

ANTHOCEROS AGRESTIS PATON IN MOROCCO

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ABSTRACT: *Anthoceros agrestis* is observed in the Mamora forest on sandy ground under the Eucalyptus and pine wood. Macroscopic and microscopic characters were described and illustrated.

KEYWORDS: *Anthoceros agrestis*, Morocco, Mamora forest, new, rare.

INTRODUCTION

According to previous publications (Corbière, 1913; Braun-Blanquet & Maire, 1924; Gattefossé, 1932; Maire & Werner, 1934; Gattefossé & Werner, 1935; Trabut, 1941; [5]; Jelenc, 1967; [6] bryological Moroccan flora comprises three (3) types of Anthocerotales: *Anthoceros* L. *Phaeoceros* Prosk. and *Phymatoceros* Stotler, W. T. Doyle & Crand.-Stotl. divided into five (5) species.

In all works in Morocco on Bryophytes, *Anthoceros agrestis* was reported but without specify localities [5]; [6] However, [7] reported that this species is very rare in Morocco, without giving reference. This species has been observed and localized for the first time at the Mamora forest (Atlantic plains during rainy and warm spring in 2009, on a sandy soil under the wood of Eucalyptus and pine). The collected specimens are described and presented in this study.

MATERIALS AND METHODS

This study concerns an area of the Mamora forest, which is divided naturally into five (5) cantons limited by the valleys of the wadis as Fouarat, Smento, Tiflet and Tourizet, nominated respectively from the west to the eastwards: Canton A, B, C, D and E. The cantons are themselves divided into smaller units called groups and are 33 in number (Fig. A).

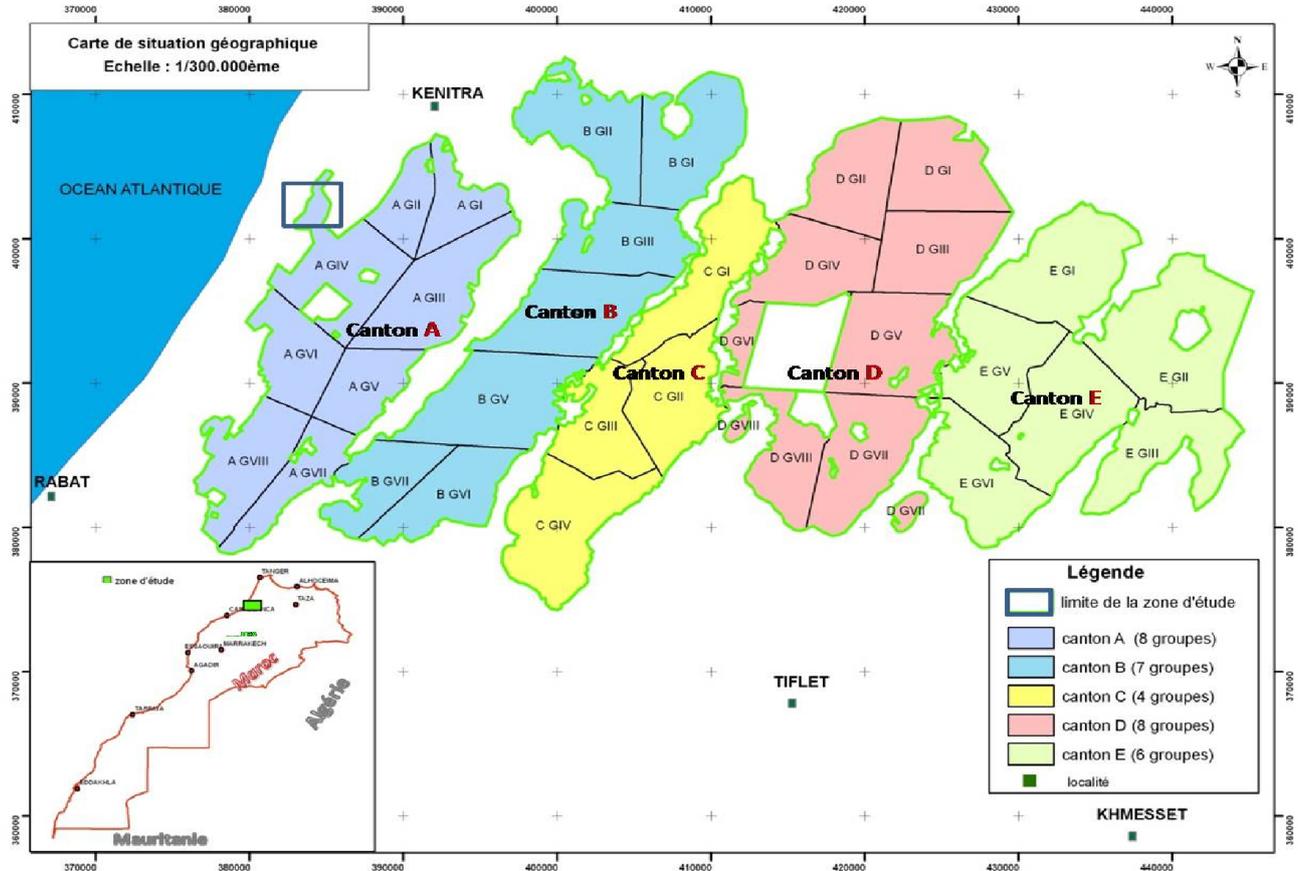


Fig. A: Location map of the Mamora forest and the cantons

The study area is located in the territory of the rural commune of Sidi Taibi, province of Kenitra, Morocco. It is located in the coastal zone, about 7 miles southwest of the Kenitra city and few kilometers from the town of Sidi Taibi, on both sides of the National Highway No. 01 Rabat-Salé and extends over an area of 112 ha.

It is limited:

- In the north by the peripheral of the Kenitra city
- In the South by the rural district of Sidi Taibi and Salé
- To the east by the Central Mamora forest
- To the west by the Lake of Sidi Boughaba

The area belongs to the Western Mamora (North West), in law along the main road No. 1 (Fig. B). The limits are determined by the following geographical coordinates (latitude / longitude) :

$$\begin{aligned} X 1 &= 383\ 986 & Y 1 &= 404\ 752 \\ X 2 &= 385\ 396 & Y 2 &= 403\ 033 \end{aligned}$$

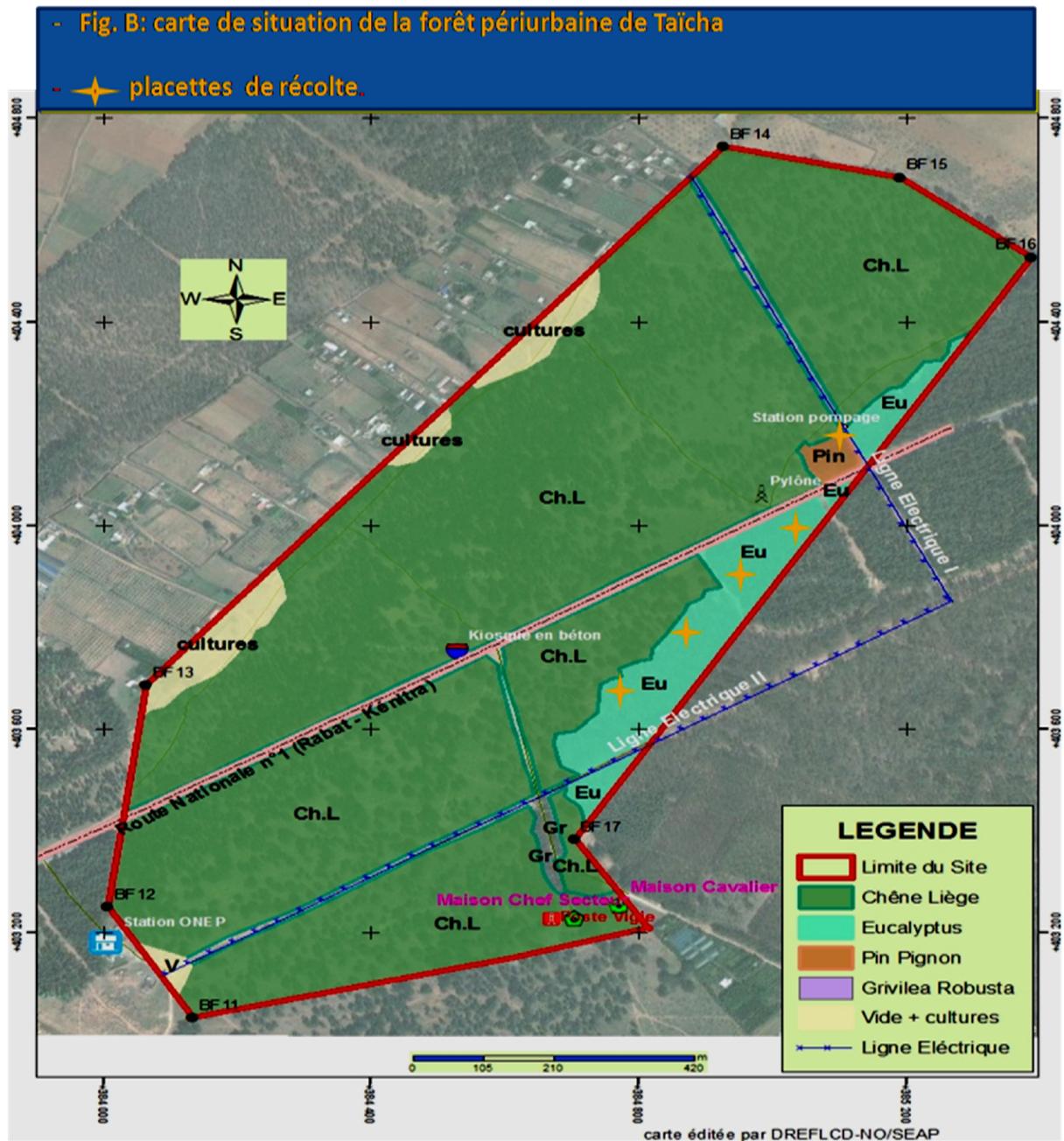
The Taicha site, GIV of the canton A, in our study, is absolutely in western Mamora forest located between the city of Kenitra to the north, the city of Salé to the southwest and Oued Fouarat to the east.

Ecologically, the Taicha site, Canton A (GIV) is under bioclimatic sub-humid atmospheres, soils are sands of varying depth on clay; they rely on a marl substrate Miocene or Pliocene sandstone [4].

The terrain is relatively flat, low slope slightly hummocky, the average altitude is between 05 and 08 meters. The assembly forms a flat land scape. The average the annual precipitation is 600 mm, with a large inter-annual variability. 120 mm is noted in December (the wettest month) and 0.5 mm in July (the driest month). The mean temperature of the warmest month (August) 27.5°C and the average of the coldest month (January): 6.9°C. The maximum monthly relative humidity is between 90 and 94% with minimum and maximum in summer and winter.

The site is occupied by an old grove of mature and clear cork oak stump. In addition to this formation, we note the presence of an old grove of Eucalyptus in its purest forms. We also note the presence of two bouquets:

- *Grevillea robusta*, located near the forest station Taicha
- Adult high forest maritime pine well vener, located at the pumping station of ONEP.



METHODOLOGY

At a herborizing in the forest of Mamora (Atlantic Morocco), cantons A, Site Taïcha a collection of several specimens of *Anthoceros* well fructifies was performed on 3/15/2009.

Samples were photographed before and after harvest. They were brought to the laboratory for microscopic study. In the laboratory, the species was described and identified using identification keys [8]; [6]; [1]; [3]; [2]. The voucher specimens are maintained and deposited in the National Scientific Institute of Rabat Herbarium (RAB).

DESCRIPTION

Anthoceros agrestis Paton is an annual species, terrestrial, characterized by a type of thalloïde gametophyte, light green, in the form of rosette 0.7 to 2 cm in diameter, spongy, margin strongly lacinated, dichotomous branching. Thallus cells have a single large chloroplast, occupying most of the cell (fig. 8).

Sporophytes are developed on the dorsal surface of the gametophyte, they are threadlike and trained, formed of a foot swollen at the base, which is located in the thallus (fig. 6) and a long cylindrical capsule or sporogone-long 1-2 (2.5) cm and a width of 0.3 mm, the wall of the door sporogone many stomata (fig. 12).

Anthoceros agrestis is monoecious, and blackberries capsules can be observed from March. At maturity, the chlorophyll capsule becomes black at the end and opens with two longitudinal slits along two valves from the top to release the spores; the valves are spiral after dehiscence sporophyte. Pseudo elaters, mixed with the spores are formed by small, short and thick elements and to various shapes, simple or grouped by the end groups of two, long 76, 54 microns wide and 13.32 microns (fig. 17-20).

Black-brown spores at distal face (FD) cross linked (fig.15-16) or tuberculate at proximal face (FP) foveolée (fig.13), measuring 46 (Fig. 14) - 54µm in diameter. Fertile species in March

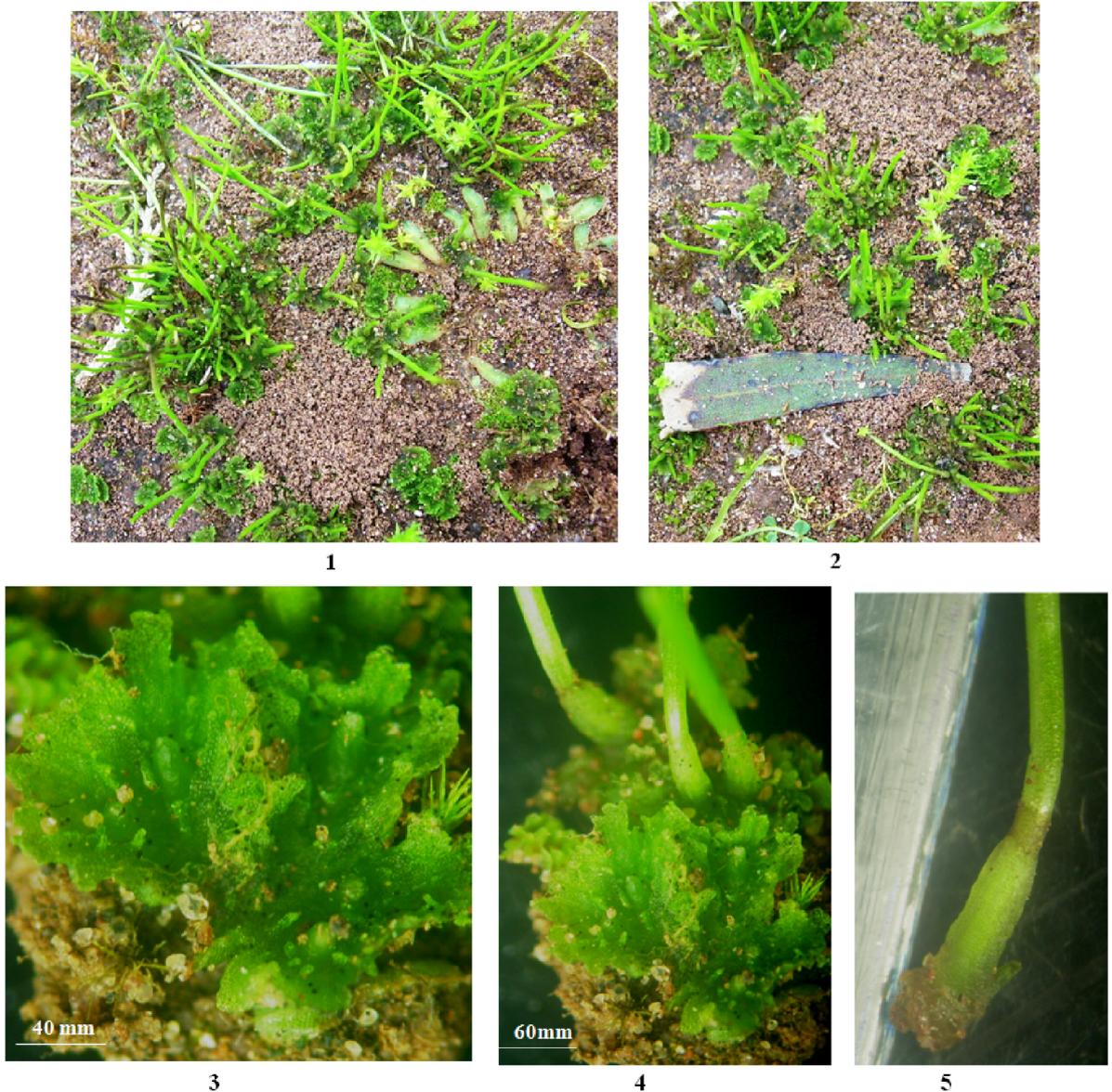


Fig. 1-5: *Anthoceros agrestis* Paton: plant in situ; thallus rosette finely cut; thallus bearing sporophytes and the basis of a sporophyte.

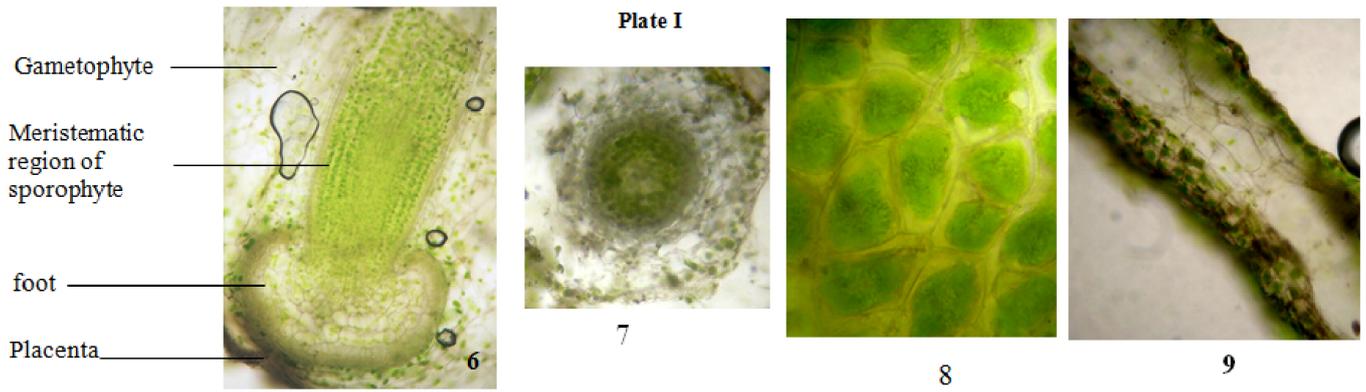


Fig. 6-9 *Anthoceros agrestis*: longitudinal section of the sporophyte; cross sections of sporogone; thallus cells to a single chloroplast; cross section of thallus X400.

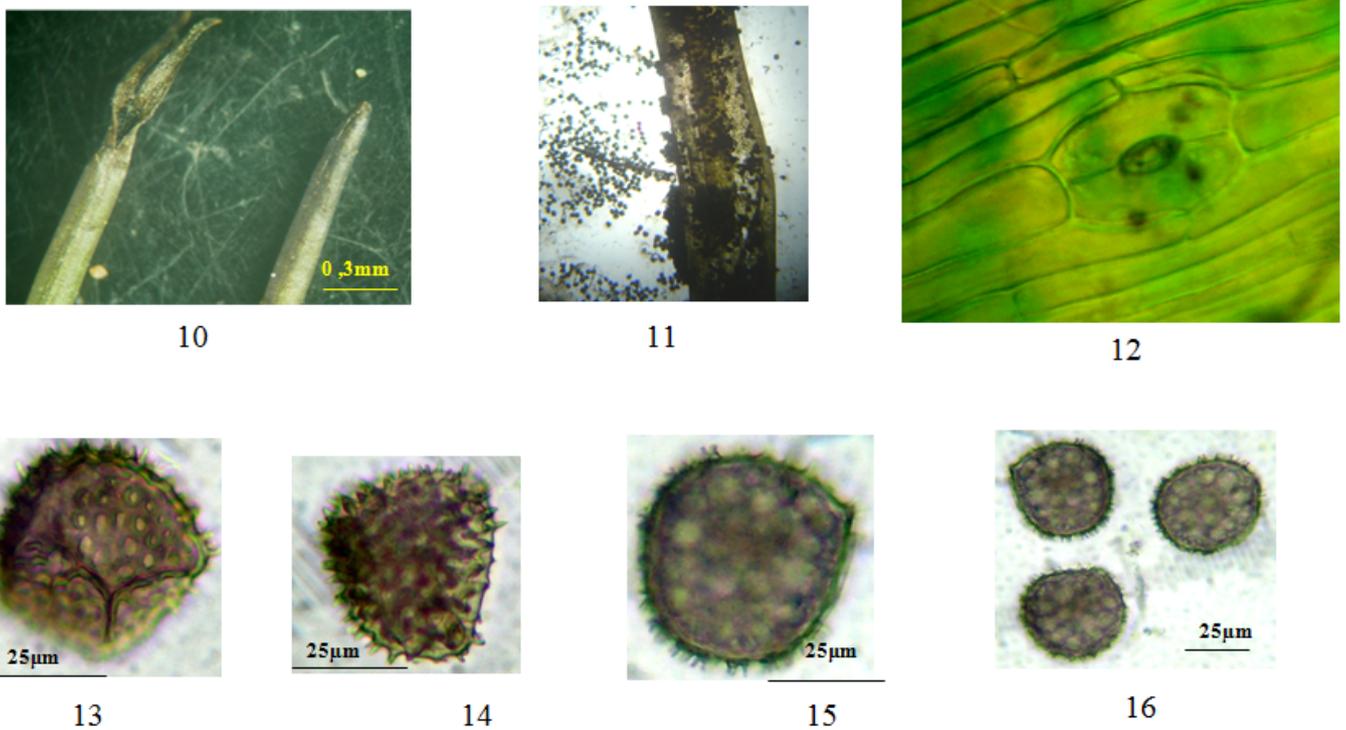


Fig. 10-16: *Anthoceros agrestis* Paton: mature sporangia; stomata and spores X400.

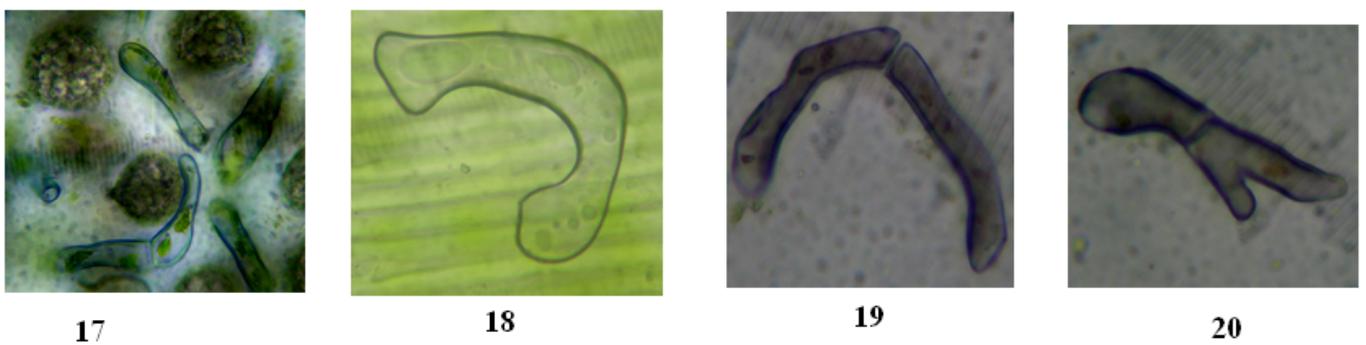


Fig. 17-20: *Anthoceros agrestis* Paton: spores blended by elaters Pseudo; pseudo elaters X400.

REFERENCES

- [1] Boudier P., Chavoutier J., 2006 — *Morphologie des Bryophytes*. Bull. Mycol. Bot. Dauphiné- Savoie. 182: 23-45.
- [2] Casas C.; Bruges M.; Cros R.M.; Sergio C.; Infante M., 2009 — *Handbook of Liverworts and Hornworts of the Iberian Peninsula and the Balearic Islands: Illustrated Keys to Genera and Species*. Institut d'Estudis Catalans. Barcelona, Spain. 177 p.
- [3] Faubert J., (25/09/2009) — *Flore des Bryophytes du Québec - Labrador- Les Anthocerotaceae Dumort-*
<http://www.floraquebeca.qc.ca/bryoweb>
- [4] Fraval A, Villemant C. La Mâamora et ses ennemis. Inra les dossiers de l'environnement 1997; 15: 133-46.
- [5] Jovet-AST, S., 1956 — *Hépatiques Marocaines II*. Bulletin de la Société des Sciences Naturelles et Physiques du Maroc, XXXVI, premier trimestre, p. 43-60.
- [6] Ros R.M., Mazimpaka V., Abou-Salama U., Aleffi M., Blockeel T.L., Brugués M., Cano M.J., Cros R.M., Dia M.G., Dirkse G.M., El Saadawi W., Erdağ A., Ganeva A., González-Mancebo J.M., Herrnstadt I., Khalil K., Kürschner H., Lanfranco E., Losada-Lima A., Refai M.S. & Söderström L. 2007- Hepatics and Anthocerotae of the Mediterranean, an annotated checklist. *Cryptogamie, Bryologie* 28: 351–437.
- [7] Smith A.J.E., 1990 — *The liverworts of Britain and Ireland*. Cambridge University Press, 392 p.
- [8] Watson E., 1981 — *British Mosses and Liverworts*. Cambridge, 3rd ed., 519 p.