

## ***Anema decipiens*, *Lecanora stenotropa* and *Rinodina polysporoides* – three new lichen records for Turkey**

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**Key words:** lichenized Ascomycetes, Batman, crustose, new records, Siirt. – Mycota of Turkey.

**Zusammenfassung:** Die drei Flechtenarten *Anema decipiens*, *Lecanora stenotropa* und *Rinodina polysporoides*, die in den Provinzen Batman und Siirt gesammelt wurden, werden als neu für die Türkei gemeldet. *Lecanora stenotropa* und *Rinodina polysporoides* sind auch neu für Asien. Es werden kurze Beschreibungen, einschließlich der geografischen Verbreitung, und Vergleiche mit ähnlichen Taxa gegeben.

**Abstract:** The three lichen species *Anema decipiens*, *Lecanora stenotropa* and *Rinodina polysporoides*, collected from Batman and Siirt provinces, are reported as new to Turkey. *Lecanora stenotropa* and *Rinodina polysporoides* are also new to Asia. Short descriptions, including geographic distribution, and comparisons with similar taxa are provided.

Approximately 1750 lichen taxa are known from Turkey, and it is assumed that this number will raise to nearly 3000 taxa in future (JOHN & TÜRK 2017, JOHN & al. 2020). In recent years the knowledge of the lichen flora of Turkey has significantly increased and substantial new lichen records and new lichen species were added to the Turkish lichen biodiversity (JOHN & al. 2020), but there are still unexplored regions, especially in east and south-east Anatolia (e.g., the provinces of Batman, Hakkari, Siirt, Şırnak and Mardin). During the project "Lichen flora of Batman and Siirt Provinces", some interesting lichen taxa were recorded. Previously, only 14 lichen species were known from Batman province and 36 from Siirt (JOHN & TÜRK 2017, JOHN & al. 2020). One *Anema* species, 56 *Rinodina* spp. and 92 *Lecanora* spp. were reported from Turkey up to now (YAZICI & ASLAN 2021, JOHN & TÜRK 2017, JOHN & al. 2020).

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Batman province is covered by steppes and only steppe plants can be found. There are *Quercus* trees, albeit few, in mountainous regions. Slopes of the valleys are covered by *Fraxinus*, *Salix* and grasslands include also bushes and weeds. Additionally, forest understory flora is very poor in these areas while all nearby mountains have a lot of rock habitats (BAYTOP & DENIZCI 1963). Batman province is characterised by a Mediterranean climate with hot and dry summers and relatively warm and rainy winters. Precipitation is in the form of snow in the highlands and rain in the plains. The annual average temperature is 16 °C and the annual mean precipitation is 552 mm (AKMAN 1999).

Continental climate prevails in the province of Siirt. Summers are hot and dry, winters cold and rainy. The north and east of the province are colder in winter and cooler in summer. The annual precipitation average is 757 mm. The annual average humidity is 51 %, and the highest humidity is 70 % in January and December (AKMAN 1999). Siirt province is located on the Eastern Anatolian leafy forest belt and the SE Anatolian steppe belt. There are significantly reduced *Quercus* forests in the parts of the Taurus Mountains to the east of Kahramanmaraş and in the plateaus and mountains intruding towards the north. These forests turn into a cover of shrubs and dwarf trees near the steppe belt in the south. In some areas, *Juniperus*, *Fraxinus*, and *Platanus* trees are also found in *Quercus* communities. The southwestern and western parts of the province are included in the steppe zone (BAYTOP & DENIZCI 1963).

Here, we report three lichen species new for Turkey including two new for Asia.

## Materials and methods

KENAN YAZICI collected the lichen samples on 2. and 12. June 2021 during a lichenological survey of the Batman and Siirt regions.

Microscopical examination of hand-made sections was performed in water (incl. all measurements). Air dried samples were studied with a Nikon Zeiss Stemi 2000-c stereomicroscope and a Zeiss Axio Imager A2 light microscope. Macro- and microphotographs were taken with the digital camera Zeiss AxioCam ERc5s. The lichens were identified by consulting relevant keys (BREUSS 2020, BOISSIERE & MONTAVONT 2006, GIRALT & MAYRHOFER 1994, NASH & al. 2004). The specimens are stored in the lichen collection of the Biology Department, Faculty of Science, Karadeniz Technical University, Trabzon, Turkey (KTUB).

## Description of the Turkish specimens

*Anema decipiens* (A. MASSAL.) FORSELL, Nova Acta R. Soc. Scient. Upsal., Ser. 3, 13(no. 6): 92: (1885) – Fig. 1

**Thallus:** crustose, with paraplectenchymatic tissue formed by moniliform hyphae, saxicolous, in a rosette-shaped, to 4–4.5 mm in diam., sometimes with a light gray-blue pruina especially more intense towards the ends of the lobes, olive-black to black, lobulated; lobes minute, numerous, bulbous, crowded, adherent to each other, up to 0.2 mm, wide.

**Isidia:** thin, black.

**Apothecia:** brown to black, sometimes immersed, 0.2–0.8 mm in diam.; disk dark red-brown; excipulum not developed; symbiotic alga *Gloeocapsa*.

**Asci:** obclavate or cylindrical, 8(–16)-spored.

**Ascospores:** ellipsoidal, 10–12.5 × 5–7.5 µm.

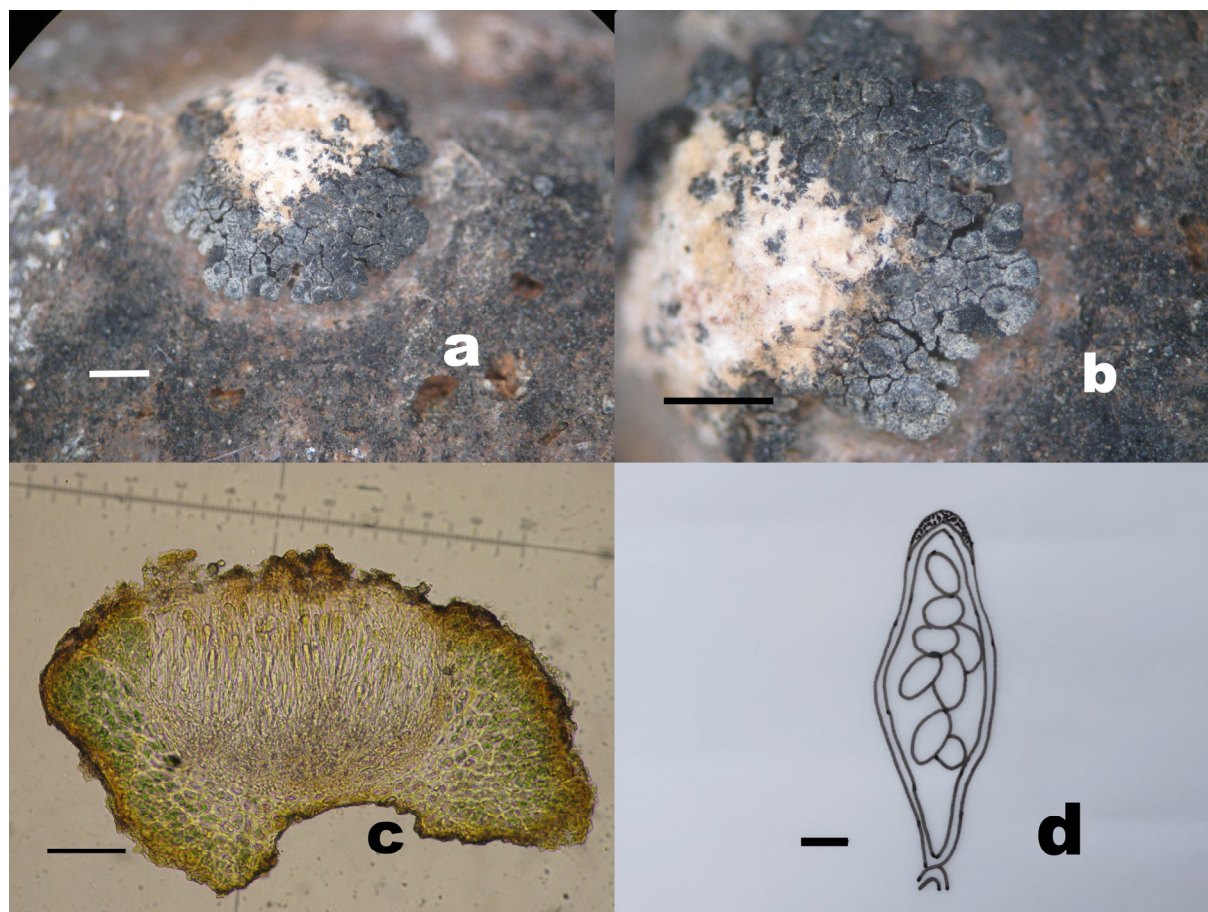


Fig. 1. *Anema decipiens*. a, b. Habitus, rosette shaped squamule and pruinose thallus with apothecia, c. Vertical section of mature apothecium with ascus, undeveloped excipulum, thalline margin and symbiont *Gloeocapsa*, d. Ascus with ascospores. Scales a, b 1 mm, c 100  $\mu$ m, d 10  $\mu$ m.

Spot tests: negative.

Specimen examined: Turkey: Siirt, Baykan, Çukurca village, roadside, 38° 13' 05.50" N, 41° 38' 37.01" E, 993 m s.m., on calcareous rock, 12. June 2021, leg. K. YAZICI, det. K. YAZICI and A. ASLAN, KTUB-2478.

**Notes:** Detailed descriptions are provided by BOISSIERE & MONTAVONT (2006).

*Anema decipiens* occurs mainly on periodically moistened calcareous rocks such as limestones or dolomites, more rarely on eruptive rocks rich in calcium in a sunny situation. It is a subhydrophilic, aeroxerophilic and heliophilic species (BOISSIERE & MONTAVONT 2006).

*Anema decipiens* is similar to *Phylliscum microphyllum*, but differs in having an  $\pm$ olive-green to black thallus (but reddish brown when moist) and moniliform hyphae.

Our specimen was associated with *Thalloidima candidum*.

The species is known from Europe (Austria, Czech Republic, England, France, Germany, Greece, Norway, Romania, Russia, Switzerland), Asia (India, Japan) and Northern Africa (ABBOTT 2009, BHAT & al. 2016, BOISSIERE & MONTAVONT 2006, SEAWARD & al. 2008, URBANAVICHUS & URBANAVICHENE 2011). It is new to Turkey.



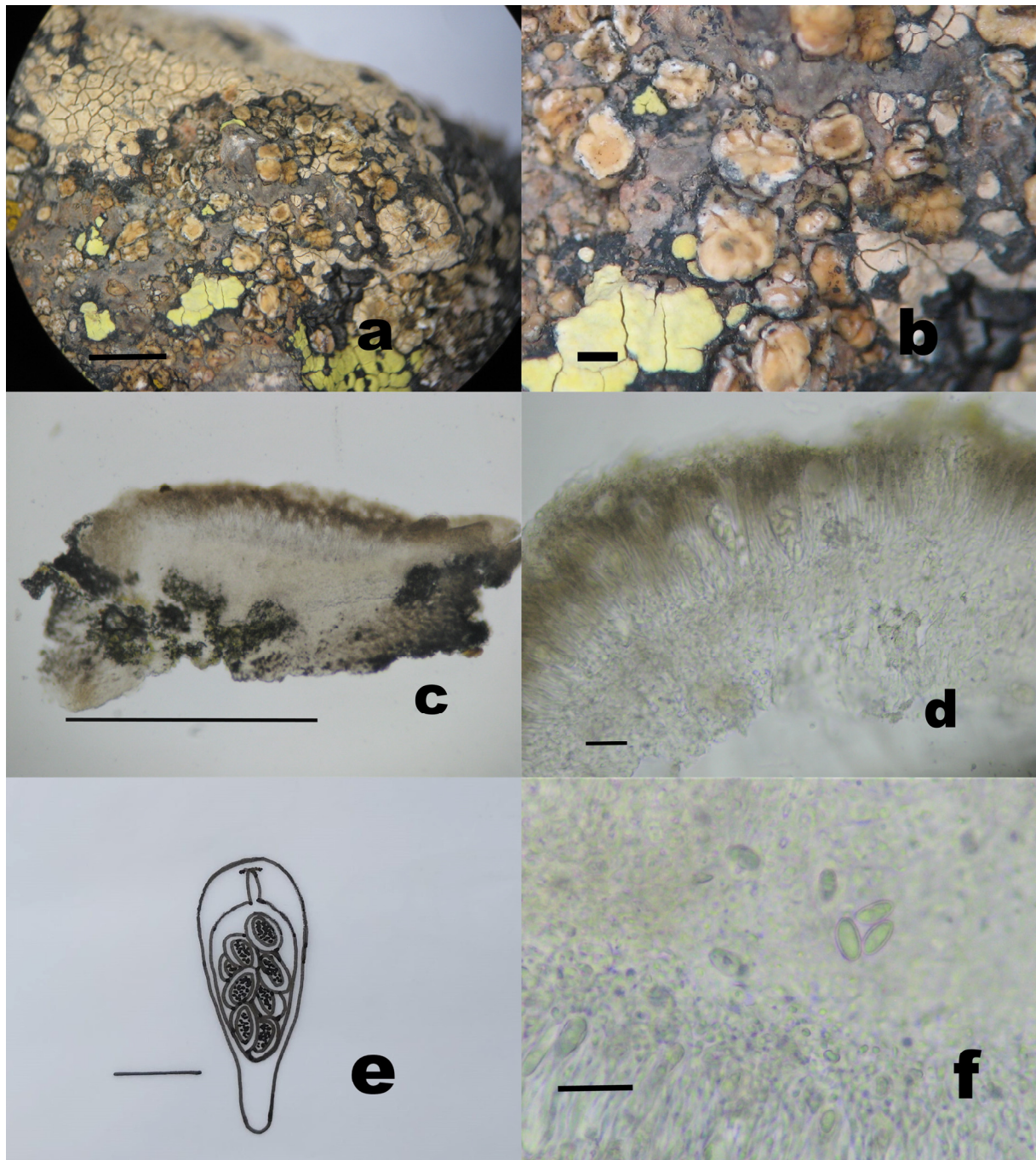


Fig. 2. *Lecanora stenotropa* a, b. Scattered thallus with apothecia, c. Vertical section of mature apothecium with hymenium, brown epihymenium and hypothecium, d. Vertical section of apothecium with epihymenium, ascus and ascospores, e. Ascus and ascospores, f. Ascospores. Scale bars: a 5 mm, b, c 1 mm, d, e, f 20  $\mu$ m.

*Lecanora stenotropa* NYL., Flora Regensburg 55: 251 (1872) – Fig. 2

**Thallus:** crustose, immersed or scattered granules or an areolate crust, areoles irregular contiguous, 0.1–0.2 mm wide, weakly convex or wrinkled, yellowish or greenish yellow or sometimes yellow-brownish, glossy, esorediate.

**Apothecia:** lecanorine, sessile or constricted at the base, often clustered, round to irregular, 0.5–0.8(–1) mm in diam.; disc pale yellow-green to pale yellow-brown, epruinose, flat or convex, often excluded thalline margin; margin indistinct; thalline ex-



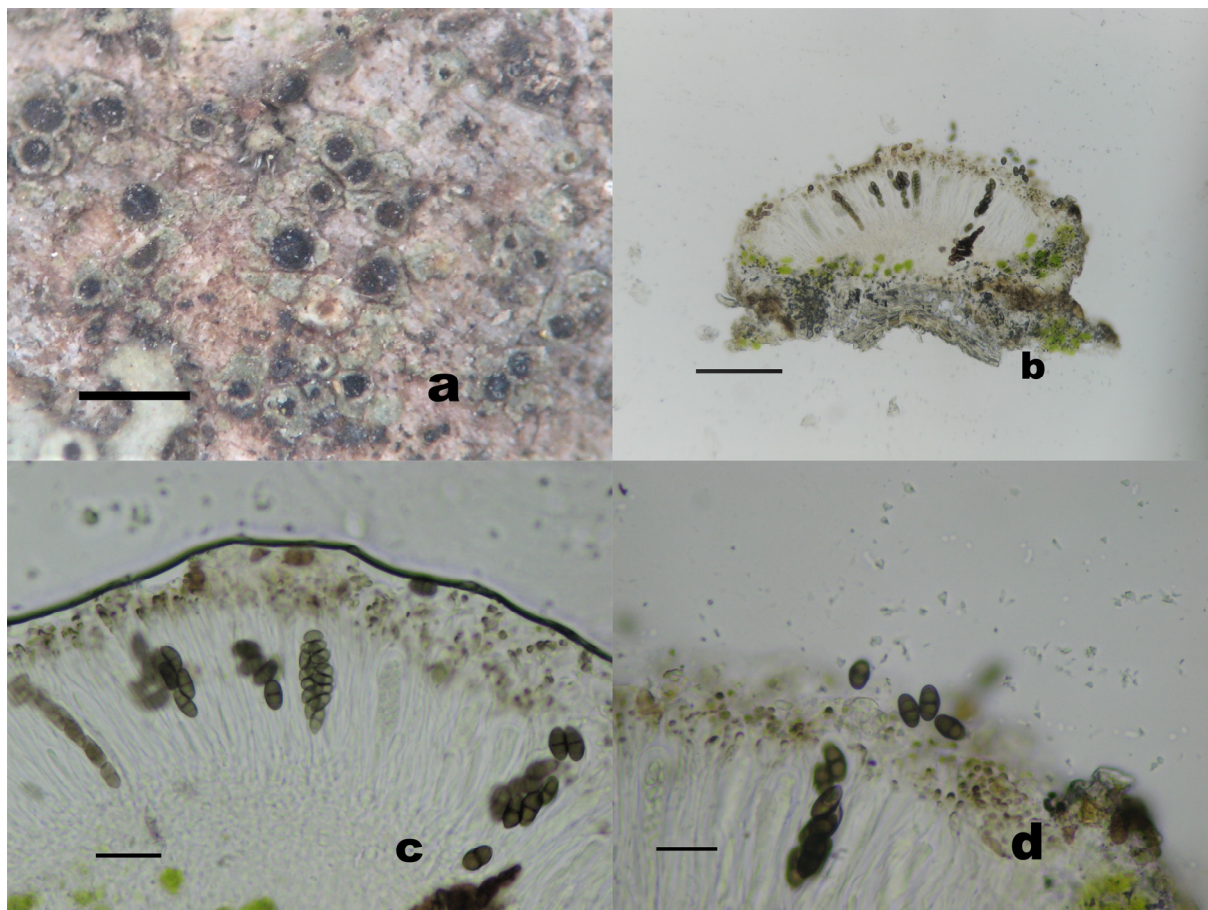


Fig. 3. *Rinodina polysporoides*. *a*. Rimose-areolate grey thallus with perithecia, *b*. Section through an apothecium with hymenium, epihymenium, hypothecium, ascus and ascospores, *c*. Epihymenium, ascus with 16-spored and ascospores, *d*. 16-spored ascus and ascospores. Scale bars *a* 1 mm, *b* 100  $\mu$ m, *c*, *d* 30  $\mu$ m

ciple with algae, no crystals, corticate; epihymenium brown, no crystals; hymenium colourless, 45–60  $\mu$ m, hyaline, weakly branched and anastomosing; hypothecium pale yellowish-brown.

*Asci*: clavate, *Lecanora*-type, 8-spored, 50–62.5  $\mu$ m long.

*Ascospores* simple, hyaline, narrowly ellipsoid, 10–12.5  $\times$  3.5–5  $\mu$ m.

*Spot tests* negative.

*Specimen examined*: Turkey, Siirt: Baykan, Çukurca village, roadside, 38° 13' 05.50" N, 41° 38' 37.01" E, 993 m s.m., on siliceous rock, 12. June 2021, leg. K. YAZICI., det. K. YAZICI & A. ASLAN, KTUB-2480.

**Notes:** Detailed descriptions are provided by NASH & al. (2004).

*Lecanora stenotropa* occurs mainly on siliceous rocks, in southern alpine and sub-alpine habitats, in moist and hyper-humid umbroclimate. It is calcifuge or subneutrophilic, mesophilic or xerophilic, little or not stegophilic, photophilic or heliophilic, little or not nitrophilic (ROUX & al. 2020).

*Lecanora stenotropa* is very similar to *L. polytropia*. Narrowly ellipsoid *ascospores* in *L. stenotropa* help to differentiate it from *L. polytropia* with broadly ellipsoidal *ascospores*, as well as its browner *apothecium* disc and the darker *thallus*.

Our specimen was associated with *Candelariella vitellina*, *Immersaria ath-roocarpa*, *Lecanora rupicola*, *Lecidea atrobrunnea*, *Lecidea fuscoatra*, *Lecidella carpathiaca*, *Physcia dubia*, *Rhizocarpon geographicum*.

*Lecanora stenotropa* is known from the Antarctic, Europe, North America and New Zealand (NASH & al. 2004, CRESPO & al. 2003, DOLNIK & NEUMANN 2014, ROSA & al. 2016, STORDEUR 2007). It is new to Turkey and Asia.

***Rinodina polysporoides* GIRALT & H. MAYRHOFFER, Herzogia 10: 33 (1994) – Fig. 3**

**Thallus:** crustose, thin, discontinuous, smooth or  $\pm$ verrucose, rimose-areolate, grey, dark grey or greyish-green, without prothallus.

**Apothecia:** lecanorine, usually scattered to confluent, broadly attached, (0.2–) 0.3–0.4 mm across; disc flat, dark brown or black; thalline margin thick, entire or flexuose, rarely excluded; thalline exciple  $\pm$  45–60  $\mu$ m wide, corticate; epithecium  $\pm$  dark brown, to 0.4(–0.5) mm; hymenium colourless, 45–5  $\mu$ m high; hypothecium colourless, 50–60–75  $\mu$ m high.

**Asci:** clavate 16-spored, *Lecanora*-type, 70–75  $\mu$ m high.

**Ascospores:** brown, ellipsoid, 12.5–17.5  $\times$  6.25–7.5  $\mu$ m, *Dirinaria*-type. Photobiont chlorococcoid, 10–12.5  $\mu$ m in diam.

**Spot tests:** negative.

**Specimen examined:** Turkey, Batman, Sason, 1.5 km to Yolüstü village, 38° 22' 35.44" N, 41° 28' 03.98" E, 896 m s.m., on *Quercus* sp., 2. June 2021, leg. & det. KENAN YAZICI, KTUB–2479.

**Notes:** Detailed descriptions is provided by GIRALT & MAYRHOFFER (1994).

*Rinodina polysporoides* is a temperate species found on smooth bark of trunks and branches of deciduous, more rarely of evergreen broad-leaved trees, especially on *Juglans* and *Fraxinus*, but also on *Quercus* (NASCIMBENE & al. 2013).

*Rinodina polysporoides* has the same habit as *Rinodina polyspora*. Both species have 16-spored asci but *R. polysporoides* differs from *R. polyspora* by *Dirinaria*-type spores (GIRALT & MAYRHOFFER 1994, SHEARD & al. 2017).

Our specimen was associated with *Phaeophyscia orbicularis*.

Is known from Europe (Armenia, Austria, Bosnia, Italy Montenegro, Slovakia, Slovenia, Spain Switzerland) (BILOVITZ & al. 2010, BILOVITZ & MAYRHOFFER 2009, GASPARYAN & SIPMAN 2016, PALICE & al. 2006, PÉREZ-ORTEGA & ÁLVAREZ-LAFUENTE 2006, NIMIS & MARTELOS 2003). It is new to Turkey and Asia.

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