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"Solidarity in a competing world — fair use of resources"

Aphids: A Major Threat to Cabbage Production in Ghana

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Abstract

Cabbage (*Brassica oleraceae* L. var. *capitata*) is a popular leafy vegetable consumed by many households in Ghana. It serves as a good source of vitamins and minerals, especially for malnourished children and pregnant women. Cabbage cultivation offers income to the rural, peri-urban and urban farmers and market women. In spite of its importance, insect pest damage contributes to high yield losses in cabbage production. Aphid attack can result in over 70–90 % loss in cabbage yield. A field trial was undertaken during the major and minor seasons in 2015 at Kpong and Kumasi in Ghana to study the infestation of aphids on cabbage, the species involved and a description of their damage and management. Ten cabbage leaves were randomly sampled weekly per treatment plot into 70 % alcohol and the total number of aphids were counted. Five pesticides were also applied weekly, namely Chlorpyrifos, Lambda-cyhalothrin, hot pepper fruit extract, neem seed extract, solution of local soap (alata samina) and water, as control. DNA barcoding using cytochrome oxidase sequences revealed two species of aphids, the mustard aphid, *Lipaphis erysimi* Kalt, which is the most abundant, and the generalist aphid, *Myzus persicae* (Sulzer), all occurring on cabbage at both locations. Aphid infestation was associated with sooty mold formation, leaf curling, mosaic, yellowing, browning, wilting and death of the plant; effects likely due to a mixture of direct feeding damage and transmission of pathogens, potentially including virus(es). Leaf samples from symptomatic plants are being tested for the presence of RNA and DNA viruses using RT-PCR and PCR, respectively, with universal primers for the different genera of viruses known to attack cabbage. The incidence and severity of aphid infestation on the cabbage was high with or without insecticide protection, except for plots sprayed with neem. A peak count of 1092 and 669 *L. erysimi*, and 495 and 199 *M. persicae* per leaf were obtained in the major and minor seasons, respectively. The least number of aphids, the highest yield and marketability was recorded in the neem-treated plots than the insecticide treated plots for both seasons.

Keywords: Aphids, cabbage, DNA barcoding, management, pesticides, viruses

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