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Opinion

A Need for Paradigm Shift in Control of Termites on Agricultural Production Fields

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Termite problem and current management approach

Although termites are undoubtedly important organisms that play a key role in the ecological functioning of many agricultural ecosystems, there are growing concerns over their negative effects in same ecosystems. Many termite species notably Macrotermes species construct large epigeal mounds [1] that occupy significant portions of the soil surface in many agricultural ecosystems. Mugerwa [2] for example reported that epigeal termite mounds occupied up to 75% of the total soil surface area in several habitats in the grasslands of central Uganda. Picker., *et al*. [3] also reported that giant earth mounds formed by the Southern harvester termite *Microhodotermes viator* occupied enormous proportions of the land surface in the Succulent Karoo, Nama Karoo and Fynbos biomes, with mound densities ranging from 143 to 704 km^2. Lovegrove and Siegfreid [4] reported that the ''little hills" of the same species occupied 14 - 25% of the land surface in South-western parts of Southern Africa. Yet, majority of termite control interventions such as use of plant and animal-based botanicals, chemical treatment and mound destruction by physical means are to a considerable extent ineffective, labor intensive, expensive over large expanses of land, and some practices notably chemical treatment are ecologically unsustainable. As such many termite management interventions only provide temporary relief to the termite problem.

Proposed shift in termite management

Preventing termites from initiating new colonies and hence constructing new termite mounds will undoubtedly suppress termite populations and alleviate or at least mitigate termite damage in long run. Foundation of new termite colonies, resulting into construction of new variously shaped and sized mounds on agricultural production fields and in other ecosystems, is primarily premised upon successful pairing of male and female alates to form tandems; maintenance of heterosexual tandems; and availability of a suitable site to host the heterosexual pair. Successful sex-pairing and maintenance of heterosexual tandems is mediated by sex-pairing pheromones, suggesting that termite control programs that aim at preventing development of new colonies and hence suppress termite populations, need to consider development of scientific approaches that disrupt sex-pairing during post-flight phase and deter alates from successful formation of heterosexual tandems and initiation of new colonies. Despite advances achieved in identification of the origin and chemical nature of sex-pairing pheromones, and their role in facilitating formation and maintenance of bisexual tandems, little efforts have been directed towards harnessing sex-pairing pheromones in termite pest control programs. Yet, the use of sex pheromones for mating disruption has proven a potentially effective, safe and environmentally sound means for controlling a number of insect pests [5]. Hence, a paradigm shift from use of current termite management interventions to harnessing sex-pairing pheromones in termite management programs offers an exciting opportunity for effective, efficient and sustainable management of termites in agricultural and forestry production systems.

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