*Nematol. medit.* (1977), *5*: 349-353.

*Istituto di Patologia vegetale*
*Cattedra di Fisiopatologia vegetale dell'Università degli Studi, Sassari, Italy*

# MORPHOMETRIC IDENTIFICATION OF THE JUVENILE STAGES OF *XIPHINEMA INDEX* THORNE *ET* ALLEN (1)

by
R. GARAU and U. PROTA

Prota *et al.* (1977) studied the life cycle of *Xiphinema index* Thorne *et* Allen in glasshouse to establish the time required for the completion of each stage from egg-laying to adult. Measurements were made of the body length and of the two odontostyles for each of the juvenile stages and these data are presented here as a basis for the morphometric identification of each stage (Dalmasso, 1970).

## MATERIALS AND METHODS

All the juvenile forms were obtained from a population of *X. index* maintained on fig (*Ficus carica* L.). They were extracted with a Seinhorst elutriator (Seinhorst, 1962a) and fixed and mounted on glass slides according to the methods of Goodey (1963) and Seinhorst (1962b). More then 900 specimens were examined and measured.

It was noticed that while the juvenile stages could be made on the basis of a single measurement (body length or length of either the functional or the replacement odonstostyle) (Fig. 1) identification of some specimens necessitated measurements of all these characters. Therefore, an analysis has been made of the relationship between body length and each of the odontostyles to establish the characteristic limits for each of the four juvenile stages (Figs. 2 and 3).

(1) Work supported by the C.N.R., Rome, under the programme of « Gruppo di ricerca sui virus e le virosi delle piante ».

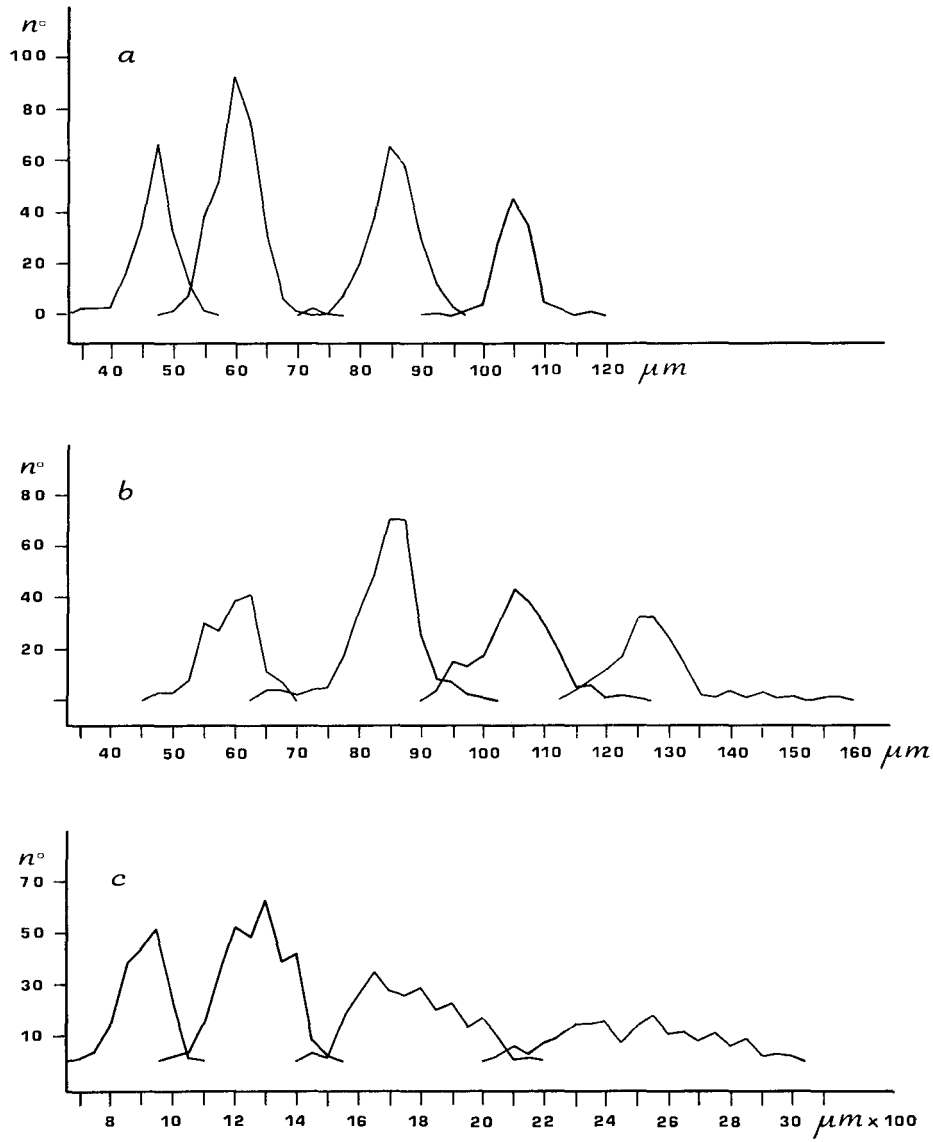


Fig. 1 - Frequency of distribution of juvenile stages of *Xiphinema index* according to length of the functional odontostyle (a), length of the replacement odontostyle (b) and length of the body (c).

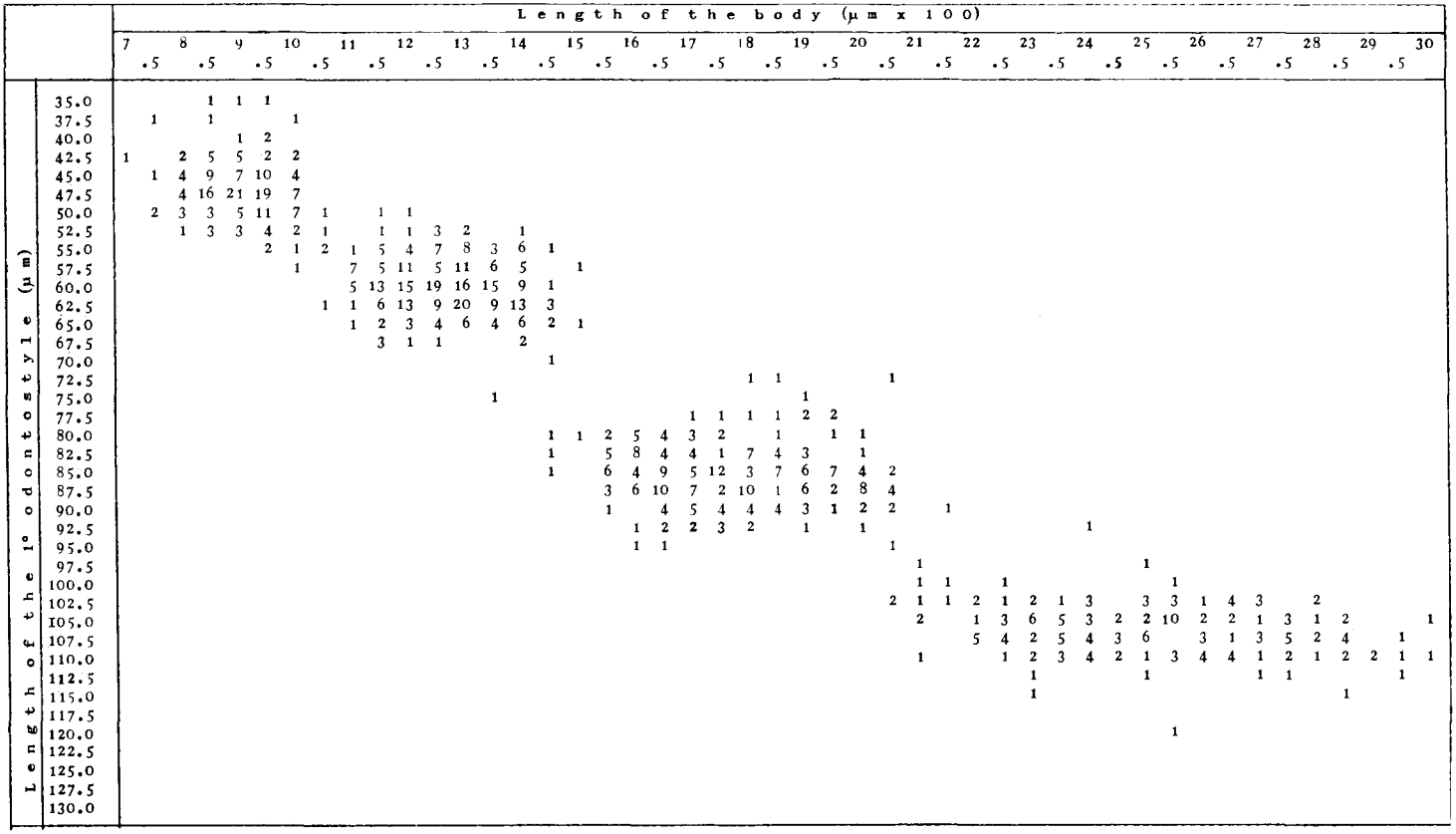


Fig. 2 - Relationship between body length and functional odontostyle in juvenile stages of *X. index*.

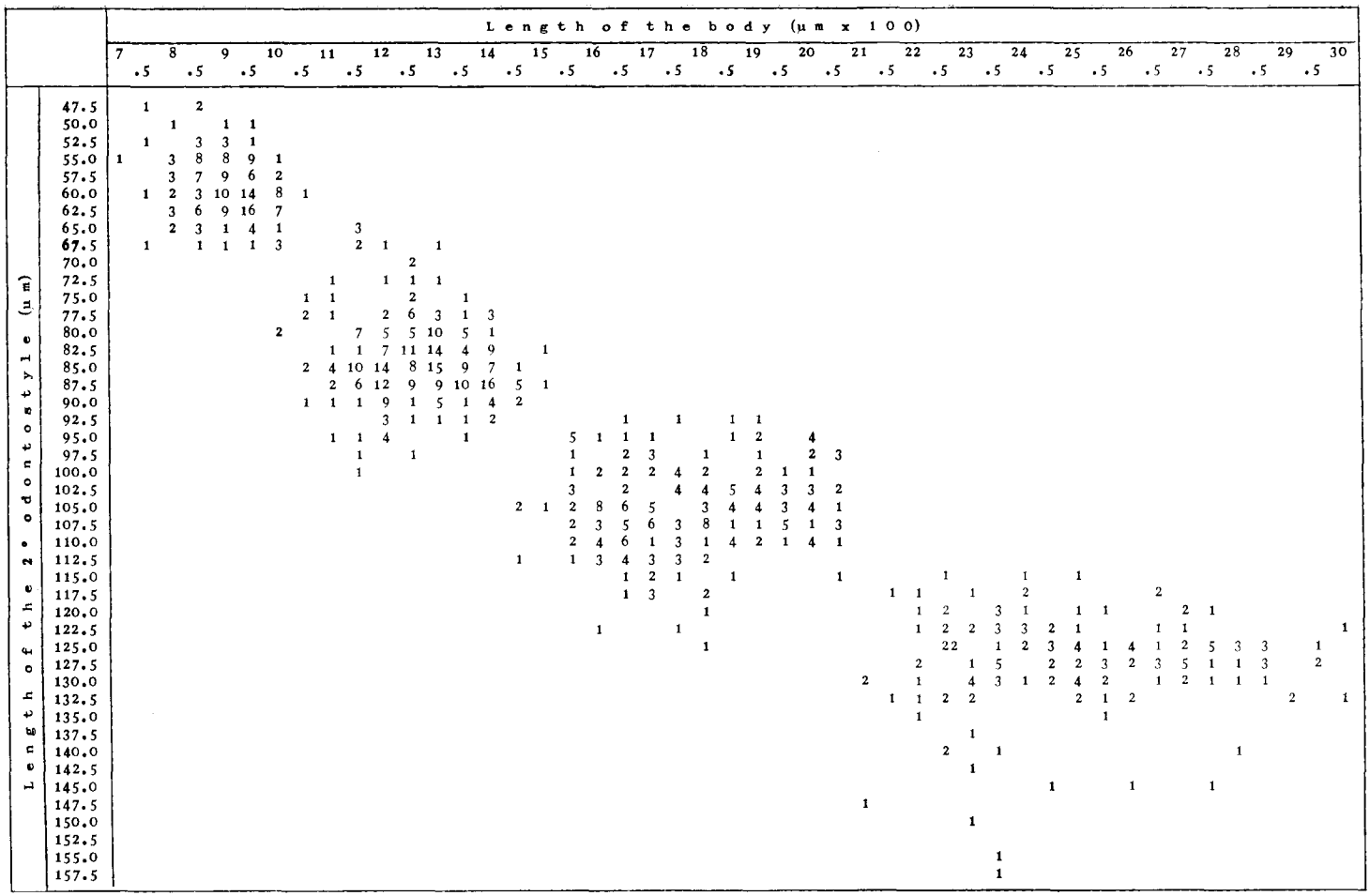


Fig. 3 - Relationship between body length and replacement odontostyle in juvenile stages of *X. index*.

## RESULTS AND CONCLUSIONS

The frequency of distribution of each of the three measurements (Fig. 1, a, b, c) showed four distinct peacks corresponding to each of the juvenile stages. There was little overlap in measurement between the third and fourth instars, and second and third instars, with any of the measurements used. However, the distinction between the first and second instars was less well defined, particularly in respect body length/first odontostyle (Fig. 2). Identification of an instar should therefore be made on the basis of measurements of each of the three elements: body length, functional odontostyle and replacement odontostyle (Table I). Nevertheless, the data presented here indicate the considerable variability within each juvenile stage of each of the three measurements considered and hence the difficulty as placing a specimen accurately within a particular stage. Exceptions are for the third and fourth stages which can be readily identified and with a high degree of assurance on the basis of a single measurement (Figs, 2 and 3).

Table I - *Morphometric identification of juvenile stages of* Xiphinema index.

| Juvenile stage | Measurement limits (µm) | | |
|---|---|---|---|
| | Body length | Functional odontostyle | Replacement odontostyle |
| 1 | < 950 | < 48 | 45 - 63 |
| 2 | 1050 - 1400 | 55 - 68 | 68 - 90 |
| 3 | 1500 - 2000 | 75 - 90 | 100 - 113 |
| 4 | 2150 - 3000 | 95 - 120 | 125 - 158 |

## LITERATURE CITED


DALMASSO A., 1970 - Etude anatomique et taxonomique des genres *Xiphinema, Longidorus* et *Paralongidorus* (Nematoda, Dorylaimoidea). *Mem. Mus. Hist. Nat. Paris, Série A, Zoologie, 61*: 33-82.

GOODEY J. B., 1963 - Laboratory methods for work with plant and soil nematodes. *Great Britain Ministr. Agric. Fish and Fd. Tech Bull.*, 2, 72 pp. H. M. Sta. Off. London.

PROTA U., BLEVE ZACHEO T., GARAU R. and LAMBERTI F., 1977 - Studies on the life cycle of *Xiphinema index. Nematol. medit., 5*: 299-303.

SEINHORST J. W, 1962 a - Modifications of the elutriation method for extracting nematodes from soil. *Nematologica, 8*: 117-128.

SEINHORST J. W., 1962 b - On the killing, fixation and transferring to glycerin of nematodes. *Nematologica, 8*: 29-32.



Accepted for publication on 20 October 1977.