

POLLEN IN LUNGS AND AIR SACS. A SPATIO-TEMPORAL MARKER FOR LONG DISTANCE MIGRANTS

Alain Tamisier¹, Pierre Cour², Paul Richard², Olivier Dehorter¹ and
Frédéric Pelsy-Mozimann¹

¹ Centre d'Ecologie Fonctionnelle et Evolutive, CNRS, 34033 Montpellier, France

² Laboratoire de Palynologie, Université de Montpellier II, +34060 Montpellier, France

Pollens are microscopic species-specific cells which resist on the long term to strong physical and chemical constraints. The pollenic composition of the atmosphere varies with space and time and pollenic calendars are available for most regions (1). Living animals inhale pollens of the biogeographic area where they are and they can store it in their respiratory system. This storage capacity was first demonstrated in man where pollen can stay several month in lungs (2). We first verified that birds can also store pollens in their lungs, air sacs and syrinx (3). Similar mean densities were found in birds as in man (1-5 pollen/g of lung) and higher values in air sacs and syrinx. These differences in density between the several parts of the bird respiratory system are likely to be related to the relative importance of the air volume which transits through each of them. Then we tested the hypothesis that pollen stored in respiratory system of birds can indicate migration routes and periods, and can be used to isolate populations.

Preliminary results on Coots *Fulica atra* showed differences between mediterranean type (i.e. olive tree *Olea europea*) and continental-type (i.e. birch tree *Betula spp.*) pollens, which could be associated with sedentary and migrating birds respectively. Strict seasonality of most pollens should allow more precise interpretation, for instance about the arrival or departure date of birds at/from a given area. This point could be used to evaluate the respective size of successive groups of transient birds and the duration of their stop-over. Other conclusive results are expected from birds wintering in tropical wetlands (Garganey *Anas querquedula* and Pintail *A. acuta*) where botanic taxa are quite different.

The advantages of this new technic to isolate populations are several: cheap and very

rapid as compared to classical ringing procedures, restricted sampling (few birds to analyze). The inconveniences are several also: precise knowledge of the pollenic calendars for the analyzed region, collaboration with a competent laboratory of palynology, availability of dead birds, difficulty in eliminating any form of pollenic pollution. Moreover, it has to be proved that, during non-stop long-distance flights (trans-mediterranean + trans-sahara routes for instance) where pulmonary activity is exceptionally strong, pollen still remains in lungs. Many more studies should be made on that topic which can be of prime importance and lead to many diverse applications.

- (1) Cour, P. *et al.* Proc. Ist. Intern. Aerobiol.: 61-80.
- (2) Marty, J. 1980. PhD. Med. Thesis, Montpellier.
- (3) Cour, P. *et al.* C. R. Acad. Sc. Paris (submit.).