New records of leprarioid lichens from Luxembourg and France, with the first report of fertile *Lecanora rouxii*

Martin Kukwa[1] & Paul Diederich[2]

[1] Department of Plant Taxonomy and Nature Conservation, University of Gdańsk, Al. Legionów 9, PL-80-441 Gdańsk, Poland (dokmak@univ.gda.pl)

[2] Musée national d'histoire naturelle, 25 rue Munster, L-2160 Luxembourg (paul.diederich@education.lu)

Kukwa, M., & P. Diederich, 2007. New records of leprarioid lichens from Luxembourg and France, with the first report of fertile *Lecanora rouxii*. *Bulletin de la Société des naturalistes luxembourgeois* 108: 15-19.

Abstract. The paper deals with new records of *Lecanora rouxii* (new to Luxembourg), *Lepraria alpina* (new to the checklist area of Belgium, Luxembourg and northern France), *L. bergensis* (new to France and continental Europe), *L. borealis* (new to France and Luxembourg), *L. caesioalba* (chemotypes I and II), *L. neglecta* (confirmed for Luxembourg) and *L. sylvicola* (new to France and continental Europe). The first fertile population of *Lecanora rouxii* is reported and illustrated. Specimens resembling *Lepraria borealis*, but containing additionally anthraquinones, are reported as *L.* aff. *borealis*.

1. Introduction

Although corticolous species of the genus *Lepraria* were quite well known in the area covered by the checklist of Belgium, Luxembourg and northern France (Diederich & Sérusiaux 2000), terricolous and saxicolous species, except the common *L. crassissima* (Hue) Lettau and *L. membranacea* (Dicks.) Vain., were little studied. The aim of this work was to revise the entire terricolous and saxicolous material of *Lepraria* s. lat. from France and Luxembourg kept in the private herbarium of the second author, after having identified the chemical substances present in the thallus by thin layer chromatography. Material of rare and interesting species is enumerated and discussed.

2. Material and methods

All specimens examined belong to the private herbarium of Paul Diederich. A topotype of *Lepraria bergensis* Tønsberg (deposited at UGDA) was used as reference material for the confirmation of a French specimen of the species. Morphology of all specimens was studied by a stereomicroscope. The chemical analyses were carried out using thin layer chromatography (TLC) following Orange et al. (2001). Extracts were run on aluminium or glass TLC plates in solvent systems A, B and C. Extracts received from the following species were used as controls for some substances: *Cladonia furcata* (Huds.) Schrad. (fumarprotocetraric acid), *Lecanora carpinea* (L.) Vain. (chromones), *Lepraria atlantica* Orange (porphyrillic acid), *L. jackii* Tønsberg (jackinic/rangiformic acid) and *L. toensbergiana* Bayerová & Kukwa (toensbergianic acid). In the enumeration of specimens coming from the area of the checklist of Belgium, Luxembourg and northern France (Diederich & Sérusiaux 2000), the phytogeographical districts and the IFBL coordinates (referring to squares of 4×4 km^2) are added.

3. Results

Lecanora rouxii S. Ekman & Tønsberg

(Fig. 1)

Syn.: *Lepraria flavescens* Cl. Roux & Tønsberg

Substances detected by TLC: atranorin, eugenitol, ±flavescin, sordidone, ± rouxii unknown 1, ± rouxii unknown 2, ± rouxii unknown 3 (for more details see Kukwa 2005).

Luxembourg (Lorr.): Lasauvage, rocher dans le village (IFBL: M7.48), sur un rocher en tuf calcaire, 1999, *Diederich* 13888. Ansembourg, garden of castle along main road (L8.44), on wall of castle, 2005, *Diederich* 16187 (sterile), 16188 (fertile). Between Ansembourg and Mersch, Marienthal (L8.44), on wall of chapel, 2005, *Diederich* 16210. Between Hobscheid and Septfontaines, Fockemillen, along main road (L8.52), on sandstone rocks along road, 2005, *Diederich* 16219.

This species was known only as sterile. We report here the discovery of a fertile population on the wall of the castle of Ansembourg in Luxembourg. Unfortunately, it was not possible to collect larger specimens, and only small fragments could therefore be obtained.

The apothecia are partly immersed to almost superficial, mostly 0.5-1 mm diam., thalline margin sorediose or indistinct, disc pruinose, when mature with a pinkish tinge (see Fig. 1). One immature apothecium was chemically tested. The margin and the disc reacted K+ weakly yellow, C+ yellow and KC+ intensively yellow (same reaction as the thallus).

One apothecium was sectioned: in water and in 5% KOH, nothing could be recognized. In Lugol's reagent with KOH pre-treatment, the entire hymenium became dark blue. After applying a strong pressure on the cover glass, some asci of c. 30 × 12 µm could be observed, but they did not contain any ascospores. We concluded that the apothecium examined

Fig. 1. Fertile *Lecanora rouxii* (*Diederich* 16188). Scale bars = 0.5 mm.

was immature, and we did not continue sectioning more apothecia.

In Europe the species was known from Austria, Belgium, France, Germany, Italy, Norway, Poland, Slovakia, Sweden and Switzerland. Outside Europe it was recorded only in Turkey (see Kukwa 2005 and literature cited therein). It is new to Luxembourg.

Lepraria alpina (B. de Lesd.) Tretiach & Baruffo

Syn.: *L. cacuminum* (A. Massal.) Lohtander

Substances detected by TLC: atranorin, porphyrillic and ± rangiformic acids.

France (Ard.): Dépt. Ardennes: Deville, bord de la route au nord du village, sur la rive gauche de la Meuse (K5.44), affleurements de schistes et quartzites noirs du Revinien faiblement enrichis en pyrite, avec présence de suintements d'eau, 1999, *Diederich* 16109.

France: Dépt. Hautes-Pyrénées: A l'ouest de St-Lary-Soulon, près du Lac d'Aubert, sur terre, entre mousses, 1985, *Diederich* 6538.

This is a widespread, but relatively rare species of the *Lepraria neglecta* group, known from Europe, Asia (Turkey), North America and the Antarctica (Laundon 1989, Leuckert & Kümmerling 1991, Yazici & Aslan 2005). In Europe it was reported from many countries, such as Austria (Hafellner & Türk 2001), Great Britain (Laundon 1989), Italy (Baruffo et al. 2006), Norway (Tønsberg 1992), Poland (Kukwa 2006) and Spain (Sánchez-Biezma & Bermúdes 1999). It is new for the area of the checklist of Belgium, Luxembourg and northern France (Diederich & Sérusiaux 2000).

Lepraria bergensis Tønsberg

Substances detected by TLC: atranorin, rangiformic acid and anthraquinones.

France (Ard.): Dépt. Ardennes: Deville, bord de la route au nord du village, sur la rive gauche de la Meuse (K5.44), affleurements de schistes et quartzites noirs du Revinien faiblement enrichis en pyrite, avec présence de suintements d'eau, 1999, *Diederich* 16108 (dupl. in UGDA).

This is a very rare species, so far known from two localities in Norway near Bergen and from two in Great Britain, where it grows on siliceous underhangs and over saxicolous bryophytes (Anonymous 2005, Tønsberg 2002). It is new for France and continental Europe.

Lepraria borealis Lohtander & Tønsberg

Substances detected by TLC: atranorin, rangiformic and ± norrangiformic acids.

Luxembourg (Ard.): Hoscheid, Molberlay (K8.24), 1987, dans une lande siliceuse, *Diederich* 7935. Lellingen, à 100 m au NW du village (K8.13), dans une pelouse, 1991, *Diederich* 12543 (sub *L. caesioalba*). A 2 km au N de Bigonville, Moulin de Bigonville (K7.47), sur des mousses, 1992, *Diederich* 4812 (sub *L. neglecta*). Bockholtz (près de Goesdorf), crête rocheuse au N du village (K8.33), sur un rocher en schistes, sur une crête, 1995, *Diederich* 12247. Niederwampach, route vers Oberwampach (J7.58), sur une paroi ombragée en schistes, 1987, *Diederich* 8688. Au S de Goesdorf, Berelsbaach (K8.32), sur une paroi ensoleillée en schistes, 1987, *Diederich* 16426.

France (Ard.): Dépt. Ardennes: Fumay, bord de route au S de la ville, sur la rive gauche de la Meuse (K5.23), affleurement de schistes et quartzites noirs du Revinien, enrichis en pyrite, avec présence de suintements d'eau permanents, 1999, *Diederich* 15704. Chooz, rochers de Petit-Chooz sur la rive droite de la Meuse, face au pont (J5.35), affleurement de roches de l'Emsien supérieur (Grauwacke de Hierges): schistes argilo-calcareux, facilement décalcifiés, 1999, *Diederich* 16272.

France: Dépt. Moselle: A 10 km au SEE de Bitche, Petit Steinberg [Réserve Naturelle des Rochers et Tourbières du Pays de Bitche: rocher 15], sur un rocher en grès bigarré, 2001, *Diederich* 14766. A 12 km à l'E de Bitche, Grosser Hundskopf [Réserve Naturelle des Rochers et Tourbières du Pays de Bitche: rocher 20], sur un rocher en grès bigarré, 2001, *Diederich* 14841, 14861, 14863.

Although this is a relatively widespread and rather common species (e.g. Lohtander 1994, Kukwa 2006), we report it here as new for France and Luxembourg. It always grows over siliceous rocks or over saxicolous bryophytes. It was known from two localities in the Belgian Ardenne (van den Boom et al. 1998)

Lepraria aff. ***borealis***

Substances detected by TLC: atranorin, rangiformic acid and anthraquinones.

Luxembourg (Ard.): Au N de Niederfeulen, vallée de la Wark (K8.44), sur une paroi ensoleillée en schistes, 1986, *Diederich* 7499.

France: Dépt. Pyrénées-Orientales: Porté-Puymorens, sur de la terre, 1985, *Diederich* 6601.

These two specimens differ from typical *Lepraria borealis* by the presence of anthraquinones in the thallus. They are only provisionally included in this species.

Lepraria caesioalba (B. de Lesd.) Laundon

Chemotype I

Substances detected by TLC: ± atranorin, fumarprotocetraric, ± angardianic and ± rangiformic acids.

Luxembourg (Lorr.): A l'W de Oberanven, Grengewald, Itziger Steig (L8.57), sur *Fagus*, 1986, *Diederich* 7163. Berdorf, Binzeltschloeff (L9.11), alt. 310 m, sur une surface horizontale ensoleillée en grès, 1997, *Diederich* 12487. Nommern, Lock (L8.16), sur une surface horizontale ensoleillée en grès, dans une lande, 2000, *Diederich* 14052, 14053.

France (Ard.): Dépt. Ardennes: Deville, bord de la route au N du village, sur la rive gauche de la Meuse (K5.44), affleurements de schistes et quartzites noirs du Revinien faiblement enrichis en pyrite, avec présence de suintements d'eau, 1999, *Diederich* 16109.

France (Mosan): Dépt. Ardennes: Chooz, rochers de Petit-Chooz sur la rive droite de la Meuse, face au pont (J5.35), affleurement de roches de l'Emsien supérieur (Grauwacke de Hierges): schistes argilo-calcareux, facilement décalcifiés, 1999, *Diederich* 16270, 16271.

Chemotype II

Substances detected by TLC: atranorin, stictic acid complex, rangiformic and ± norrangiformic acids.

Luxembourg (Ard.): Bockholz-lès-Hosingen, vallon du Lellgerbaach (K8.14), sur une paroi ensoleillée en schistes, 1986, *Diederich* 7722. Lellingen, à 100 m au NW du village (K8.13), dans une pelouse, 1991, *Diederich* 12543. 1 km E of Esch-sur-Sûre, near tunnel and road N15, wall along stairs and top of the hill above tunnel (K8.32), sur une surface inclinée ensoleillée en schistes, 2000, *Diederich* 14093.

In the lichen checklist from Belgium, Luxembourg and northern France (Diederich & Sérusiaux 2000), this species was considered to be the most frequent within the *Lepraria neglecta* group, but no detailed study of the chemistry of the entire material had been done. A study of all our specimens from Luxembourg and northern France revealed that more or less half of them belong to *L. borealis*. Chemotypes I and II (see Leuckert et al. 1995) are present in our material of *L. caesioalba*. In the Luxembourg Ardenne district, only chemotype II has been recorded, whilst in the Luxembourg Lorraine district, only chemotype I is known. More specimens will have to be studied to identify if this is just a result of a too small number of specimens available, or if both chemotypes have a distinct ecology and distribution. Interestingly, chemotype I has been collected once as an epiphyte on a trunk of *Fagus*.

According to molecular analyses by Ekman & Tønsberg (2002), *L. caesioalba* is not a monophyletic entity. However, as there are no available names, the different chemotypes are still placed in *L. caesioalba*.

Lepraria neglecta (Nyl.) Lettau

Substance detected by TLC: alectorialic acid.

Luxembourg (Ard.): A 2 km au N de Bigonville, Moulin de Bigonville (K7.47), sur des mousses, 1992, *Diederich* 4812.

The name *Lepraria neglecta* was used in the past for an assemblage of several species, of which *L. borealis* and *L. caesioalba* are the most frequent in many European countries. In the lichen checklist of Belgium, Luxembourg and northern France (Diederich & Sérusiaux 2000), *L. neglecta* was considered as dubious, as no correctly identified specimen was available. Earlier reports were considered as belonging to the *L. neglecta* group, and not to *L. neglecta* s. str. A chemical study of our Luxembourg and French material revealed one specimen that definitely belongs to *L. neglecta*.

Lepraria sylvicola Orange

Substances detected by TLC: atranorin, toensbergianic and roccellic acids.

France (Ard.): Dépt. Ardennes: Fumay, bord de route au S de la ville, sur la rive gauche de la Meuse (K5.23), affleurement de schistes et quartzites noirs du Revinien, enrichis en pyrite, avec présence de suintements d'eau permanents, 1999, *Diederich* 15705, 15706.

This species has just been described from Great Britain and Ireland (Slavíková-Bayerová & Orange 2006) and is therefore new for France and continental Europe. In western Britain, it is mainly corticolous and often the most abundant *Lepraria* species, and has been collected twice on bryophyte-rich rocks. The French specimen was saxicolous.

Acknowledgements

The second author thanks Emmanuël Sérusiaux (Liège) who guided an excursion to northern France, during which specimens of several rare species reported here were collected.

References

Anonymous, 2005. New, rare and interesting lichens. *British Lichen Society Bulletin* 97: 69-79.

Baruffo, L., L. Zedda, J. A. Elix & M. Tretiach, 2006. A revision of the lichen genus *Lepraria* s.lat. in Italy. *Nova Hedwigia* 83: 387-429.

Diederich, P. & E. Sérusiaux, 2000. The lichens and lichenicolous fungi of Belgium and Luxembourg. An annotated checklist. Musée national d'histoire naturelle, Luxembourg, 207 pp.

Ekman, S. & T. Tønsberg, 2002. Most species of *Lepraria* and *Leproloma* form a monophyletic group closely related to *Stereocaulon*. *Mycological Research* 106: 1262-1276.

Hafellner, J. & R. Türk, 2001. Die lichenisertien Pilze Österreich – eine Checkliste der bisher nachgewiesenen Arten mit Verbreitungsangaben. *Stapfia* 76: 3-167.

Kukwa, M., 2005. Notes on the chemistry and distribution of *Lecanora rouxii* (lichenized Ascomycota) in Poland. *Botanica Lithuanica* 11: 161-166.

Kukwa, M., 2006. The lichen genus *Lepraria* in Poland. *Lichenologist* 38: 293-305.

Laundon, J. R., 1989. The species of *Leproloma* – the name for *Lepraria membranacea* group. *Lichenologist* 21: 1-22.

Leuckert, C. & H. Kümmerling, 1991. Chemotaxonomische Studien in der Gattung *Leproloma* Nyl. ex Crombie (Lichenes). *Nova Hedvigia* 52: 17-32.

Leuckert, C., H. Kümmerling, & W. Wirth, 1995. Chemotaxonomy of *Lepraria* Ach. and *Leproloma* Nyl ex. Crombie, with particular reference to Central Europe. *Bibliotheca Lichenologica* 58: 245-259.

Lohtander, K., 1994. The genus *Lepraria* in Finland. *Annales Botanici Fennici* 31: 223-231.

Orange, A, P. W. James & F. J. White, 2001. Microchemical methods for the identification of lichens. British Lichen Society, 101 pp.

Sánchez-Biezma, J. & G. P. Bermúdes, 1999. Algunas especies liquénicas interesantes de la Costa Cantábrica Occidental. *Studia Botanica* 18: 101-116.

Slavíková-Bayerová, S. & A. Orange, 2006. Three new species of *Lepraria* (Ascomycota, Stereocaulaceae) containing fatty acids and atranorin. *Lichenologist* 38: 503-513.

Tønsberg, T., 1992. The sorediate and isidiate, corticolous, crustose lichens in Norway. *Sommerfeltia* 14: 1-331.

Tønsberg, T., 2002. Notes on non-corticolous *Lepraria* s. lat. in Norway. *Graphis Scripta* 14: 45-51.

van den Boom, P., E. Sérusiaux, P. Diederich, M. Brand, A. Aptroot & L. Spier, 1998. A lichenological excursion in May 1997 near Han-sur-Lesse and Saint-Hubert, with notes on rare and critical taxa of the flora of Belgium and Luxembourg. *Lejeunia* 158: 1-58.

Yazici, K. & A. Aslan, 2005. Six new lichen records from Turkey. *Mycotaxon* 93: 359-363.