

# Notes brèves

## THE DEVELOPMENT OF JUVENILE STAGES OF *XIPHINEMA INDEX* (NEMATODA : DORYLAIMIDA) ON *VITIS VINIFERA*

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In southern Italy *X. index* reduces yields of *Ficus carica* L. by its direct feeding and more importantly the yields of *Vitis* sp. by grapevine fanleaf nepovirus which it transmits.

Brown and Coiro (1985) reported that female *X. index* from Israel, Italy and the United States of America survived on *F. carica* for c. 64 weeks, had a reproductive span of c. 56 weeks and produced a total of c. 150 progeny. It was estimated that 25 days were required for each egg produced. However, Brown and Coiro (1985) did not determine the developmental requirements of the four juvenile stages but Prota *et al.* (1977) reported that on *F. carica* the life cycles of *X. index* from Sardinia and southern Italy were 17 and 8 weeks respectively. Furthermore, these authors reported differences between these two populations in the time required for development of each of the juvenile stages.

With *X. index* from the rhizosphere of *F. carica* growing in sandy loam soil at Brindisi, southern Italy we undertook a laboratory study to determine the development time on *V. vinifera* of the four juvenile stages. The nematodes were extracted by a decanting and sieving method (Brown & Boag, 1988) and, after identification, groups of these nematodes, each of the same juvenile stage, were hand-picked into a sterile sand and loam soil mixture in a series of 25 cm<sup>3</sup> clay pots with drainage holes. A separate series of pots were used for each of the four juvenile stages. A seedling of *V. vinifera* cv. Mission was added to each pot and the pots placed in temperature controlled cabinets, similar to that of Taylor and Brown (1974), at 23° ± 1 °C with supplementary lighting to provide a minimum day length of 16 h. At weekly intervals for each of 12 weeks from the commencement of the experiment nematodes were extracted from a minimum of four pots for each of the initial development stages. The nematodes recovered were counted and the development stages of each specimen identified.

The different developmental stages used to study the subsequent development of the nematodes each gave similar results with the nematodes requiring 10 weeks to complete a full developmental sequence (Fig. 1). All of the J1 nematodes developed to J2s within 1 week (Fig. 1 A), all J2s developed to J3s within two weeks (Fig. 1 A, B), all J3s developed to J4s within 3 to 4 weeks (Fig. 1, A, B, C), all J4s developed to females within 4 to 5 weeks (Fig. 1, A, B, C, D) females began to produce eggs after 2 weeks (Fig. 1 A) or 3 weeks (Fig. 1 B, C, D) and J1s

developing from eggs were observed after a further 2 (Fig. 1 A) to 3 weeks (Fig. B, C, D). The minimum times required for each stage to develop to the subsequent stage were J1 to J2, one week; J2 to J3, one week; J3 to J4, two weeks; J4 to female, two weeks and female to gravid female, two weeks.

The times required for development of *X. index* on *F. carica* of female to gravid female, eggs from gravid females to J1s, J1s to J2s, J2s to J3s, J3s to J4s and J4s to females for nematodes from Sardinia and from southern Italy were 3, 1, 2, 2, 6 and 3 weeks and 3, 1, 1, 1, 1 and 1 weeks respectively (Prota *et al.*, 1977). Accepting that *F. carica* is a better host for *X. index* than *V. vinifera* (Coiro & Brown, 1984; Brown & Coiro, 1985), our results are in agreement with those of Prota *et al.* (1977) for their population from southern Italy. Brown and Coiro (1985) estimated that on *V. vinifera* host plant a female *X. index* could produce an egg every 48 days above a minimum daily threshold temperature of 10 °C. From field observations, Coiro, Taylor and Lamberti (1987) suggested that the minimum daily threshold temperature required by *X. index* in southern Italy was 15 °C but Coiro and Agostinelli (unpubl.) in a laboratory experiment recorded some reproduction by *X. index* from southern Italy at 13 °C. The minimum temperature requirements for development of each juvenile stage of *X. index* above a minimum daily threshold temperature of 15 °C can be tentatively estimated here as being J1, 56 day. °C; J2, 54 day. °C; J3, 56 day. °C; J4, 112 day. °C; female to gravid female, 112 day. °C and egg to J1, 168 day. °C. Knowledge of these values may be useful when developing cropping systems or determining the timing of chemical applications for controlling the nematodes and the virus diseases which they transmit.

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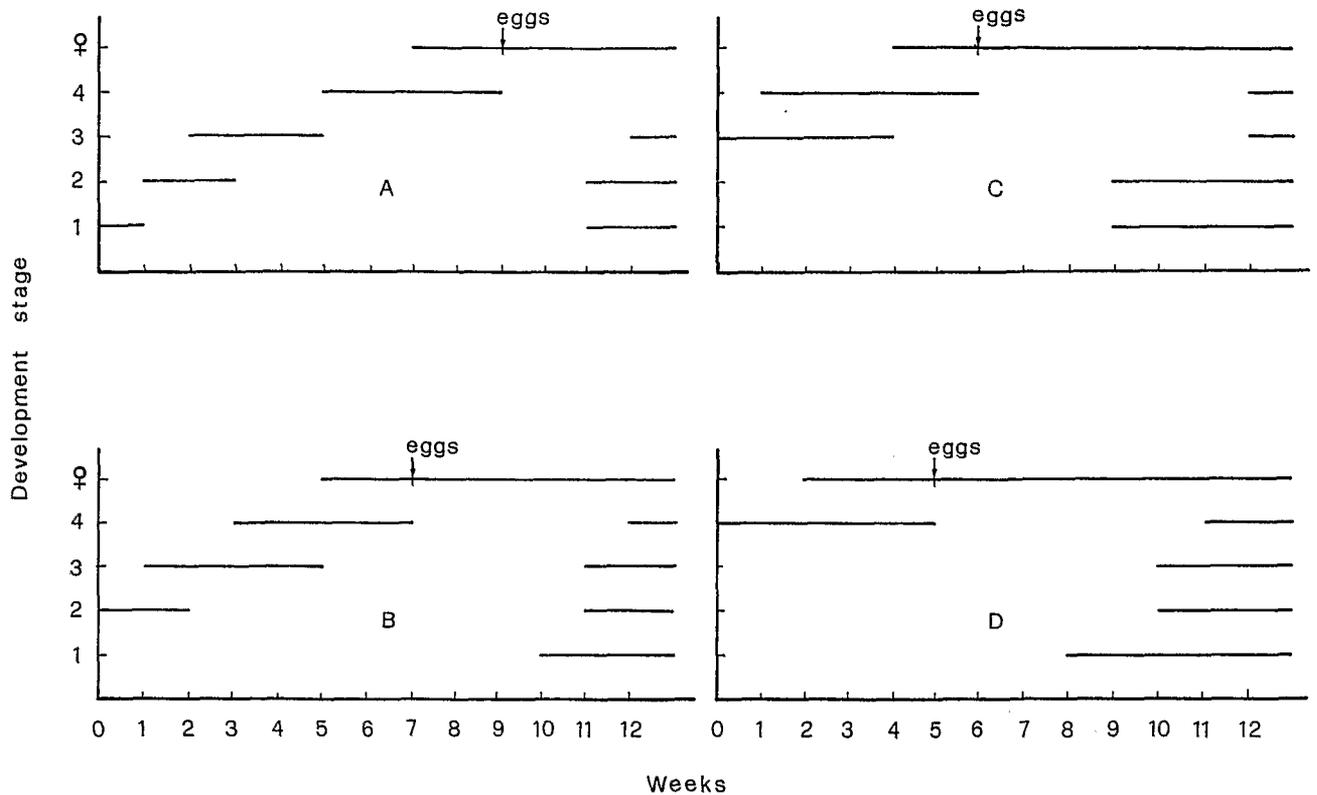


Fig. 1. The times required for the development of juvenile and adult *Xiphinema index* on *Vitis vinifera*. A : First stage; B : Second stage; C : Third stage; D : Fourth stage.

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