

A revised polytomous key for the identification of species of the genus *Xiphinema* Cobb, 1913 (Nematoda: Longidoridae) with exclusion of the *X. americanum*-group: Supplement 1

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Abstract

Codes are given for eleven *Xiphinema* species described since the new polytomous key (Loof & Luc, 1990) was submitted plus one species described earlier but which had not come to the authors' notice. Differences from related species are given. *X. ilyasi* Ahmad & Baqri, 1987 is considered a junior synonym of *X. ensiculiferum* (Cobb, 1893) Thorne, 1937. *X. clavatum* Heyns, 1965 is transferred from Group 8 to Group 5. The authors agree that *X. attorodorum* Luc, 1961 is a junior synonym of *X. parasetariae* Luc, 1958.

Introduction

Since the submission of the revised polytomous key to *Xiphinema* Cobb, 1913 (see Loof & Luc, 1990), eleven new species have been described in this genus, viz.:

- X. abrantinum* Roca & Pereira, 1991;
- X. belmontense* Roca & Pereira, 1992;
- X. coronatum* Roca, 1991;
- X. fagesi* Germani, 1990;
- X. guillaumeti* Germani, 1989;
- X. karachiense* Nasira, Firoza & Maqbool, 1992;
- X. llanosum* Siddiqi & Lenné, 1990;
- X. macroacanthum* Lamberti, Roca & Agostinelli, 1990;
- X. miekeae* Heyns, 1991;
- X. pongolense* Hutsebaut, 1989;
- X. riparium* (*riparia* emend.) Chizhov, Subbotin, Romanenko & Kruchina, 1991.

In addition, one species described earlier has

come to our notice, viz. *X. ilyasi* Ahmad & Baqri, 1987.

A great advantage of a polytomous key over a dichotomous one is that it is not upset by descriptions of new species; these can be inserted easily. For this reason, we plan to give supplements from time to time dealing with new species.

Codes and comments

X. abrantinum

Group 5. Code: A4 – B2 – C3 – D45 – E456 – F34 – G2 (3?) – H3 – I3 – J3 – K2 – L2.

This species belongs to the *coxi*-group but differs from all species in this group by the common occurrence of males, which, moreover, possess only one or two rudimentary ventro-median supplements.

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X. belmontense

Group 5. Code: A4 - B2 + 3 - C4 - D5 - E3 - F4 - G3 - H2 - I3 - J4 - K3 - L2.

This species belongs in Group 5. The code is clearly different from the other species in this group.

X. coronatum

Group 5 Code (by author): A4 - B2 + 3 - C7b - D6 - E56 - F45 - G34 - H2 - I3 - J7b - K2 - L1.

We agree with this code, which is close to that of *X. smoliki*, from which *X. coronatum* differs by codes D, G and I.

X. fagesi

Group 1. Code: A1 - B4 - C7b - D6 - E12 - F2(3) - G3 - H2 - I2 - J7b - K2 - L1.

This code is identical to that for *X. ensiculiferum*. *X. fagesi* can be distinguished from that species by:

- female tail: clavate vs not clavate;
- tail of J-1: terminus clavate, $h = 5-7 \mu\text{m}$ vs not clavate, $h = 26-29 \mu\text{m}$;
- tail of J-2: terminus slightly clavate and $c' = 4-6$ vs terminus not clavate and $c' = 3$;
- length of h in J-3: $20-41 \mu\text{m}$ vs $15.5 \mu\text{m}$.

Repeated requests for the loan of type-specimens remained unanswered.

X. guillaumeti

Group 8. Code: A4 - B4 - C7b - D6 - E6 - F34 - G4 - H2 - I2 - J7b - K2 - L2.

The combination A4 - B4 - C7b - D6 - E6 is common to the final six species (*X. yapoense* to *X. porosum*). The code for *X. guillaumeti* is different from all six in terms of G and/or H and/or I and partly F.

Repeated requests for the loan of type-specimens remained unanswered.

X. ilyasi

Group 1. Code: A1 - B4 - C7b - D6 - E2 - F2 - G2 - H1(2) - I23 - J? - K? - L1.

Ahmad & Baqri (1987) considered *X. ensiculiferum* apud Williams (1959) identical with this species. However, Williams illustrated a blind

canal in the tail (code 7a); Ahmad & Baqri did not mention nor illustrate such a canal. Furthermore, Williams did not state or draw the absence of the anterior uterine sac, only his formula 32^{18} suggests it. Williams' (1959) two females were collected in sugar cane fields at Union Park and Bel Etang, Mauritius. He gave some measurements ($L = 1.95 \text{ mm}$; $a = 39$; $b = 4.5$; $c = 60$; $V = 32^{18}$) and drawings of anterior part and tail; no description completed these data. Williams (1969) again cited *X. ensiculiferum* as associated with sugar cane in Mauritius. Cohn & Sher (1972) assigned these two females to *X. krugi* Lordello, 1955. Williams' (1959) drawing shows a very conspicuous blind tail canal which is always present in *X. krugi* but never in *X. ensiculiferum*; the tail does not exhibit a terminal bulge, common in *X. krugi* and absent in *X. ensiculiferum*, but a rounded tail without bulge is not infrequent in the former species (Luc & Hunt, 1978). Subsequent sampling in both localities yielded only *X. krugi* (see Williams & Luc, 1977). Numerical data and drawings produced by Williams (1959) for the two females reported in that paper fit well the data recorded for the Mauritius populations of *X. krugi*. So, Williams & Luc (1977) confirmed that *X. ensiculiferum* apud Williams (1959) was *X. krugi*. This was repeated by Loof & Luc (1990). Consequently, it appears that the identity of *X. ensiculiferum* apud Williams (1959, 1969) with *X. krugi* has now been sufficiently documented so that further justification is unnecessary.

Apparently, *X. ilyasi* differs from *X. ensiculiferum* in only one respect, i.e. stylet length, the odontostyle length being $109-110 \mu\text{m}$ vs $137-164 \mu\text{m}$ [however, Cohn & Sher (1972) reported for *X. ensiculiferoides* (= *X. ensiculiferum*) a minimum odontostyle length of $115 \mu\text{m}$], and the total stylet length being $168-172 \mu\text{m}$ vs $188-241 \mu\text{m}$. Possibly, there is also a difference in the position of the guiding ring, $90-92 \mu\text{m}$ vs $133-156 \mu\text{m}$, but Cohn & Sher gave only one value ($140 \mu\text{m}$), whereas the specimen with an odontostyle length of $115 \mu\text{m}$ would certainly have a much lower value.

In conclusion, if the Malaysian specimens of *X. ilyasi* (which include the holotype) are really

conspecific with Williams' (1959) specimens, then *X. ilyasi* should be considered a junior synonym of *X. krugi*; if not, it may be identical with *X. ensiculiferum*, which occurs commonly in Malaysia (Sauer & Winoto, 1975). The former is not likely since Ahmad & Baqri (1987) stated that in *X. ilyasi* the anterior female genital branch is absent. We propose, therefore, that *X. ilyasi* be synonymised with *X. ensiculiferum*, since in our opinion the small difference in the odontostyle length does not warrant specific distinction.

Unfortunately no type-specimens of *X. ilyasi* could be obtained because the holotype and paratypes have been mounted on the same slide and are consequently not permitted to be dispatched (Chatterjee, *in litt.*)

X. karachiense

Group 5. Code (by authors): A4 - B2 - C6 - D5 - E56 - F3 - G2 - H2 - I34 - J6 - K2 - L2.

We agree with this code, which is closest to those of *X. imitator*, *X. majus* and *X. melitense*. The species can be differentiated from *X. imitator* by codes D and L and by the length of the odontostyle (113-123 μm vs 74-101 μm), from *X. majus* by codes F, G and L, and from *X. melitense* by codes D, F, G, K and L.

X. llanosum

Group 2. Code: A2 - B4 - C6b - D5 - E45 - F23 - G12 - H2 - I3 - J6b - K2 - L2.

The code is clearly different from those of all other species in this group.

X. macroacanthum

Group 5. Code: A4 - B2 + 3 - C5a - D6 - E5 - F45 - G34 - H2 - I3 - J5a - K3 - L2.

This species is close to *X. ingens*, *X. smoliki* and *X. thorneanum*. It differs from these species as follows:

- from *X. ingens* by the large uterine spines and the more strongly developed pseudo-Z-organ;
- from *X. smoliki* by length of the odontostyle (165-183 μm vs 108-115 μm) and odontophore (80-99 μm vs 65-74 μm), and presence of males; not by body length (4.1-5.4 mm vs 3.9-5.0 mm)

and vulva position (V = 44-49 vs 42-47) as stated in the description.

- from *X. thorneanum* by body length (4.1-5.4 mm vs 2.8-3.8 mm), the length of the odontostyle (165-183 μm vs 89-106 μm) and odontophore (80-99 μm vs 55-69 μm); by tail shape (the terminal peg protrusion is insignificant in *X. macroacanthum*, but quite distinct in *X. thorneanum*); and in the pseudo-Z-organ (in *X. macroacanthum* this is well developed with large granules, while in *X. thorneanum* it is very weakly differentiated with minute granules).

X. miekeae

Group 5. Code: A4 - B2 + 3 - C7b - D56 - E56 - F3 - G3 - H2 - I3 - J6a7a - K2 - L1.

Hutsebaut (1989) described a parthenogenetic population of *X. clavatum* Heyns, 1965. Heyns (1991) considered this population representative of a separate species which he named *X. miekeae*. The code is close to that of *X. smoliki* but differs in E, F and J.

Hutsebaut (1989) also found, on re-examination of the type-specimens of *X. clavatum*, that this species possesses a pseudo-Z-organ and uterine spines. Therefore, *X. clavatum* is transferred from Group 8 to Group 5, its code becoming:

A4 - B2 + 3 - C7b - D56 - E56 - F3 - G23 - H2 - I3 - J5a7b - K? - L2.

This code is also similar to that of *X. smoliki* but differs in E, F, J and L. *X. clavatum* and *X. miekeae* can be distinguished, in addition to code L, by the odontostyle length (*X. clavatum* 107-130 μm , *X. miekeae* 140-153 μm), total stylet length (*X. clavatum* 194-217 μm , *X. miekeae* 222-245 μm), distance of fixed guiding ring from anterior end (*X. clavatum* 101-118 μm , *X. miekeae* 125-143 μm), length of ovejector (*X. clavatum* 102-170 μm , *X. miekeae* 75-116 μm), ratio c (*X. clavatum* 81-111, *X. miekeae* 57-81) and tail shape of adult females and J-4 (clavate in *X. clavatum*, not so in *X. miekeae*).

X. pongolense

Group 5. Code: A4 - B2 + 3 - C3 - D4 - E56 - F(3)4 - G2 - H2 - I3(4) - J3(?) - K(?) - L2.

This code is not clearly different from those of *X.*

rarum and *X. ornativulvatum*. *X. pongolense* can be distinguished from these species as follows:

– from *X. rarum*: by body length (3.4–4.4 mm vs 2.5–3.1 mm), odontostyle length (103–116 µm vs 85–95 µm), tail shape (subdigitate, $c' = 1.6$ –2.4 vs conical, $c' = 2.2$ –3.2), and spiculum length (57–73 µm vs 53–56 µm).

– from *X. ornativulvatum*: by tail shape (straight, subdigitate vs curved, regularly conical), and absence of cuticular ornamentation in vulvar region.

X. riparium

Group 6. Code: A4 – B3 – C5a – D6 – E45 – F3 – G3 – H2 – I3 – J5a – K? – L2.

The code resembles that of *X. aequum* Roca & Lamberti, 1988, but *X. riparium* is smaller (L of females 2.7–3.2 mm vs 4.1–5.3 mm), its tail is shorter (females 28–37 µm vs 43–53 µm) and stouter ($c' = 0.6$ –0.8 vs 1.1–1.5). No mention was made concerning the presence or absence of a blind canal in the tail, and the illustrations are insufficient to decide this, but examination of paratypes showed that a blind canal is present in adults and in the J-4.

Status of *X. parasetariae* Luc, 1958

Sharma & Siddiqi (1990) pointed out that *X. attorodorum* Luc, 1961 agrees in every respect with *X. parasetariae* Luc, 1958. The latter species has previously been considered a *species inquirenda* because it was described from a single female which has been lost. They stated that its description is sufficient, especially with regard to the tail structure. We agree with their conclusion. Consequently, *X. parasetariae* Luc, 1958 should be considered the valid name for the species previously known as *X. attorodorum* Luc, 1961, the latter name becoming a subjective junior synonym of the former.

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** Correction of page numbers in Loof & Luc (1990).