

IDENTIFICATION OF *LOTUS CORNICULATUS* L. AND *L. TENUIS*
(Waldst. et Kit.) SEEDS BY ITS FLAVONOIDS

Cristina D. Strittmatter*; Marcelo L. Wagner**;

Mariana Kade*; Mercedes Rivero*; Rafael A. Ricco** and

Alberto A. Gurni.**

* Centro de Ecofisiología Vegetal. Serrano 665. 1414
Buenos Aires. Argentina. Fax: 54-1-8567110

** Cátedra de Farmacobotánica, Fac. de Farmacia y
Bioquímica. UBA. Junín 956. 1113. Buenos Aires. Argentina.

INTRODUCTION

In Argentina two species of the genus *Lotus* are used as pasture legumes. *L. tenuis* has spread naturally on heavy and alkaline soils, which may be flooded during a long time, whereas *L. corniculatus* is sown on soils of higher fertility conditions.

Since both species are adapted to different environmental conditions, it is very important to identify precisely the species seeds before being sown. But it results very difficult to distinguish one species seeds from the other one because their characteristics such as size, shape, colour or width are very similar.

Previous studies (Strittmatter *et al.* 1988, 1990, 1991 and 1992) have demonstrated that the species present a different flavonoid composition. While in *L. tenuis* free kaempferol (K) and kaempferol-3-O-glucosyl-7-O-rhamnoside (K-G-R) are proposed as chemosystematic markers (Strittmatter *et al.*, 1992), in *L. corniculatus* the presence of K, quercetin and delphinidin is cited (Harney and Grant, 1964; 1965; Yay *et al.*, 1978).

The aim of this study is to assess a quick and precise method to discriminate precisely between seeds of both species based on their flavonoid composition.

MATERIALS AND METHODS

Commercial seeds of *L. corniculatus* cv. *El Boyero* and *L. tenuis* cv. *Chajá* were subjected to chromosome number determination to ensure they were not mixed.

Five g of each seed sample were ground and then extracted with boiling water during 30 min.

Flavonoid compounds were isolated, purified and identified according to standard procedures described in previous papers (Strittmatter *et al.*, 1988 and 1992).

RESULTS

The seeds of both species showed a high concentration of free quercetin. Also the presence of its 3-O-xiloside, 3-O-glucoside and 3-O-galactoside were determined.

DISCUSSION

In previous papers Strittmatter *et al.* (1988, 1990, 1991 and 1992) have detected only kaempferol glycosides in *L. tenuis* plants during its whole life-cycle. Therefore the presence of quercetin glycosides in its seeds indicates that this species show a different flavonoid metabolism in the plant in relation to the seed.

L. corniculatus seeds synthesize quercetin glycosides as *L. tenuis*, but this aglycone is also present in the plant besides kaempferol and delphinidin.

These results show different pathways for the biosynthesis of flavonol glycosides in the seed and plant of *L. corniculatus* and *L. tenuis*.

As the seeds of both species produce the same 3-O-glycosides of quercetin it is still not possible to distinguish these seeds by means of their flavonols.

REFERENCES

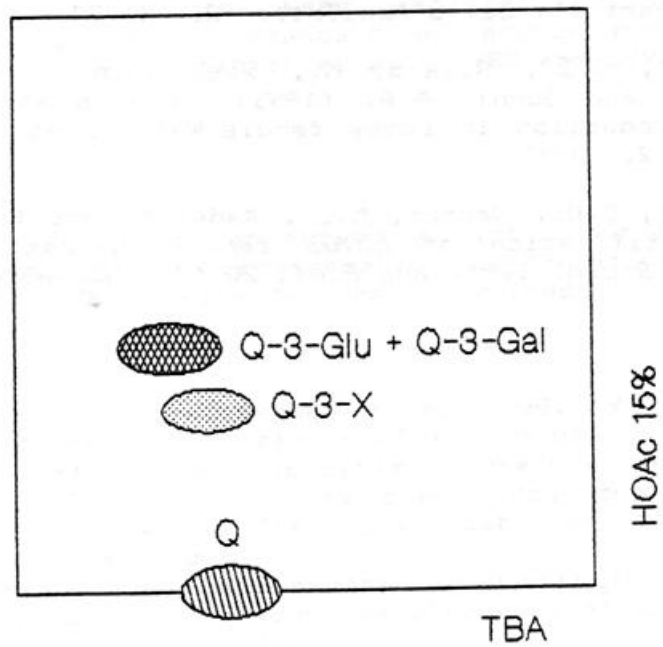
- Harney, P.M. and Grant, W.F. (1964) A chromatographic study of the phenolics of species of *Lotus* closely related to *L. corniculatus* and their taxonomic significance. *Amer. Jour. Bot.* 51 6, 621-627.
- Harney, P.M. and Grant, W.F. (1965) A polygonal presentation of chromatographic investigations on the phenolic content of certain species of *Lotus*. *Canad. J. Genet. Cytol.* 7, 40-51.
- Jay, M., Hasan, A., Voirin, B. and Viricel, M.R. (1978) Les flavonoides du *Lotus corniculatus*. *Phytochemistry* 17, 827-829.
- Strittmatter, C.D., Wagner, M.L., Kade, M. and Gurni, A.A. (1988) The identification of *Lotus tenuis* flavonoids. *Lotus Newsletter* 19, 34-36.

Strittmatter, C.D., Wagner, M.L., Kade, M. and Gurni, A.A.
(1990) Identification of *Lotus tenuis* (Waldst. et Kit.)
flavonoids-Part II. *Lotus Newsletter* 21, 31-34.

Strittmatter, C.D., Rivero, M., Wagner, M.L., Kade, M.,
Ricco, R.A. and Gurni, A.A. (1991) *In vivo* and *in vitro*
flavonoid production in *Lotus tenuis* Waldst. et Kit. *Lotus
Newsletter* 22, 14-17.

Strittmatter, C.D., Wagner, M.L., Kade, M. and Gurni, A.A.
(1992) Identification of *Lotus tenuis* (Waldst. et Kit.)
Flavonoids. *Bioch. Syst. and Ecol.* 20 (7), 685-687.

Fig.1: The two dimensional paper chromatographic pattern of flavonoids obtained from *Lotus tenuis* and *Lotus corniculatus* seeds.



Q: quercetin.
Q-3-Glu: quercetin-3-O-glucoside.
Q-3-Gal: quercetin-3-O-galactoside.
Q-3-X: quercetin-3-O-xyloside.