

## Influence of Water Stress on Groundnut Aphids

G.V. Ranga Rao, J.A. Wightman, K.D.R. Wadia, D.V. Ranga Rao, and R.C. Nageswara Rao (ICRISAT Center)

The groundnut aphid *Aphis craccivora* Koch is cosmopolitan in distribution and infests many host plants belonging to the leguminous group. The alates (winged) invade the groundnut field from the nearby alternate hosts and produce nymphs parthenogenetically. Both nymphs and adults suck sap from the tender shoots, flower buds, and pegs. This species is generally considered as a pest of the rainy season groundnut crop in southern India. The

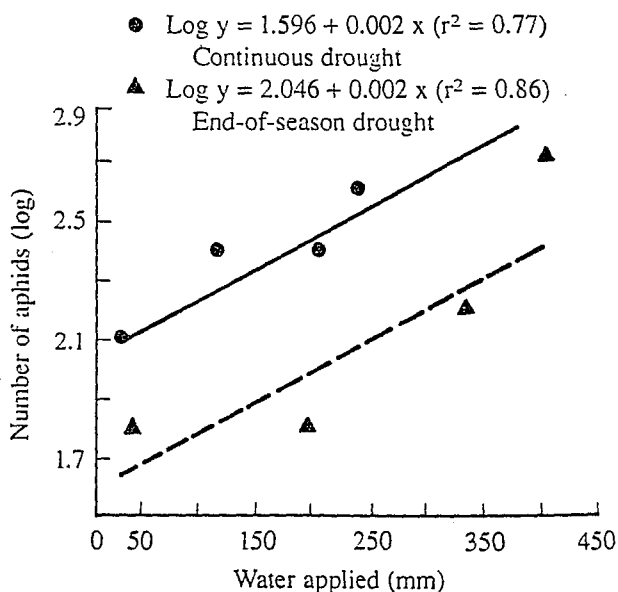


Figure 1. Distribution of aphid populations across a drought-stress gradient created by line-source overhead irrigation.

impact of this species is greater under moisture-stress situations. However, the effect of moisture stress on aphid populations was not clear. In the past couple of

seasons at ICRISAT Center, this species attained pest status unusually during the post-rainy season crop. This unusual appearance of aphids during the 1989/90 post-rainy season enabled us to observe aphid distribution across the water-stress gradient created by a line source overhead sprinkler irrigation system (Hanks et al. 1976). The crop was sown on beds of 1.5-m width during the 2nd week of December and there were eight beds across the gradient (range was complete wet to totally dry). Two different water stress situations were created, i.e., one was continuous water stress which was imposed from 40 days after sowing (DAS) and the other was end-of-season water stress introduced at 80 DAS. One week after the imposition of end-of-season stress on 8 Mar 1990 observations on aphid population were taken on 40 terminals sample<sup>-1</sup> in three replications. The results (Fig. 1) indicate that the aphid density was much higher in plants that had sufficient moisture. The difference in population from wet to totally dry end of the gradient was significant. There was a clear-cut negative relationship in population development as the distance from the water source increased. Similar trend was also noticed even 1 week after the initiation of end-of-season stress. Thus, these observations clearly indicated that aphids build up more rapidly on plants without moisture stress rather than on plants under stress. Two days after the aphid counts in the above trial, there was 70 mm rain at ICRISAT Center. The observation immediately after the rain showed that there was about 90% decline in population. The effect of rain on aphid population suggests that although the density was maximum close to the irrigation source, it had probably been suppressed by the physical effect of the water landing on the plants. The plants that were provided with irrigation during post-rainy season, attracted a large number of aphids which had the potential of reducing the yields significantly.

### Reference

Hanks, R.J., Keller, J., Rasmussen, V.P., and Wilson, G.O. 1976. Line source sprinkler for continuous variable irrigation crop production studies. Soil Science Society of America Journal 40:426-429.