

**CHARACTERIZATION OF *REICHARDIA TINGITANA* L. ROTH, A
HOST FOR *PUCCINIA HIERACII* (ROHL.) H. MART. 1817, IN
MOROCCO**

**Mohammed KHOUADER, Rachid BENKIRANE,
Amina OUAZZANI TOUHAMI and Allal DOUIRA**

*Laboratoire de Botanique et de Protection des Plantes, Université Ibn Tofail,
Faculté des Sciences, B.P. 133, 14000 Kénitra, Maroc.*

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* Correspondance et tirés à part, e-mail : khouader77@yahoo.fr

ABSTRACT

Puccinia hieracii (Rohl.) H. Mart., rust, was observed for the first time in Morocco on *Reichardia tingitana*, collected in the forest of Mamora. In this study are described the symptoms on the host as well as the microscopic characteristics of the fungus.

Keywords : *Puccinia hieracii*, *Reichardia tingitana*, description, Morocco.

RÉSUMÉ

**Caractérisation de *Reichardia tingitana* L. Roth, un hôte pour
Puccinia hieracii (Rohl.) H. Mart. 1817, au Maroc**

Puccinia hieracii (Rohl.) H. Mart. a été observée pour la première fois au Maroc sur *Reichardia tingitana*, récoltée dans la forêt de Mamora. Dans cette étude, les symptômes sur l'hôte sont décrits ainsi que les caractères microscopiques du champignon.

Mots-clés : *Puccinia hieracii*, *Reichardia tingitana*, description, Maroc.

I – INTRODUCTION

The uredinales, regarded as obligatory parasites of plants, are represented by more than 7000 species (see Kirk in 2005 and Aime in 2006) [1,2]. The genus *Puccinia*, cosmopolitan rust, has 4877 species [1] prevalent in all regions of the world on various species of Gramineae, Liliaceae,

Umbelliferae and Composites (see Saveluscu in 1953) [3]. Most of these species are heteroxenous, especially those that parasitize grasses [3]. In Morocco, the genus *Puccinia* is represented by 250 species [4] that infect different plant species.

Puccinia hieracii is a parasite that has never been previously reported in Morocco on *Reichardia tingitana*. Indeed, the host species live on rocks, sand, sea, sandy and rocky pastures of the plains and low mountains (reported since 1934 by Jahandiez and Maire) [5]. In Morocco, *Reichardia tingitana* is found in the Anti Atlas, Central Morocco (north), the Great Atlas, Morocco steppe south, the Middle Atlas, the Oran Area coast, the Mountaineer Area Oran, the Rif, the plain of Souss, the Sector Macaronesian Moroccan, Peninsula tingitane, eastern Morocco desert, north Morocco West, the South Western Morocco [5].

In this study, *Puccinia hieracii* was featured on *Reichardia tingitana*, collected in the forest of Mamora between the city of Kenitra and El Kamouni (north western Morocco).

II - MATERIALS AND METHODS

Surveys carried out March 22, 2009 and April 18, 2010 in the forest of Mamora, between the city of Kenitra and El Kamouni, have allowed finding at the edges of meadows and trees below the cork oak plants *Reichardia tingitana* attacked by *Puccinia hieracii*.

The symptoms observed on the upper leaf surface are in the form of yellow-orange pustules to brown or black.

The determination of the causative agent of different symptoms, was conducted through consultation of certain works [3,6,7].

The description of the symptoms was conducted through the use of a hand lens or dissecting microscope to better view the pustules observed on the leaves of *Reichardia tingitana*.

To study the fungus, a scratch was made at the level of developed pustules on the leaves *Reichardia tingitana*. Preparations were made to observe, through an optical microscope (X 400), the urediniospores and mostly teliospores because it is the latter's aspect that determines the kind of fungus.

Mounting medium is tap water and sometimes we add to the preparation, a drop of bleach which elucidate the spore wall. Measurements of aeciospores, teliospores (at least 50 spores), and pedicel were made by the means of ocular micrometer.

III - RESULTS AND DISCUSSION

Forms of reproduction were observed in stages II and III of the disease. *Puccinia hieracii* develops the pustules visible on the green limbs of *Reichardia tingitana*. Symptoms appear as yellow spots to orange brown or black at the upper leaf surface of *Reichardia tingitana*.



Figure 1 : Symptoms of *Puccinia hieracii* on *Reichardia tingitana*

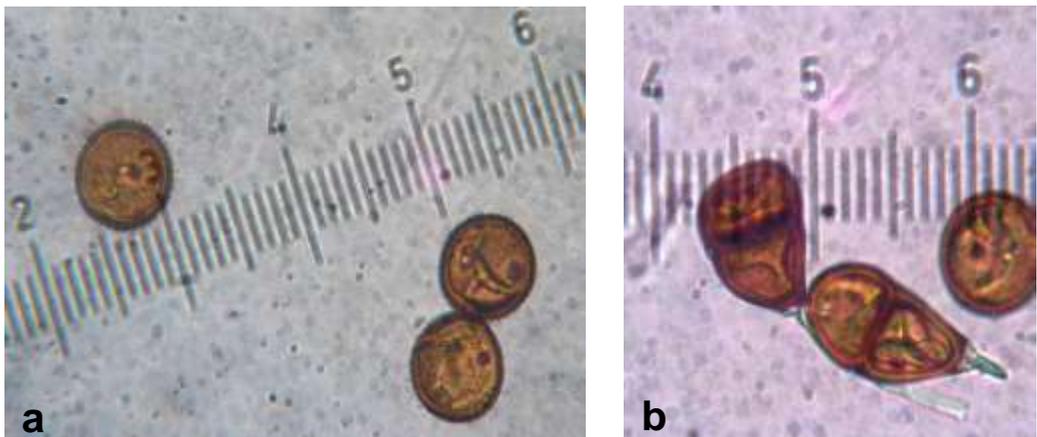


Figure 2 : Spores of *Puccinia hieracii*, **a** : Urediniospores , **b** : Teliospores.

The uredinia (0.5 mm to 2 mm in length and 1 / 5 to 0.5 mm in width) are powdery, dark brown, scattered (sometimes confluent), oblong, sometimes rounded. They can be seen on the green limbs (**Figure 1**). The urediniospores (23.30 µm in diameter) are ellipsoidal or globose, yellow-orange. They have a thick-walled, brown, echinulate, nearly 2 µm (**Figure 2a**).

The telia similar to uredinia, but black, can be seen on the dry leaves. The teliospores measure from 25 to 30 µm in length and 23.30 µm in width, two-celled, pedicellate, and brown to brown. The wall (3.30 µm thick) is smooth, thick and yellow-orange to brown. The pedicel is hyaline, thick and long (2 times the length of teliospores) and can reach up to 60 microns in length and 5 microns in width (**Figure 2b**). *Puccinia hieracii*, cosmopolitan species, is a well known parasite autoecious the Asteraceae [6,8].

In Morocco, in 1970, Rieuf [6] reported the presence of *Puccinia hieracii* (Röhl.) H. Mart. (1817) on *Crepis vesicaria* ssp. *taraxacifolia* and *Crepis virens*. But this author did not specify the location and did not describe the structure of aeciospores, urediniospores and teliospores.

On the world scale, *Puccinia hieracii* was encountered on *Reichardia tingitana* in Australia (see Cook and Dubé, in 1989) [9]. It was cited on several host plants : *Hieracium koemickeanum* in Romania [3], *Lactuca* sp. in Australia [10], *Leontodon nudicaulis* in Denmark [11], *Scolymus hispanicus* in Bulgaria [12] and *Taraxacum andinum* in Argentina [13].

IV - CONCLUSION

We have characterized *Puccinia hieracii* (Röhl.) H. Mart., encountered for the first time in Morocco. Symptoms on the host have been described as well as the microscopic fungus characters. Forms of reproduction were observed during the disease. *Puccinia hieracii* develops the pustules visible on the green limbs of *Reichardia tingitana*. Symptoms appear as yellow spots to orange brown or black at the upper leaf surface of *Reichardia tingitana*. This study will be benefit to the fight against some parasites of the fungus.

REFERENCES

- [1] - **Kirk P.**, Ainsworth and Bisby's Dictionary of the Fungi, 9th Edition, www.indexfungorum.org (2005)
- [2] - **Aime, M. C.**, Toward resolving family-level relationships in rust fungi (Uredinales). Mycoscience, 47 (2006) 112–122.

- [3] - **Savulescu A.**, Monografia Uredinalelor din Republica Populara Romania. Tome II. Editura Academiei Republicii Populare Romania, (1953) 1166 p.
- [4] - **Khouader M., Benkirane R., Ouazzani Touhami A., Boussalwa E. & Douira A.**, Catalogue des Uredinales au Maroc. Biodiversité au service du développement durable. Cinquième Journées Nationales de Biodiversité, 18-20 décembre, Fès, Maroc, (2008) p.13.
- [5] - **Jahandiez É. & Maire R.**, Catalogue des Plantes du Maroc (Spermatophytes et Ptéridophytes). Tome troisième : Dicotylédones Gamopétalées et Supplément aux volumes I et II. Imprimerie Minerva, Alger et P. Lechevalier, Paris, (1934) LI-LVII + 559-913.
- [6] - **Rieuf P.**, Parasites et saprophytes des plantes au Maroc. Les cahiers de recherche agronomique, 28 (1970) 179-357.
- [7] - **Makbule E., Elşad H. & Zekiye S.**, Description of the rusts from Kemaliye (Erzincan, Turkey). *Phytoparasitica*, 38 (2010) 81–93.
- [8] - **Erdoğdu M. & Hüseyin E.**, Microfungi of Kurtboğazi dam (Ankara) and its environment. *Ot Sistematik Botanik Degisi*, 14 (2008) 131–150.
- [9] - **Cook R. P & Dubé A. J.**, Host-pathogen index of plant diseases in South Australia. South Australian, Departement of Agriculture, (1989) 142p.
- [10] - **Cunnington J.**, Pathogenic fungi on introduced plants in Victoria. A host list and literature guide for their identification. Department of Primary Industries, Research Victoria, (2003) 57p.
- [11] - **Hylander N., Jorstad I. & Nannfeldt J. A.**, Enumerato Uredinearum Scandinavicarum. *Opera Bot.*, 1 (1953) 1-102.
- [12] - **Denchev C. M.**, Bulgarian Uredinales. *Mycotaxon*, 55 (1995) 405-465.
- [13] - **Jorstad I.**, Uredinales from South America and tropical North America. *Ark. Bot.*, 3 (1956) 443-490.