

The first records of *Hypotrachyna lividescens* and *H. pseudosinuosa* in the Iberian Peninsula

Sandrina AZEVEDO RODRIGUES^{a*}, John A. ELIX^b,
José VÍTOR VINGADA^c, Arsenio TERRÓN ALFONSO^d,
Amadeu V. MORTÁGUA SOARES^a

^a CESAM & Departamento de Biologia, Universidade de Aveiro,
Campus Universitário de Santiago, 3810-193 Aveiro, Portugal.
Fax: +351 233 910 670. E-mail: sandrina.rodrigues@bio.ua.pt

^b Department of Chemistry, Building 33, Australian National University,
Canberra ACT 0200, Australia. E-mail: John.Elix@anu.edu.au

^c Departamento de Biologia, Universidade do Minho, Campus de Gualtar,
4710-057 Braga, Portugal. E-mail: jvv@bio.uminho.pt

^d Departamento de Biologia Vegetal, Facultad de Ciencias Biológicas
y Ambientales, Universidad de León, Campus de Vegazana,
24071 León, Spain. E-mail: a.terron@unileon.es

Résumé – *Hypotrachyna lividescens* et *H. pseudosinuosa* sont rapportés pour la première fois de la Péninsule Ibérique, le second rapport de ces espèces en Europe Continentale. Ces lichens ont été trouvés dans une localité de la côte au centre du Portugal, en Dunas de Quiaios, Figueira da Foz. *H. lividescens* a été trouvé en majorité sur *Halimium halimifolium* et *H. pseudosinuosa* sur *Pinus pinaster*. L'acide echinocarpic est rapporté pour la première fois comme une substance accessoire en *H. lividescens*.

Abstract – *Hypotrachyna lividescens* and *H. pseudosinuosa* are reported for the first time from the Iberian Peninsula, the second record of these species from Continental Europe. These lichens were found in a coastal area in the centre of Portugal, at Dunas de Quiaios, Figueira da Foz. *H. lividescens* was most commonly found on *Halimium halimifolium*, whereas *H. pseudosinuosa* was found mostly on *Pinus pinaster*. In addition, echinocarpic acid is reported as an accessory substance in *H. lividescens* for the first time.

Hypotrachyna / Iberian Peninsula / Portugal / Quiaios

INTRODUCTION

Hypotrachyna lividescens (Kurok.) Hale and *H. pseudosinuosa* (Asahina) Hale were recently recorded for the first time from continental Europe in France (Masson, 2001, 2004). We now report the occurrence of these two species from Dunas de Quiaios (Figueira da Foz), in the central coastal region of Portugal.

*Corresponding author. Postal Address: Portuguese Wildlife Society; Apartado 16, EC Quiaios; 3081-101 Figueira da Foz; Portugal.

Dunas de Quiaios is a sand dune area covered mostly by *Pinus* forest. The Portuguese Forest Service began the pine plantation in 1924 in order to stabilise the sand dunes (Almeida, 1997), which at that time had a vegetation mainly formed by scrublands, dune meadows and scattered mixed woods. *Pinus pinaster* Aiton is the main phorophyte but grows together with *Pinus pinea* L., *Acacia longifolia* (Andrews) Willd., *Arbustus unedo* L. and *Myrica faya* Aiton. The shrub vegetation consists mainly of *Cistus salvifolius* (L.), *Corema album* (L.) D. Don, *Cytisus grandiflorus* DC., *Cytisus striatus* (Hill) Rothm., *Halimium halimifolium* (L.) Willk., *Halimium calycinum* (L.) K. Koch, *Lavandula stoechas* L. subsp. *sampaiana* Rozeira and *Ulex europaeus* L. (Almeida, 1997). The mean minimum temperature of the coldest month varies between 4.8-6.4°C, while the mean maximum temperature of the hottest month ranges between 23.0-24.2°C (Almeida, 1997).

MATERIALS AND METHODS

Specimens were analysed morphologically and compared with authentic material deposited in CANB. Chemical analyses were performed according to standardized methods of thin layer chromatography (TLC) (White & James, 1985; Orange *et al.*, 2001) and high performance liquid chromatography (HPLC) (Elix *et al.*, 1993).

THE SPECIES

***Hypotrachyna lividescens* (Kurok.) Hale** was most commonly found on *H. halimifolium*, but it was also collected on *C. salvifolius*, *Cytisus* sp. and *P. pinaster*. The morphology of the specimens (n=38) examined was consistent with the descriptions given by Masson (2005) and Nash *et al.* (2002) and was identical with authentic material. The present study also revealed new data regarding the chemistry of this species. In total, 32 samples were analysed by TLC and 9 of these were examined further by HPLC. The majority of specimens contained atranorin (minor), chloroatranorin (minor), olivetoric acid (major) and anziaic acid (minor) but accessory echinocarpic acid (minor) was also detected in some specimens for the first time.

In Europe this species was previously reported from the littoral areas of western and south-central France where it occurs on a variety of substrates (Masson, 2005). This species is also known from South Africa, Australia (Elix, 1994) and Mexico (Nash *et al.*, 2002).

Selected specimens examined: Portugal: Beira Litoral, Figueira da Foz: Mata Nacional das Dunas de Quiaios, epiphytic on *Halimium halimifolium* in a shrubby area surrounded by pine vegetation, 58m, 15 September 2005, S. Rodrigues (AVE-L 92, LEB 6805 Lichen).

***Hypotrachyna pseudosinuosa* (Asahina) Hale** was collected growing on *P. pinaster* and on *H. halimifolium*. The morphology and chemistry of the specimens examined were consistent with descriptions given by Louwhoff & Elix (2002a, b), Masson (2005) and Nash *et al.* (2002) and was identical with authentic

material. Specimens were analysed by TLC (n=12) and HPLC (n=3), which confirmed the presence of atranorin (minor), chloroatranorin (minor) and protocetraric acid (major).

This species has previously been reported for continental Europe (Masson, 2001) from littoral areas of western France, where it was also found to occur on *P. pinaster*. This species is also known from Macaronesia, with reports from the Azores and Canary archipelagos (Hafellner, 1995). The paucity of information regarding the distribution of this species led Sérusiaux (1989) to include it in the Red List for Europe as a vulnerable species. *Hypotrachyna pseudosinuosa* exhibits a broad world distribution that includes Western Europe, Central, North and South America, the Antilles, Macaronesia, Africa, North Asia (China, Taiwan, Japan), South-East Asia and the Pacific (New Zealand, New Guinea, New Caledonia and Hawaii) (Hafellner, 1995; Louwhoff & Elix, 2002a, b; Masson, 2001, 2005; Nash *et al.*, 2002).

Selected specimens examined: Portugal: Beira Litoral, Figueira da Foz: Mata Nacional das Dunas de Quiaios, epiphytic on *Pinus pinaster* in a pine forest, 48m, 28 March 2006, S. Rodrigues (AVE-L 93, LEB-Lichen 6803).

Acknowledgments. The first author gratefully thanks Dr. Graciela Paz-Bermúdez (Universidad de Vigo, Spain) for a first help with specimen's identification, for helpful comments on an earlier version of this manuscript and for the support presented at the beginning of the study of lichens. This work was supported by Fundação para a Ciência e Tecnologia, grant reference SFRH/BD/18541/2004.

REFERENCES

- ALMEIDA A.C., 1997 – *Dunas de Quiaios, Gândara e Serra da Boa Viagem. Uma abordagem ecológica da paisagem*. Lisboa, Fundação Caloust Gulbenkian – Junta Nacional de Investigação Científica e Tecnológica. p. 321.
- ELIX J. A., 1994 – *Hypotrachyna*. In: *Flora of Australia* 55, Canberra, Australian Nature Conservation Agency, pp 49-59.
- ELIX J.A., GIRALT, M. & WARDLAW, J.H., 2003 – New chloro-depsides from the lichen *Dimelaena radiata*. *Bibliotheca Lichenologica* 86: 1-7.
- HAFELLNER J., 1995 – A new checklist of lichens and lichenicolous fungi of insular Laurimacaronesia including a lichenological bibliography for the area. *Fritschiana* 5: 1-132.
- LOUWHOFF S. & ELIX J.A., 2002a – *Hypotrachyna* (Parmeliaceae) and allied genera in Papua New Guinea. *Bibliotheca Lichenologica* 81. Berlin, J. Cramer. 149 p.
- LOUWHOFF S. & ELIX J.A., 2002b – The Parmeliaceae (lichenized Ascomycota) of New Caledonia. *Lichenologist* 34 (5): 373-394.
- MASSON D., 2001 – *Hypotrachyna pseudosinuosa* et *Leptogium corticola*, deux lichens nouveaux pour la France. *Bulletin de la Société Linnéenne de Bordeaux* 29 (3): 185-193.
- MASSON D., 2004 – Branches ou tronc? Distribution spatiale des lichens *Hypotrachyna lividescens*, *H. revoluta* et *Parmelinopsis afrorevoluta* sur un même phorophyte. *Cryptogamie, Mycologie* 25 (3): 303-312.
- MASSON D., 2005 – Taxinomie, écologie et chorologie des espèces françaises des genres *Hypotrachyna* et *Parmelinopsis* (Ascomycota lichénisés, Parmeliaceae). *Cryptogamie, Mycologie* 26 (3): 205-263.
- NASH T.H., SIPMAN H.J.M. & ELIX J.A., 2002 – *Hypotrachyna*. In: Nash T.H., Ryan B.D., Gries C., Bungartz F. (eds), *Lichen Flora of the Greater Sonoran Desert Region. I. Arizona*, Lichens Unlimited, pp. 238-251.
- ORANGE A., JAMES P.W. & WHITE F.J. 2001 – Microchemical methods for the identification of lichens. London, British Lichen Society, p. 101.
- SÉRUSIAUX E., 1989 – *Liste Rouge des macrolichens dans la Communauté Européenne*. Liège, Centre de Recherches sur les Lichens.
- WHITE F.J. & JAMES P.W. 1985 – A new guide to microchemical techniques for the identification of lichen substances. *British Lichen Society Bulletin* 57 (supplement), p. 41.