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Contribution to the study of the genus *Paratylenchus* Micoletzky, 1922 *sensu lato* (Nematoda: Tylenchulidae)

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Abstract

Morphological and morphometric analyses were conducted on the genus *Paratylenchus*, based on documented data in the literature and characters of Iranian populations of twelve species, including *P. arcuatus*, *P. colinus*, *P. conicephalus*, *P. coronatus*, *P. neoamblycephalus*, *P. neoprojectus*, *P. obtusicaudatus*, *P. paraperaticus*, *P. similis*, *P. straeleni*, *P. variabilis* and *P. veruculatus*. Moreover, males of *P. obtusicaudatus* are described for the first time and additional data provided for males of *P. paraperaticus*. The variability of the most important taxonomic characters for species identification in the genus was estimated by calculation of coefficient of variation (CV) for 49 species and the ratio of extremes in the range of measured females (max/min ratios) for 82 species of the genus, based on 66 and 170 populations, respectively. A list of 117 valid species of *Paratylenchus* is provided, along with a dichotomous identification key and a diagnostic compendium.

Key words: identification, key, compendium, pin nematode, Paratylenchinae, *Paratylenchus*, *Gracilacus*, taxonomy

Introduction

The pin nematode, genus *Paratylenchus* Micoletzky, 1922 (Nematoda: Tylenchulidae) was originally described on the basis of a single female of its type species, *P. bukowinensis* Micoletzky, 1922 from a sandy meadow overflowed by Pruth river, at that time in Romania. Filipjev (1934) placed *Paratylenchus* in the subfamily Hoplolaiminae Filipjev, 1934, but Taylor (1936) transferred it to his subfamily Criconematinae. Thorne (1949) proposed the subfamily Paratylenchinae in the family Criconematidae Taylor, 1936 and designated *Paratylenchus* as its type genus. In the most recent classification (e.g., Decraemer & Hunt 2006), this genus is placed in the subfamily Paratylenchinae under the family Tylenchulidae Skarbilovich, 1947.

Tarjan (1960) reviewed the genus *Paratylenchus* for the first time, describing two new species and proposing a key to the species. Raski (1962) proposed the genus *Gracilacus* to include species of *Paratylenchus*, with a stylet longer than 48 µm. However, Brzeski (1963), Siddiqi & Goodey (1964), and Geraert (1965) synonymized *Gracilacus* with *Paratylenchus*. Thorne & Malek (1968) distinguished *Paratylenchus* from *Gracilacus*. Solov'eva (1975) reviewed *Paratylenchus* and provided a key for 44 known species. Esser (1992) developed a diagnostic compendium for 116 species of Paratylenchinae, assigned to four genera: *Cacopaurus* Thorne, 1943, *Gracilacus*, *Paratylenchoides* Raski, 1973 (Synonym of *Paratylenchus* for Raski 1991 and Siddiqi 2000) and *Paratylenchus*. In subsequent works, *Gracilacus* has been treated as either a valid genus (Raski & Luc 1987, Maggenti *et al.* 1988, Raski 1991, Andrassy 2007) or a subgenus of *Paratylenchus* (Siddiqi 1986, 2000); however, some nematologists have documented all species under *Paratylenchus* (Brzeski 1998, Nguyen *et al.* 2004, Decraemer & Hunt 2006). Andrassy (2007) listed 45 valid species under *Gracilacus* and 74 species under *Paratylenchus*.

To date, several diagnostic compendia and keys have been published (Raski 1962, 1975b, 1976, 1991; Wouts 1966; Solov'eva 1975; Wu 1975; Pinochet & Raski 1977; Bajaj 1988; Esser 1992; Brzeski 1998). The most recent dichotomous key (Raski 1991) for *Paratylenchus* includes 96 species of which seven species are synonymized or considered as *species inquirendae*. Since publication of the last diagnostic compendium (Brzeski 1998), seven new

continued.

Species\characters	A	B	C	D	E	F	Stylet	L	V
<i>P. vexans</i>	3	1	1	3	1	3	15–18	290–380	84–87
<i>P. vitecus</i>	11	3	2	3	1	1(2)	42–65	220–350	72–77
<i>P. yokooi</i>	10	2	2	3	1	2	54–65	200–400	71–82

Where multiple states are given, common states are arranged in order; rare states are in parentheses.

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