

**THE SYSTEMATIC POSITION OF *PELTIGERA HORIZONTALIS* (HUDS.) BAUMG.
AND *P. ELISABETHAE* GYELN. (LICHENIZED ASCOMYCOTA) ON THE BASIS
OF ITS SEQUENCE ANALYSIS**

Alessio PAPINI, Renato BENESPERI, Mauro RAFFAELLI, Enio NARDI

Dipartimento Biologia Vegetale, Università degli Studi di Firenze

The lichen genus *Peltigera* Willd. (Peltigerinae, lichenized Ascomycota), with more than 50 species worldwide, presents a wide range of morphological and chemical variation at both intra- and interspecific level. According to Miadlikowska & Lutzoni (2000), notwithstanding the high number of studies concerning this taxon, it is still poorly understood in comparison to other macrolichens.

The most recent infrageneric subdivision of *Peltigera*, based on morphological, chemical and molecular (LSU nrDNA) data, circumscribed eight monophyletic sections: *Chloropeltigera* Gyeln., *Peltidea* (Ach.) Vain., *Horizontales* Miadlikowska & Lutzoni, *Hydrothyriae* Miadlikowska & Lutzoni, *Peltigera*, *Phlebia* Wallr., *Polydactylon* Miadlikowska & Lutzoni, *Retifoveate* Miadlikowska & Lutzoni, (Miadlikowska & Lutzoni, 2000). One of these sections, *Horizontales*, includes six species: *P. collina* (Ach.) Schrad., *P. elisabethae* Gyeln., *P. horizontalis* (Huds.) Baumg., *P. neckeri* Müll. Arg., *P. polydactyloides* Nyl., and *P. phyllidiosa* Goffinet & Miadlikowska. In particular, *P. elisabethae* and *P. horizontalis* are morphologically similar species, characterized by horizontal apotecia, fusiform spores and similar chemistry, and past infrageneric classification of *Peltigera*, based on morphological and chemical data only, included only these two species in the *horizontalis* group (Vitikainen, 1994). The presence of schizidia and the dark veinless lower surface allow to distinguish *P. elisabethae* from *P. horizontalis*, that has a distinct network of veins and lacks schizidia (Holtan-Hartwig, 1993; Vitikainen, 1994).

The aim of this paper was to check the phylogenetic relationships among *P. elisabethae* and *P. horizontalis*, and to verify the relationships of these two species with other species of the genus *Peltigera* using Internal Transcribed Spacers as molecular markers. We used both parsimony and neighbor-joining methods for the phylogenetic analysis with PAUP* 4.0 (Swofford, 1998).

Since the ITS was very variable, the alignment of the ITS sequences of species of the genus *Peltigera* with sequences of other close genera (*Lobaria* and *Nephroma*) was very difficult. A two steps analysis was necessary: at first we analyzed *Peltigera* with *Lobaria* and *Nephroma* excluding the uncertain positions to assess the most basal species of *Peltigera* among those analyzed.

This species was *P. didactyla*. A second analysis used *P. didactyla* as outgroup for the rest of the genus. Three groups of *Peltigera* were found on the basis of the ITS sequences. *Peltigera horizontalis* and *P. elisabethae* clustered together with 100% bootstrap confirming their strict phylogenetic relationship. They are the sister group of a cluster including *P. phyllidiosa*, *P. neckeri* and *P. collina*.

Literature cited

- MIADLIKOWSKA J. & LUTZONI F., 2000 - Phylogenetic revision of the genus *Peltigera* (lichen-forming Ascomycota) based on morphological, chemical and large subunit nuclear ribosomal DNA data. *Int. J. Plant Sci.* 161(6): 925-958
- SWOFFORD D. L., 1998. - PAUP*. Phylogenetic Analysis Using Parsimony. Test version. Sinauer Associates. Sunderland, MA.
- VITIKAINEN O., 1994 - Taxonomic revision of *Peltigera* (lichenized Ascomycotina) in Europe. *Acta Bot. Fennica* 152: 1-96.