

**OBSERVATIONS ON THE GENERA *CEROTELIUM*,  
*MELAMPSORIDIUM* AND *PILEOLARIA*  
(UREDINALES) IN TURKEY**

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**Abstract**

Rust fungi viz., *Cerotelium fici* on *Ficus carica*, *Melampsorium betulinum* on *Betula pendula* and *M. carpini* on *Carpinus betulus* are and reports from Turkey. Species *Pileolaria terebinthi* (on *Pistacia terebinthus*) is poorly known in the Near East and the Anatolian peninsula. These species have been collected in Turkey and short descriptions are given.

**Introduction**

Studies on rust fungi in Turkey were started by Bremer *et al.*, 1947, 1952 followed by Karel (1958) and Henderson (1957, 1959, 1961, 1964) and (Tamer & al. 1998). As a result of these and other studies with about 288 species of rust fungi recorded from Turkey. The present report describes *Cerotelium fici* on *Ficus carica*, *Melampsorium betulinum* on *Betula pendula* and *M. carpini* on *Carpinus betulus* from Turkey.

**Materials and Methods**

The plant material was collected from different localities of Rize, Trabzon and Adana province during August and November 1998-2000. Specimens were taken to the laboratory and examined by standard methods used in mycology. The fungi were identified using keys of Azbukina (1984) and Ulijanizhev *et al.*, (1985).

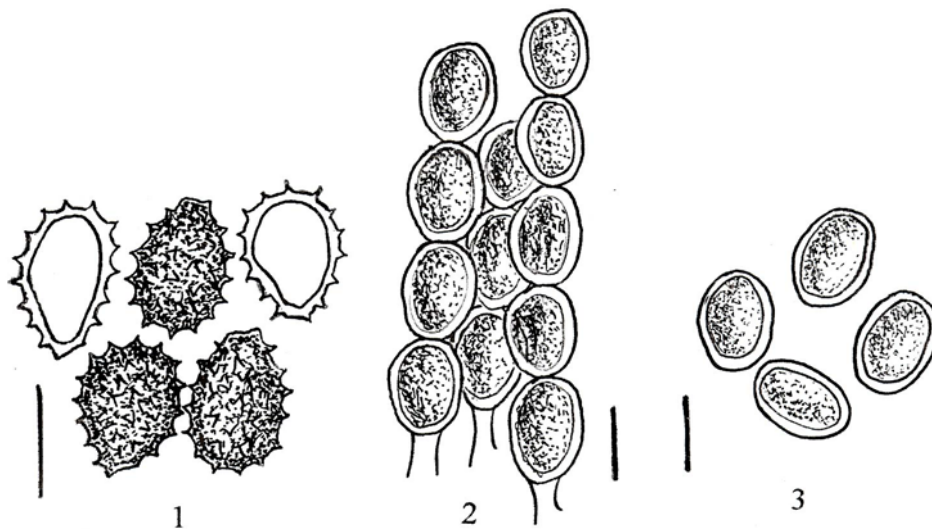
All collections are deposited at Gazi University, Kirsehir Sciences and Arts Faculty Herbarium in Kirsehir Province (KRFEF) of Turkey.

**Results**

The genera *Cerotelium* Arthur (*Phakopsoraceae*), *Melampsorium* Kleb. (*Pucciniastraceae*) and *Pileolaria* Castagne (*Pileolariaceae*) are poorly recorded genera in the Near East. *Cerotelium fici* (Castagne) Arthur, *Melampsorium betulinum* (Fr.) Kleb., *M. carpini* (Fuckel) Dietel are new additions and *Pileolaria terebinthi* (DC.) Castagne is a rare species in Turkey (Tamer *et al.*, 1998). Descriptions of these species based on Turkish samples are given below.

***Cerotelium fici* (Castagne) Arthur  
(Figs. 1–3)**

Spermogonia and Aecia unknown. Uredinia on the lower surface of leaves, scattered, small, vesiculose, brown, covered by epidermis, rupture by the central pore, surrounded by curved pale brown paraphyses. Urediniospores broadly ellipsoid or obovoid-globose,  
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Figs. 1-3. *Cerotelium fici*. Fig. 1. Urediniospores. Bar = 20  $\mu\text{m}$ . Fig. 2. Teliospore chains. Bar = 15  $\mu\text{m}$ . Fig. 3. Teliospores. Bar = 15  $\mu\text{m}$ .

22-26 x 16-20  $\mu\text{m}$ ; spore wall 1-1,5  $\mu\text{m}$  thick, yellow, sparsely echinulate. Telia on lower surface of leaves, scattered, very small, slightly purposed, whitish. Teliospores in chains with 2-7 spores, angular-spherical, broadly-ellipsoid or oblong, 19-22 x 10-17  $\mu\text{m}$ ; spore wall 1-1,5  $\mu\text{m}$  thick, hyaline, smooth.

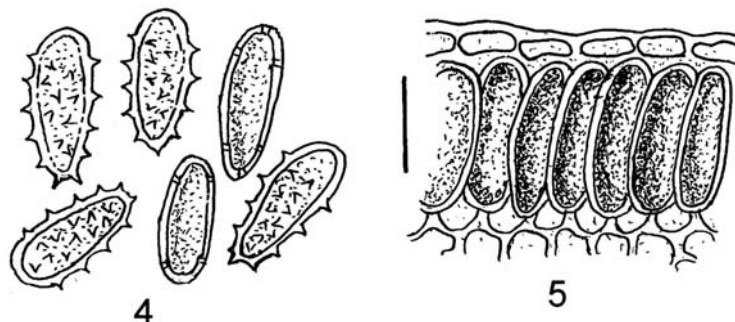
Hemi-species

**Specimens examined:** On leaves of *Ficus carica* L. (*Moraceae*) (II, III). Rize province, from Çayeli district to Pazar district 11 km. Merdivenli village, 10 m, 04.8.1999. FS. 0386 (in IUM); Adana province, Kozan, 150 m, 20 11. 1999. EH, 001.

***Melampsorium betulinum* (Fr.) Kleb.  
(Figs. 4-5)**

Uredinia on the lower surface of leaves, subepidermal, scattered or grouped, on yellow spots, 0.2-0.5 mm diam., covered by subglobose peridium. Peridial cells isodiametrical, irregularly polygonal, 10-15 x 10-15  $\mu\text{m}$ , inside wall 3-8  $\mu\text{m}$  thick. Cells around ostium of peridium protracted up to 35  $\mu\text{m}$  long echinulate. Urediniospores ellipsoid, oblong, oblong-clavate or irregular polygonal, 27.5-38 (-42) x 12.5-15  $\mu\text{m}$ , orange-yellow; spore wall thin, sparsely and delicately echinulate, smooth on apex, with 4-6 bizonal germ pores (2-3 on upper part, 2-3 on lower part). Telia on the lower surface of leaves, subepidermal, scattered or grouped, at first orange-red, then brown, small, confluent. Teliospores unicellular, prismatical, 30-50 x 8-16.5  $\mu\text{m}$ , slightly rounded near base, truncate or oblique; spore wall about 1  $\mu\text{m}$  thick, up to 1.5-2  $\mu\text{m}$  on apex, subhyaline, smooth.

Eu-hetero-species.



Figs. 4-5. *Melampsoridium betulinum*. Fig. 4. Urediniospores. Bar = 25  $\mu\text{m}$ . Fig. 5. Teliospores. Bar = 25  $\mu\text{m}$ .

**Specimen examined:** On leaves of *Betula pendula* Roth. (*Betulaceae*) (II, III). Trabzon province; from Uzungöl to Bayburt 12 km, Şekersu high plateau, 2010 m. 06. 8. 1999. FS. 0421.

Spermogonia and Aecia on *Larix* spp., (Sato, 1966).

***Melampsoridium carpini* (Fuckel) Dietel  
(Figs. 6–7)**

Spermogonia and Aecia unknown. Uredinia on the lower surface of leaves, subepidermal, scattered or grouped on yellow spots, 0.1-0.25 mm diam., yellow. Peridium subglobose, uncovered at apex. Peridial cells irregular, polygonal, 7-12 x 5-10  $\mu\text{m}$ ; with outer wall 1-2  $\mu\text{m}$  thick, inner wall 3-4  $\mu\text{m}$  thick. Cells around ostium of peridium protracted up to 25  $\mu\text{m}$  long echinula, pachydermatic. Urediniospores oblong, clavate or pear shaped, 17.5-24 (-25) x (8.5-) 10-11  $\mu\text{m}$ , yellow; spore wall thin, hyaline, echinulate, on apex smooth, 1-1.5  $\mu\text{m}$  thick, with 2-3 equatorial germ pores. Telia on the lower surface of leaves, subepidermal, scattered, small, yellow-brown. Teliospores unicellular, oblong or clavate, 28-45 x 7.5-14  $\mu\text{m}$ ; spore wall thin, light-yellow-brown, smooth.

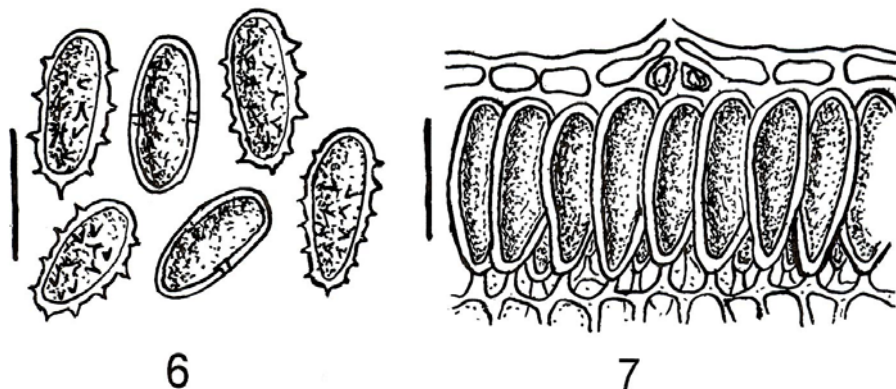
Hemi-species.

**Specimen examined:** On leaves of *Carpinus betulus* L. (*Betulaceae*) (II, III). Trabzon province: Çaykara distr., Uzungöl town, 1050 m, 06.8.1999. FS. 0420.

***Pileolaria terebinthi* (DC.) Castagne  
(Figs. 8–9)**

Spermogonia flat, subcuticular. Aecia unknown. Uredinia mostly epiphyllous, irregular or roundish, often on nerves and petioles, elongate, merged then naked, 1.5-3 mm diam., reddish-brown. Urediniospores spherical, ellipsoid, pyriform or oblong, 27.5-36 x (15-)20-24  $\mu\text{m}$ ; spore wall brown, yellowish-brown, densely and minutely verruculose, 4-5  $\mu\text{m}$  thick, slightly thickened apically up to 6  $\mu\text{m}$ , with 4 equatorial germ pores. Telia mainly epiphyllous, irregular or roundish, merged, dusty, 1-2 mm diam., dark-brown to black. Teliospores unicellular, lenticular, globose-lenticular, 30-32.5 x 22.5-25 (-31.5)  $\mu\text{m}$ ; spore wall chestnut-brown, sparsely-verruculose; pedicel up to 450  $\mu\text{m}$  long, filiform, hyaline, strong.

Brachy-species.



Figs. 6-7. *Melampsoridium carpini*. Fig. 6. Urediniospores. Bar = 20  $\mu\text{m}$ . Fig. 7. Teliospores. Bar = 25  $\mu\text{m}$ .

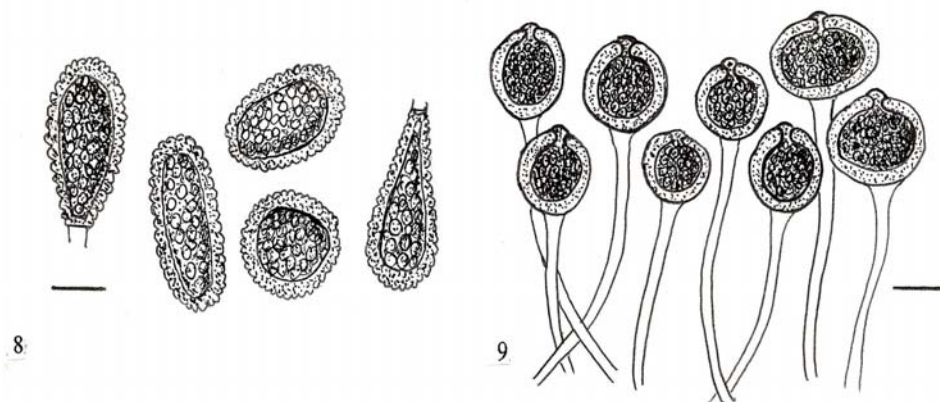


Fig. 8-9. *Pileolaria terebinthi*: Fig. 8. Urediniospores. Bar = 15  $\mu\text{m}$ . Fig. 9. Teliospores. Bar = 15  $\mu\text{m}$ .

**Specimen examined:** On leaves of *Pistacia terebinthus* L., (*Anacardiaceae*). Adana province, Kozan kalesi, 300 m, 21.10. 1999. EH. 055.

### Discussion

*Cerotelium fici* occurs in Europe, Asia (Transcaucasia, India), North America and South Africa. *Melampsoridium betulinum* has been reported from Europe, Transcaucasia, West and East Siberia, Middle Asia, Far East and Australia. *M. carpini* has been collected in Europe, Asia (Georgia, Japan, China) and North America (Kuprevich & Ulijanishev, 1975; Azbukina, 1984, Sato, 1966). *Pileolaria terebinthi* has been reported in Europe, North America, North Africa and Central Asia (Ulijanishev *et al.*, 1985).

In neighbouring Transcaucasia, urediniospores of *C. fici* measure 18–30 x 15–22  $\mu$  m, teliospores 15–22 x 10–13  $\mu$ m. *M. betulinum* urediniospores measure 22–40 x 8–12  $\mu$  m, teliospores are the same as measured here. Urediniospores and teliospores of *M. carpini* and *P. terebinthi* in Turkey are smaller than in Transcaucasia.

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