



INVESTIGATIONS OF RESISTANCE IN WHEAT, BARLEY,  
AND OATS TO HETERODERA AVENAE WOLL.

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SUMMARY

Resistance of wheat, barley and oats to different populations of, and the effect of cultivars of wheat on the growth of H. avenae were studied.

White females in soil and on roots should both be considered when assessing resistance by the number of females produced on the cultivar. Different results between trials on resistance emphasised the need for uniformity within the accepted methods of assessment, which with the possibility of better methods has been discussed.

Different ratings of resistance occurred between cultivars of the same cereal, suggesting more than a single gene was involved. Two cultivars of wheat (Spring Wheat 12698 and Loros) were resistant. Problems in breeding with the resistant cultivars, and control by using susceptible cultivars have been discussed. Some cultivars reacted differently to the two populations of H. avenae used. Loros was resistant to one and susceptible to the other population. Therefore, at least two biotypes of H. avenae are in South Australia.

Four growth stages of females of H. avenae, separated by three moulting phases, occurred during development on Heron. Growth of the nematode was affected by inherent differences in

growth between cultivars (Heron and Justin) and/or environmental factors affecting growth of cultivars.

- (a) Floral initiation occurred earlier in Justin than Heron.
- (b) Female growth was slower during the pre-adult stage in Justin.
- (c) Early growth of the adult female was similar, but was slower at a later stage when growth in Justin with and without floral initiation was compared.

Growth of H. avenae in resistant cultivars was similar to that in Heron during growth in the second larval stage, but differed in all later stages and few females developed. Infection occurred with all cultivars, and some larvae left the site of infection and reinfected the host at another site. Nematode growth was not retarded in resistant cultivars, but fewer females matured while normal development of the males occurred.

DECLARATION

I hereby declare that the work presented in this thesis has been performed by myself, except where otherwise stated in the text, and has not been submitted in any other application for a degree.

(Peter C. O'Brien)

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