

## **LAIMYDORUS PARABASTIANI (PAETZOLD, 1958) SIDDIQI, 1969 - A POTENTIAL BIO-INDICATOR NEMATODE FOR HALOMORPHIC SOILS**

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**Summary.** Studies of the free-living terrestrial nematofauna of a salt-affected area in Cluj County, in Transylvania, revealed the specific association of the nematode *Laimydorus parabastiani* with continental salt-affected areas. The possible use of this species as bio-indicator for halomorphic soils is discussed.

**Key words:** Halophilic plants, halo-tolerance, Romania, salt-affected area.

Physical, chemical and biological indicators can be used to estimate soil characteristics and soil conditions. Biological indicators offer excellent perspectives because of their integral role, reflecting the total impact of physical and/or chemical characteristics or possible changes in the soil. Nematodes have particular potential as bio-indicators (Popovici, 1993; Popovici and Korthals, 1993). Interest in their use for ecological monitoring of habitats has increased during the last two decades. The presence of certain taxa in a particular habitat could be indicative of environmental changes due to natural or anthropo-zoogenic causes.

This contribution reports some of the results of studies carried out on the free-living soil nematode fauna identified in the halomorphic soil from a salt-affected area located in the vicinity of Cojocna (in Cluj County), Romania, a small area known for its salt water pools with curative effects.

The salt-affected area on which this study focuses represents a particular type of habitat, clearly distinct and characterized by the presence of halomorphic soil with a high salt content.

### **MATERIAL AND METHODS**

The salt-affected area of Cojocna (46°44'N, 23°50'E) is situated at 335 m altitude, 25 km south-east from Cluj-Napoca, in a region of deforested hills, typical of the Transylvanian Plain (Rusu *et al.*, 1967). The area chosen for sampling is a salt-affected plain, easy to identify from the conspicuous white-grayish salt crusts to be seen here and there on the barren soil and the typical

halophilic vegetation (Mészáros, 1997). The salt-affected field is located north-east of a salt-affected brook called "Valea Sărată" (the Salted Valley).

Nematode specimens were collected by the first author between 1996 and 2000. They were extracted using the centrifugation method of De Grisse (1969), killed and preserved in a 4% formaldehyde solution heated to 65 °C, and mounted in anhydrous glycerine (Seinhorst, 1959). Nematode identifications were made with the aid of information in: Paetzold (1958), Loof (1961, 1996), Siddiqi (1969) and Andrassy (1986, 2002).

Five vegetation surveys were carried out in late summer 2000, at the same locations where soil samples had been taken; the type of halophilic phytocoenosis was determined according to Soó (1980), Mucina (1993), Borhidi (1996) and Coldea (2000).

### **RESULTS**

Among the 461 free-living soil nematode species recorded from Romania so far (Popovici and Ciobanu, pers. comm.), *Laimydorus parabastiani* appeared to be a suitable candidate as a bio-indicator based on the following criteria:

- a. its occurrence in the same specific type of habitat from which the German type population was described.
- b. multivariate statistical analyses distinctly showed the ecological preferences of the species for this type of habitat (and implicitly for certain environmental conditions) (Ciobanu *et al.*, 2004a).

*Laimydorus parabastiani* was originally identified as *Dorylaimus parabastiani*; it was collected from a salt-affected soil (halomorphic soil) in the area of Halle, situated in the central part of Germany (Paetzold, 1958). In the original description, the author also provided details

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**Table I.** Plant composition and related cover<sup>1</sup> of the preferent halophilic phytocoenosis (plant association: Puccinellietum peisonis) from the salt-affected area<sup>2</sup> located near Cojocna (Coldea, unpublished data).

Plant species	Stand table at survey				
	1	2	3	4	5
<i>Puccinellia peisonis</i>	4	3	5	4	4
<i>Juncus gerardi</i>	.	.	.	.	+
<i>Triglochin maritima</i>	1	1	+	1	+
<i>Salicornia europaea</i> var. <i>prostrata</i>	.	+	.	.	.
<i>Spergularia marina</i>	+	.	.	.	.
<i>Plantago cornuti</i>	.	.	+	.	.
<i>Statice gmelini</i>	.	.	+	+	.
<i>Aster tripolium</i>	3	3	+	2	2

<sup>1</sup> Braun-Blanquet (1932) scale for cover percentages: +=<1%; 1=1-5%; 2=5-25%; 3=25-50%; 4=50-75%; 5=75-100%; . = absent (but not excluded)

<sup>2</sup> soil pH=7.9

referring to halophilic plant species (halophytes) occurring in the place from where the species was recorded, namely *Glaux maritima* L., *Plantago maritima* L., *Juncus gerardi* Loisel., *Aster tripolium* L., *Puccinellia distans* (Jacq.) Parl. and *Triglochin maritima* L.

Up to now, *L. parabastiani* has been recorded from only one location in Romania, i.e. from the salt-affected area near Cojocna (Ciobanu *et al.*, 2004b). The Romanian habitat is similar to that of the type location of the species.

It is interesting to point out that three plant species identified in the habitat from Germany, where the species was originally collected, occur also in the salt-affected area near Cojocna (Table I), a preferent halophilic phytocoenosis (Soó, 1980; Mucina, 1993; Borhidi, 1996; Coldea, 2000).

The use of multivariate statistical analyses and their interpretation to elucidate the relationships between the composition of nematode fauna and halophilic vegetation allowed the effect of salinity on each nematode species to be detected; *L. parabastiani* appeared to have the highest halo-tolerance. The data confirmed the results of the faunistic study of Ciobanu *et al.* (2004b).

## CONCLUSIONS

Ecological studies of the Romanian nematofauna that focus on specific associations of certain nematode taxa with specific habitat types and their preferences for certain abiotic and/or biotic factors (soil type, some physical-chemical soil parameters, vegetation, saprophytic mycoflora, etc.) are just beginning. The species *L. parabastiani* is the first to show clear potential as a bio-indicator for halomorphic soils, with preferent halophilic phytocoenoses, of salt-affected continental

habitats. However, future research on salt-affected areas in Romania, and also on other types of habitats, could reveal additional species of nematodes with bio-indicator potential. This is a field to which little attention has been given so far, but it has clear practical applications for environmental studies.

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