A Note on Host Plants for the Groundnut Plant Hopper, *Hilda patruelis,* in Southern Africa

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The groundnut hopper, *Hilda patruelis* Stal (Homoptera: Tettigometridae), is a polyphagous sucking bug found in Africa south of the Sahara (Weaving 1980, Bohlen 1978, NRI 1996). Although *Hilda* is reported as a minor pest on cashew nuts, pigeonpea, citrus, soybean, maize, potato, okra, sunflower, cowpea, *Phaseolus* bean, and mung bean, the extent of damage to groundnut can often be of economic importance.

An adult hopper is from 3 to 5 mm in length, and brown or green in colour with white markings. Nymphs resemble the adults but without fully developed wings. Plants are attacked below the soil surface at the base of the stem and on the roots. On groundnuts the hoppers are also found feeding on pegs and pods and they tend to jump off when disturbed. Breeding occurs throughout the year and clusters (usually 10-50) of small, silvery-blue, elongate eggs are laid on the stems, roots, and in the case of groundnuts, on pegs and pods as well. Eggs hatch in 10-15 days. Each generation takes about 37-42 days with 5 nymphal instars to the adult. These hoppers survive the dry season on the roots of weeds or volunteer groundnut plants and later move into groundnut fields shortly after germination.

Infested plants turn yellow, wilt, and die due to sap-sucking by the hoppers. The vascular system of the plants turns brown, probably as a result of toxins in the saliva of Hilda or secondary infection by plant pathogens and the hoppers move from dying to adjacent healthy plants. *Hilda* has an obligate symbiotic relationship with several species of ants which protect it from predators and maintain the tunnels around the root zone in return for the honeydew excreted by the hopper. Common ant species include *Anoplolepis* spp and *Pheidole* spp (Bohlen 1978, NRI 1996). The presence of these ants at the base and along stems, branches, and pods on plants is a useful diagnostic feature.

Additional host plants in Malawi and Zimbabwe. During the course of field studies in Malawi in 1997/98, four additional host plants for Hilda were observed. They were sorghum, Hibiscus bushes, fish bean plant (*Tephrosia vogelii*), and a common Asteraceae weed (*Veronia poskeana*) locally known in Malawi's Chichewa language as Mbilizongwe. In Zimbabwe, Hilda was reported on *Hibiscus* bushes and Mexican marigold plants, Tagetes spp (PPRI 1982).

Incidence and damage levels on groundnut in Malawi, South Africa, Zambia, and Zimbabwe. Reports from Malawi (Rose 1962, Wightman and Wightman 1994), South Africa (Van Eeden 1993), and Zimbabwe (Weaving 1980, PPRI 1986) indicate extensive damage to groundnut crops particularly in dry seasons. The pest is always found at low densities on many farms (2-5% of plants) in most countries in southern Africa during normal growing seasons.

H. patruelis is generally considered as a minor pest of groundnuts and control is not cost effective. However, sporadic heavy infestations may occur in periods of drought or on an off-season crop. For example, during the 1997/98 growing season, groundnut field surveys at full podding phase indicated that 1-5% (mean 3.5%) of plants were infested in Malawi, eastern Zambia, and parts of Zimbabwe. Southern Zambia (Gwembe valley) had infestations ranging from 20-80% (mean 46%). The high infestation in southern Zambia was associated with very low and unevenly distributed rainfall. A small off-season groundnut seed multiplication crop at Chitedze Research Station had to be abandoned in 1997 due to an unexpected heavy infestation by *Hilda* (over 75% of plants). Isolated and very early or late sown farmers' crops often suffer severely from *Hilda* damage in many locations in Malawi, Zambia, and Zimbabwe. Heavy and continuous rains, however, destroy the tunnels maintained by the ants and reduce hopper populations.

References

E. Bohlen. 1978. Crop pests in Tanzania and their control. German Agency for Technical Cooperation, Ltd. (GTZ). 2nd edn. Berlin and Hamburg, Germany: Verlag Paul Parey. 142 pp.

NRI (Natural Resources Institute). 1996. Groundnuts. Pest Control Series, PANS2 (2nd edn). Chatham, UK: Natural Resources Institute. 348 pp.

PPRI (Plant Protection Research Institute). 1982. Control of *Hilda patruelis.* Pages 12-14 in Annual Report 1980/81.

Harare, Zimbabwe: Department of Research and Specialist Services, Ministry of Lands, Agriculture and Water Development.

PPRI (Plant Protection Research Institute). 1986. National surveys of insect pests of crops in communal areas. Pages 23-31 *in* Annual Report 1985/86. Harare, Zimbabwe: Department of Research and Specialist Services, Ministry of Lands, Agriculture and Water Development.

Rose, D.J.W. 1962. Pests of groundnuts. Rhodesian Agricultural Journal 59:197-298.

Van Eeden, C.F. 1993. The ecology and injuriousness of the insect pest complex of groundnuts *(Arachis hypogaea)* in the South African highveld region. Ph.D. thesis, University of Orange Free State, South Africa. 144 pp.

Weaving, A.J.S. 1980. Observations on *Hilda patruelis* Stal (Homoptera: Tettigometridae) and its infestation of the groundnut crop in Rhodesia. Journal of the Entomological Society of South Africa 43:151-167.

Wightman, J.A., and Wightman, A.S. 1994. An insect, agronomic and sociological survey of groundnut fields in southern Africa. Agriculture, Ecosystems and Environment 51:3.11-331.

Efficacy of Plant Products Against Thrips (Scirtothrips dorsalis Hood) in Groundnut

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Several species of thrips attack groundnut, but only a few such as Scirtothrips *dorsalis* Hood, *Frankliniella schultzei* (Trybom), and *Caliothrips indicus* (Bagnall) are of economic importance. Among different thrips, S. dorsalis is an important species causing crinkling and distortion of leaves. Prolonged and heavy infestation may cause stunting of plants resulting in 40% reduction in yield of groundnut Systemic insecticides were found to be effective against thrips in groundnut (Thimmaiah and Panchabhavi 1973, Senapathi and Patnaik 1980). However, control of thrips by botanical products would be less expensive with fewer adverse effects on natural enemies, and fewer environmental and operational hazards. Thus, the present study was conducted to find an effective plant product against *S. dorsalis.*

Scirtothrips dorsalis was a serious pest in the early crop growth of groundnut at Pudukkottai, Tamil Nadu. Field trials were conducted for two rainy seasons and one dry season namely, kharif 1995, winter 1995/96, and kharif 1996 in red lateritic soils at the National Pulses Research Centre, Vamban, Pudukkottai, Tamil Nadu, India, using the groundnut variety TMV 7 under irrigated conditions. Two separate trials, one for neem products, and one for indigenous plant extracts, were laid out in a randomized block design with three replications and a plot size of 5 m x 4 m. The plant extracts (50 g L^{-1}) other than the neem formulations, neem oil and neem seed kernel (NSK), were made into paste by grinding a few hours before spraying. The required quantity of water combined with teepol (1 ml L^{-1}) and the plant extract were then mixed thoroughly and filtered through muslin cloth. The plant products in both the trials were sprayed twice at 25 and 40 days after sowing using a manual knapsack sprayer. Water alone was sprayed in control plots and 0.05% monocrotophos used as a chemical insecticide control. Observations were made on 25 partially opened terminal leaves of five randomly-selected plants for the number of thrips prior to spraying and 3, 7, and 14 days after each treatment.

Significant differences were noted among the treatments of thrips population per leaf in all seasons. In both the trials, the monocrotophos was more effective than the plant products in controlling *S. dorsalis.* It recorded 45-50% reduction in population over the water control. All the neem products resulted in significantly lower thrips population than the control. Neem Gold® in kharif 1995 (2.44 thrips $leaf^{-1}$), neem leaf extract in winter 1995/96 (1.54 thrips $leaf^{-1}$), and neem oil in kharif 1996 (1.90 thrips $leaf^{-1}$) recorded low thrips population. The overall mean of three seasons indicated that the neem products namely, Achook®, Neem Gold® and neem oil (3%) had 29, 29 and 28% lower populations than the control (3.02 thrips $leaf^{-1}$) (Table 1). Mohan (1989) reported that application of NSK (5%) caused high mortality of thrips and mites within a week after application in rice. The neem-based formulations such as RD-9 Repelin and Neem Guard® were most effective in controlling groundnut leaf miner (Prabakar et al. 1994).

Among the indigenous plant products, Vitex leaf extract (LE) during kharif 1995 (1.95 thrips $leaf^{-1}$), *Achorus* root extract (RE) during winter 1995/96 and kharif 1996 recorded low (1.71 and 1.80 thrips leaf respectively) population of thrips. The mean data showed that Vitex LE and *Eucalyptus* LE were the best treatments in controlling *S. dorsalis,* as they recorded 30 and 29% lower populations than the control (Table 2). The other plant