

Evolution of populations of *Lotus corniculatus s.l.* in the south-western area of the French Alps.

Joël REYNAUD, Laboratoire de Botanique et Biologie Cellulaire, Institut des Sciences Pharmaceutiques et Biologiques, Université Lyon I, 8 Avenue Rockefeller, 69373 Lyon Cedex 08. FRANCE.

Maurice JAY, Laboratoire de Biologie Micromoléculaire et Phytochimie, Université Lyon I, 43 Boulevard du 11 Novembre 1918, 69622 Villeurbanne. FRANCE

In the south-western area of the French Alps (Prealps), Mont Ventoux (1700 m) and Montagne de Lure (1600 m) are commonly considered to have played the role of shelters for some species of plants during the last glaciations. Ancestral plant populations were thus fractionated and could survive in these shelters from which they recolonized the Alps after the glaciations.

On the basis of this hypothesis, we have collected about 300 samples of *Lotus corniculatus s.l.* belonging to different populations growing in Mont Ventoux, Montagne de Lure, and in the Mercantour (in the north-east of the two first mountains). We have determined their level of ploidy (di or tetraploids; with the help of Solange Blaise and Delphine Cartier, Faculty of Sciences, Paris XI, Orsay) and their flavonoid profile by High Performance Liquid Chromatography (Figure I). A Principal component Analysis was then performed on all the chromatographic profiles obtained.

Our conclusions are as follows :

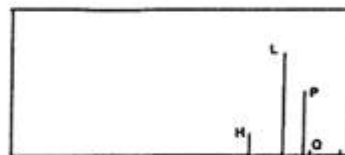
In Mont Ventoux and Montagne de Lure (fig.II), in severe climatic conditions (at the highest altitudes) diploids are predominant and possess a chemotype defined as D1. They are probably issued from the ancestral population of *Lotus* nowadays fractionated. In less hostile situations, they gave birth to tetraploids showing a high capacity of colonization and a larger diversity in their flavonoid metabolism ; furthermore slight differences could be noted between the tetraploids of the two origins, permitting to distinguish a chemotype TV and a chemotype TL (Fig.I).

In the Mercantour, in the same stations as diploids with chemotype D1 (at about 2200-2300 m), and growing among them, could be found other diploids with a different flavonoid pattern named D2. They are probably issued from relictual populations which had found shelter in the inner Alps (in "nunataks"). The two diploid groups seem to have given no hybrids, however their respective tetraploids seem to have been able to hybridize, with probably phenomena of introgression ; so, in the Mercantour, tetraploid samples show very different flavonoid patterns.

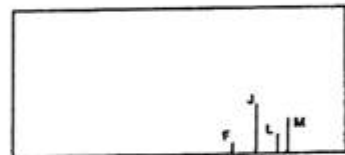
FIGURE I

FIGURE SHOWING THE MEAN PHENOLIC PROFILES OBTAINED  
FOR THE DIFFERENT POPULATIONS COLLECTED

DIPLOIDS

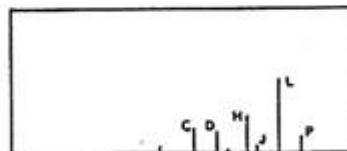


Mont VENTOUX, Montagne de LURE  
Massif du MERCANTOUR pro parte  
Chemotype D1

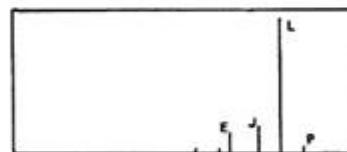


Massif du MERCANTOUR pro parte  
Chemotype D2

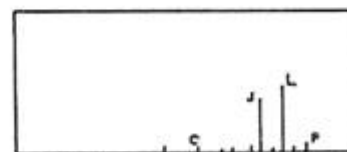
TETRAPLOIDS



Mont VENTOUX



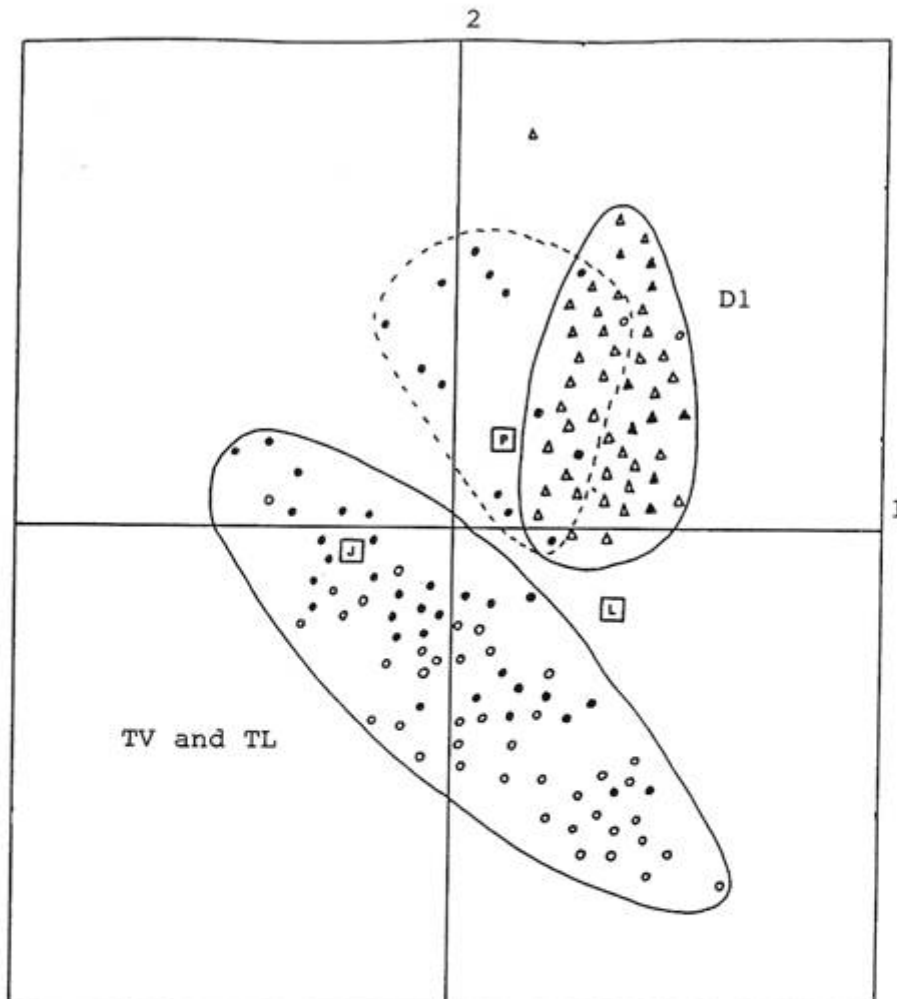
Montagne de LURE



Massif du MERCANTOUR

The letters on the plots correspond to the different  
pics obtained with H.P.L.C.

FIGURE II



Principal Component Analysis of the samples from  
Mont VENTOUX and Montagne de LURE

- ▲ Diploids from Ventoux
- △ Diploids from Lure
- Tetraploids from Ventoux
- Tetraploids from Lure
- Discriminant phenolic markers.

Diploids (▲ or △) and Tetraploids (● or ○) are separated into two different clouds, an homogeneous cloud for the diploids, and a larger one for the tetraploids.