OBSERVATIONS ON GROWTH OF ADULTS OF ANGUINA FUNESTA
(NEMATODA: ANGUINIDAE)

BY

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Time of sampling of populations of grass-infesting Anguina spp. is probably the cause of greatest variability in body measurements of adults. Two-fold differences in length of males and females of A. funesta and in widths of males were obtained; three-fold differences in widths of females were recorded. Other characters such as tail length, length of post-vulval sac and position of the vulva were less variable as the nematodes grew. Development of colonies of the associated bacterium, Corynebacterium sp. inhibited development of adults shortly after the fourth moult.

Keywords: variability, inhibition, Corynebacterium, ryegrass, Lolium rigidum.

The taxonomy of the Anguinidae has recently been reviewed (Brzeski, 1981) with several new genera proposed and strong suggestions for further study. At present only grass-infesting species (with one exception) are included in Anguina. Earlier, Southey (1973) referred to the confused taxonomy of the grass-infesting species, particularly A. agrostis (Steinbuch, 1799) Filipjev, 1936, and recommended restriction of the specific name agrostis to nematodes reproducing on the type host Agrostis capillaris L. Price et al. (1979) agreed with this assessment and proposed A. funesta Price, Fisher & Kerr, 1979 for the nematode reproducing on Lolium spp. and Festuca spp. Stynes & Bird (1981) disagreed and synonymised A. funesta with A. agrostis.

In the genus Anguina, measurements of adults contribute to our understanding of the species as do other characters such as host range, which, however, is more usually used to separate pathotypes. Many factors contribute to variation and these are collectively grouped under genetic and environmental variables (including host): operator variables also contribute (Frederick & Tarjan, 1978; Brown, 1981). However, in synchronised populations, another factor, time of sampling, probably contributes to variation and there has been no estimate of this.

In the grass-infesting, seed-galling Anguina spp., populations in the field are probably mostly synchronised because growth and development of the host is largely synchronised by internal and environmental variables. Development of the nematode population in a single field begins after penetration of the ovules
of the host at about the same time and further development to adults proceeds under control of the environment. It follows that time of sampling for nematode measurements will affect the results obtained. In addition, the size of some characters, such as the hardened structures (e.g. spicules, stylet) is probably controlled by genetic and environmental factors that contribute to variation in juvenile growth, while other characters (body length and width) are affected during both juvenile and adult growth (Fisher, 1969; 1970). Characters which are affected in both juvenile and adult stages are likely to be more variable.

This paper examines the effects of time of sampling, as estimated by stage of growth of the host (*Lolium rigidum* Gaud.) on variation in body size of *A. funesta* in South Australia. It also discusses the effect of bacteria, and includes comments on the taxonomic status of *A. funesta*.

**MATERIALS AND METHODS**

Tillers of annual ryegrass (*L. rigidum*) were collected from marked areas in a field 5 km southwest of Murray Bridge, South Australia at weekly intervals from the beginning of September (Spring) (Table I, II) until nematodes reached maximum size. Galls were hand-dissected, the nematodes picked out, placed in 0.85% saline till more than twenty of each sex had been collected and were then killed with hot F:A 4:10. Development of the host was assessed by measuring the length of the ryegrass seedhead from the last node to the tip of the seedhead. Nematodes from galls with obvious bacterial (*Corynebacterium* sp.) contamination were kept separate. In the galls, observations on the presence or absence of deposited eggs and hatched second-stage juveniles were recorded. All measurements were from drawings made with a camera lucida on specimens mounted in F:A 4:10 and averages are based on twenty specimens.

**RESULTS**

Data on length of inflorescence, presence or absence of bacteria, stage of development of the population and measurements of various morphometric characters (Tables I and II) show that when the inflorescence was 10 to 18 cm long, many of the nematodes were undergoing the fourth moult and this suggests minimum sizes of adults. In the absence of the bacterium, as the inflorescence elongated, both length and width of adults increased till a maximum was reached when the inflorescence was longer than 23 cm. Eggs appeared for the first time when the inflorescence was longer than 23 cm but hatching did not commence till later.

Length and width were most variable and in females width was more variable than in males. The longest female was about twice the length of the shortest and the fattest about 3 times the diameter of the thinnest. Characters such as position of vulva as a percentage of body length, tail length and length of post-vulval sac as a percentage of vulval/anal distance were more consistent.