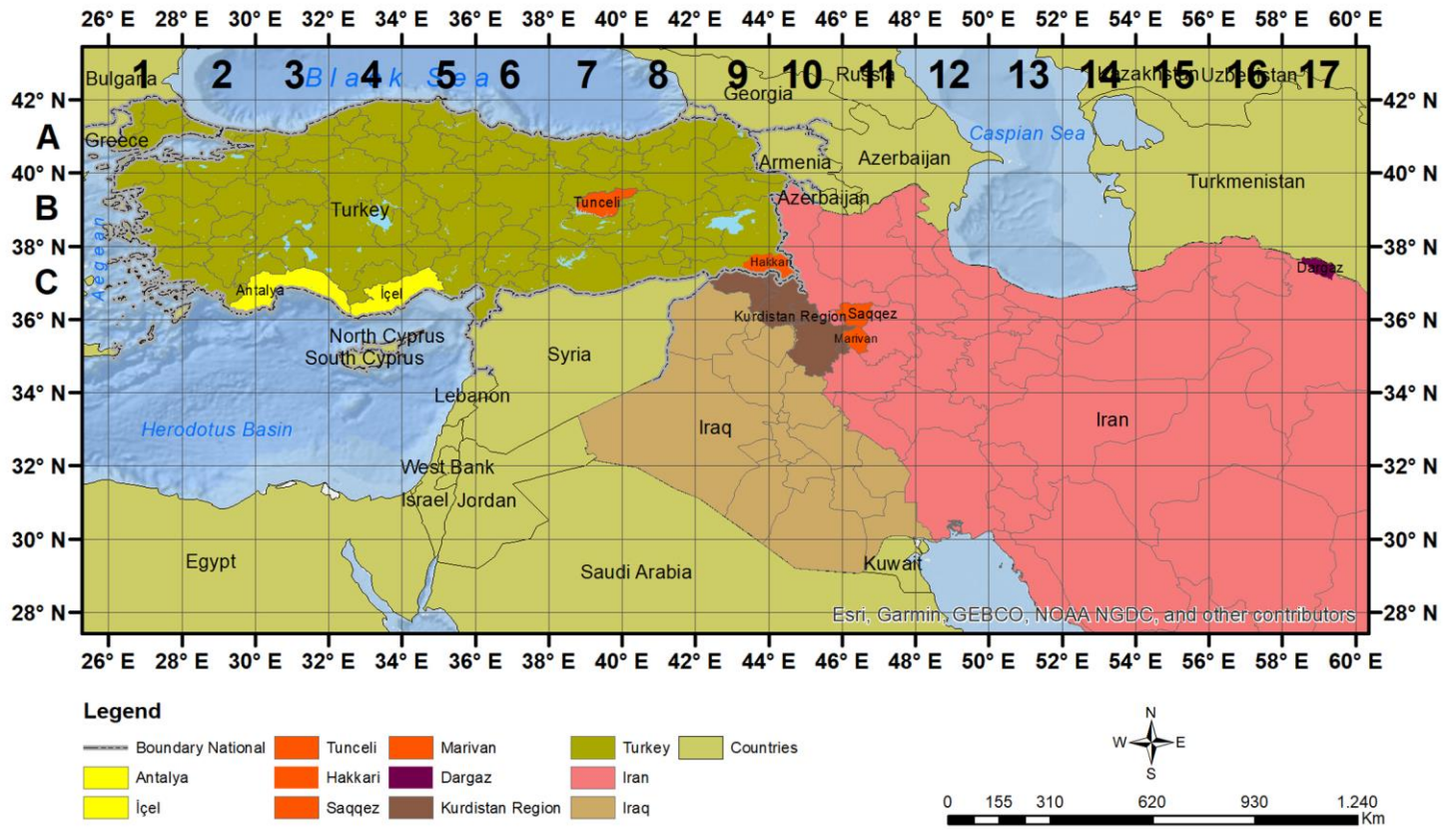


Figure 1. Distribution map of *Eranthis kurdica* (orange) in Turkey and Iran, *E. cilicica* (yellow) in Turkey and *E. iranica* (purple) in Iran

Results

Eranthis kurdica Rukšāns (Figure 2–9)

Type: Iran, Kurdistan, along the road from Saqqez to Marivan, on gentle slopes of mountain pass at altitude

2130 m; 35°43'N; 46°23'E. Leg. J. Rukšāns 12 april 2022 (22IRS-089). Holotype: RIG! (University of Latvia).



Figure 2. *Eranthis kurdica*: **A**- habitat, **B**. in habitat



Figure 3. Habit of *Eranthis kurdica* (early stage of flower)



Figure 4. Habit of *Eranthis kurdica* (late stage of flower)

Description: *Herb* perennial, stems erect, up to 21 cm long at flowering and up to 27 cm long at fruiting. *Tubers* elongated, branching few or many small, round daughter tubers more or less, 1.4–3.5 cm diam., producing thin fibrous roots, 1–9 cm long. *Basal leaf* usually absent some times one or two, 2–3.5 cm, palmately 3–5-parted, deeply dissected almost to the base, each lobe in turn dissected into 2–3(-4) secondary lobes, at the start of vegetation light green or brownish green, very narrowly edged brown, later becoming dark green; the leafless stem 5–12 cm long, shaded brownish over green with a single very shortly pedicelled flower at the top. *Involucral bracts (cauline leaf)* 3–5.5 cm in flowers, 4.5–9 cm in fruit, divided (more or less) similarly to the basal leaves and of the same colour. *Flowers* bisexual, actinomorphic, solitary, erect, 2.5–4 cm diam. *Sepals* (outer perianth segments) 6, petaloid, deciduous in fruit, elliptic to orbicular, 1.1–2.6 × 0.5–1.3 cm, pure yellow or yellow (when older or dry becoming sulfur yellow), flat, narrowly obovate or elliptic, 1.4–2.5 × 0.8–0.9 cm. *Petals* tubular (inner perianth segments) 6, 5–6 × 0.1–1.5 mm (limb 3–4 × 1–1.5 mm, claw 2–3 × 0.1–0.3 mm), yellow. *Stamens* numerous, 0.5–1.4 cm, filaments filiform, yellow; anthers yellow. *Fruit* a group of follicles 3–15. *Follicles* 10–19 × 4–6 mm (including beak), stalks 3–7 mm, beak 2–4 mm, filiform, divergent towards the end of fruiting, curved. *Seeds* black (mature), 2–2.4 × 1–1.5 mm, prolate to spheroidal, rugose.

Habitat: Wet area of on gentle slopes of mountain pass, 1300–2300 m.

Phenology: Flowering from March to May and fruiting from April to May.

Distribution in Turkey: Hakkari/Şemdinli and Tunceli/Ovacık province

General distribution: Iran and new to Turkey

Vernacular name: *Eranthis kurdica* is called is Kurdish as “Bûka biharê, Buka baranê” by the local people of the Hakkari/Şemdinli province.

New locality: *Eranthis kurdica*: TURKEY. C10 Hakkâri: Şemdinli district, Geliya Helena, Zogros Mountain, Neraly border of Iran, areas where the snow melts of mountain pass, 1472 m, 37°12'58"N 44°16'55"E, 11 April 2011, M. Fırat 27054 (VHLV and Herb. M. Fırat) in flower; from Cîyayê Govende (Güney Dağı) to Oremar (Dağlıca), wet area of on gentle slopes of mountain pass, 1472 m, 37°12'58"N 44°16'55"E, 11 April 2012, M. Fırat 27793 (VHLV and Herb. M. Fırat) in flower; Cîyayê Govende wet area, 1244 m, 37°03'24"N 44°14'09"E, 19 April 2016, M. Fırat 32633 (VHLV and Herb. M. Fırat) in flower; Derya village, wet area in grape garden, 1522 m, 37°21'51"N 44°31'31"E, 22 April 2016, M. Fırat 32669 (VHLV and Herb. M. Fırat) in flower; Derya village, wet area in grape garden, 1522 m, 37°21'51"N 44°31'31"E, 19 May 2022, M. Fırat 32680 (VHLV and Herb. M. Fırat) in fruit; Derya village, wet area in grape garden, 1754 m, 37°22'15"N 44°33'57"E, 09 April 2023, M. Fırat 36081 (VHLV and Herb. M. Fırat) in flower; B7 Tunceli: Ovacık district, wet area of on gentle slopes of mountain pass, 1220 m, 39°20'50"N 39°15'06"E, 11 May 2016, M. Fırat 32674 (VHLV and Herb. M. Fırat) in flower

Comments: *Eranthis kurdica* belongs to section *Eranthis*. With the new record, the number of Turkish *Eranthis* species amounts to 2, both of them belonging to section *Eranthis*. Species of the genus *Eranthis* distributed in Turkey are included in the *Eranthis* section. The two *Eranthis* species distributed in Turkey are *Eranthis cilicica* (as *E. hyemalis*) and *Eranthis kurdica*.

Eranthis kurdica species has been observed to come from the Kurdistan province of Iran to the Tunceli province of Eastern Anatolia in the mountainous region of Turkey. This situation showed us the eastern Taurus Mountains and the Mountainous Zagros region of Turkey, starting from Iran. Considering the distribution area, it is estimated that this species will also spread in the mountainous Kurdistan region of Iraq. Although it is recorded in Hakkari and Tunceli in Turkey, it is estimated that it spreads in these intermediate regions in future studies.

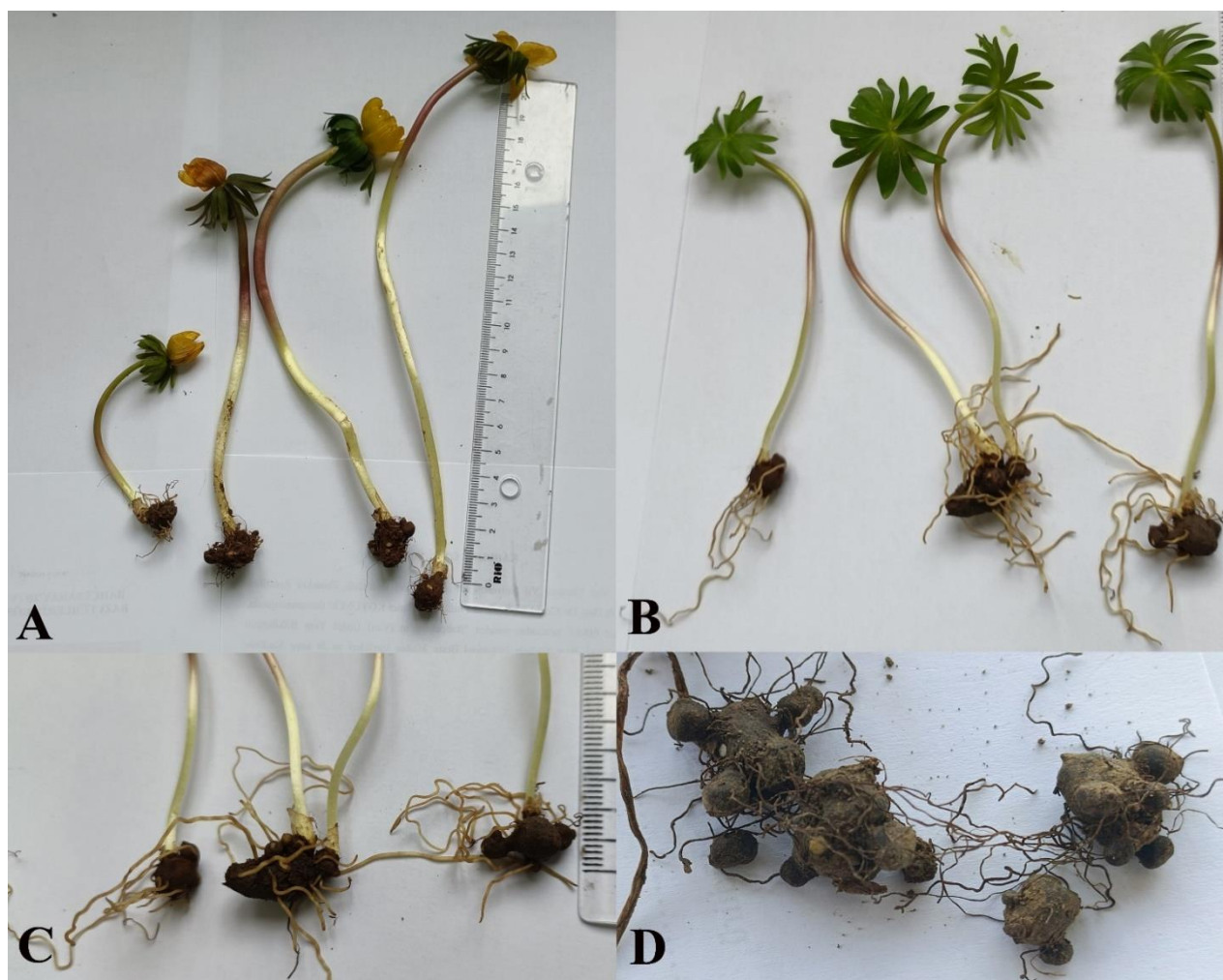


Figure 5. *Eranthis kurdica*: **A.** general habit, **B.** basal leaves, **C-D.** tubers

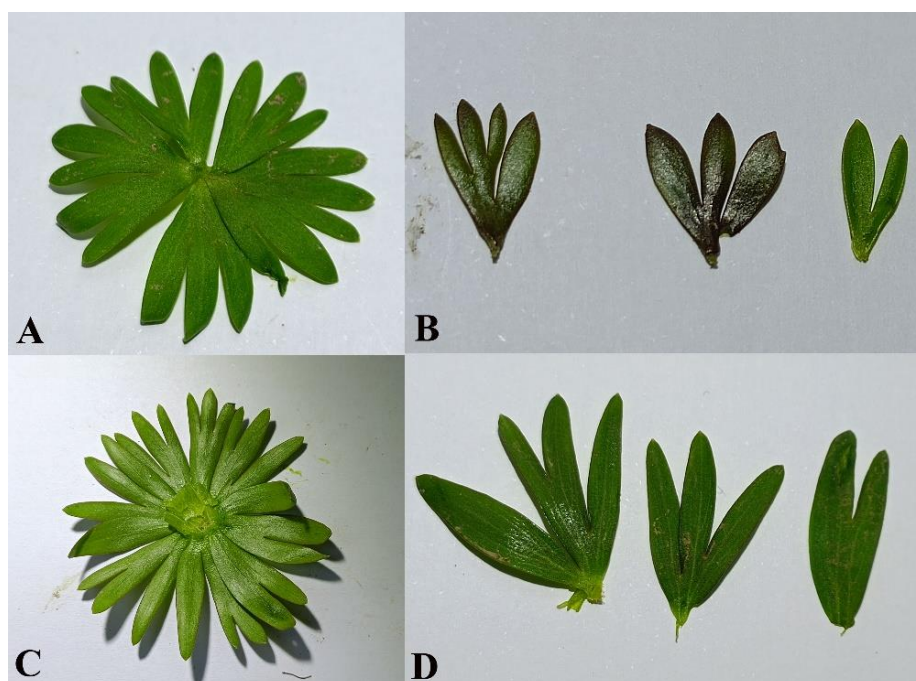


Figure 6. Habit of *Eranthis kurdica*: **A.** basal leaves (5 parts), **B.** parts of basal leaves (4, 3, 2 lobes), **C.** involucral bracts (cauline leaf), **D.** parts of involucral bracts (4, 3, 2 lobes)



Figure 7. Habit of *Eranthis kurdica*: **A.** flower (**a1.** sepals, **a2.** petals, **a3.** anthers, **a4.** stamens, **a5.** follicles), **B.** older flower, **a1.** sepals (outer perianth segments), **a2.** petals (outer perianth segments)



Figure 8. Habit of *Eranthis kurdica*: **A.** follicles (early fruit stage), **B.** follicles (mature fruit), **C.** fruit, **D.** follicles (ripe fruit), **E.** follicles (opening ripe fruit), **F.** habit (in fruit and dry stage), **G.** fruit stages tubers

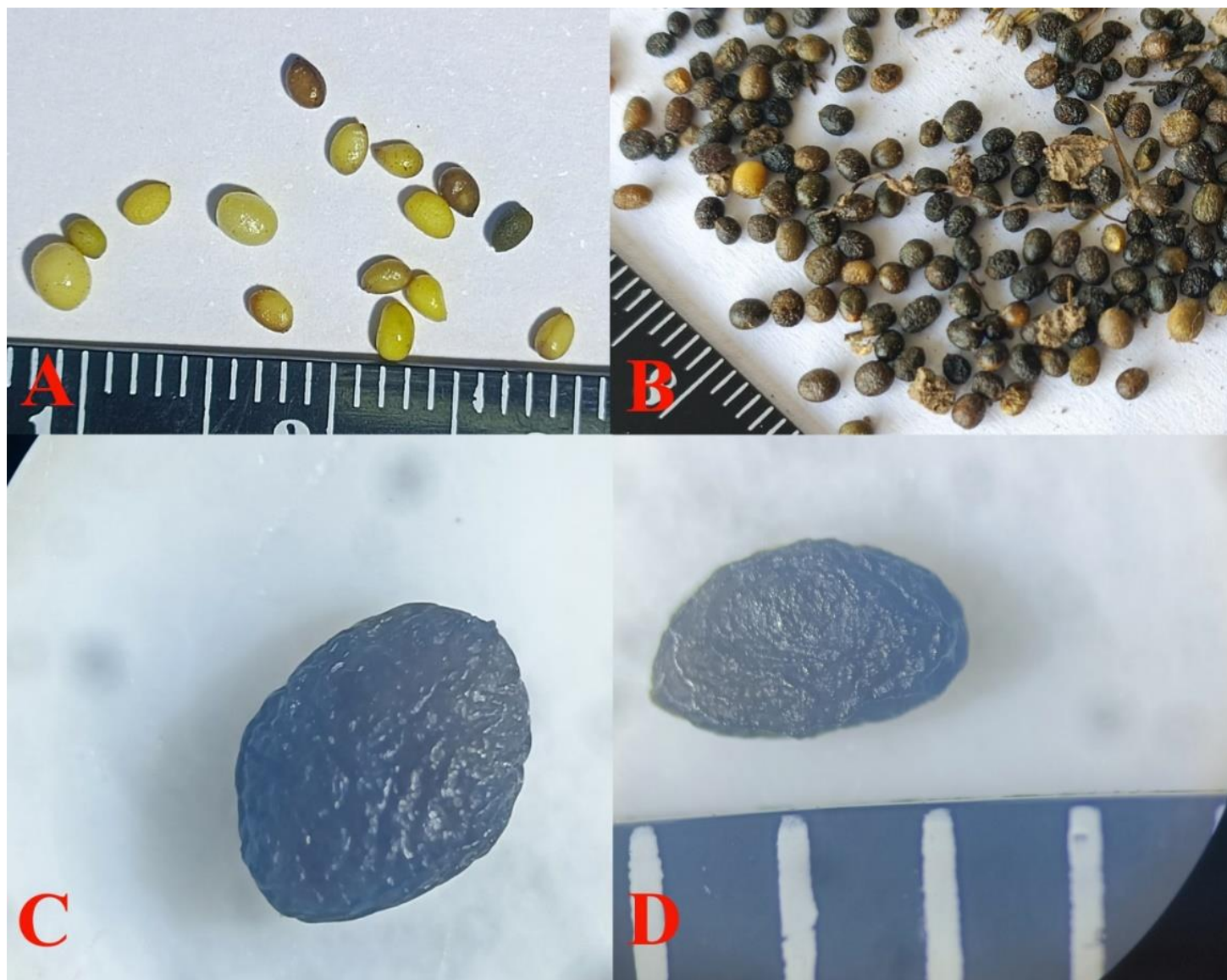


Figure 9. Seeds of *Eranthis kurdica*: **A.** early stage of seeds, **B.** mature stage of seeds, **C-D.** seeds

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Ethical Approval

The author does not declare ethical approval.

Conflicts of Interest

The author declares that he has no conflict of interest.

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