

NATIONAL COLLECTION OF INSECT VECTORS

(G.J. Venter, C. de Beer, K. Labuschagne)

Biting and bloodsucking insects may cause severe irritation and transmit the causal agents of various diseases from infected to susceptible hosts. Trypanosomiasis of man and animals, bluetongue of sheep and malaria in man, are well-known insect-borne diseases and are transmitted by tsetse flies, midges and mosquitoes respectively. Parasitic larvae destroy either external or internal tissues of the host, causing a condition called myiasis. For example, in parts of South Africa the lesions produced by blowfly larvae on sheep are common, while nasal worm infestations in sheep and bots in equines are so widespread that they may be considered the rule rather than the exception in animals throughout the Republic. Control of the various parasitic flies and/or their larvae, even when it is based on knowledge of their life cycles, is sometimes difficult. In many species it is possible to destroy the immature stages at their breeding sites but the sites used by some species are not readily accessible, or they may be widely dispersed. Control measures then have to be aimed at the adults, either during their contact with the host animals or at their resting places or by using baits. Chemical pesticides applied to host animals at certain intervals may achieve reasonable control of bloodsucking or biting flies, but frequently destruction of both the immature and adult stages is necessary to obtain satisfactory results.

Veterinary and Medical Entomology is a vast and economical important discipline affecting the population of South Africa on all levels of society. In the veterinary field alone insects play an important role as the vectors of a number of important viral, protozoan and bacterial pathogens. A vast number of insects are considered as severe pest species of man and his animals. Insects can therefore be seen as a real impediment in the economical and sustainable animal production of any country. This impact is not restricted to animal production but also hampers the export of animals and animal products. Resistance to chemical control and reactions to global warming create further hurdles that need to be overcome in the successful management of the Veterinary Entomological problems in South Africa.

Insect collection

This activity deals with the diagnostics, biosystematics and control of insects of veterinary importance, as well as technology transfer to farmers, students and the public. The reference collection of veterinary important insects, including *Culicoides*, *Simulium*, lice and fleas can be considered a National asset. The maintenance and expansion of these collections databases, and the development of identification keys and new research areas also form part of this project. Input into and expansion of the reference collection depends greatly on receiving ad hoc samples for routine identification and material collected as part of other funded activities.

- ***Culicoides* (K. Labuschagne)**

Due to personnel shortages this is the only active collect at present. The number of African species in the collection is 132 and that of the rest of the world 78 species. Most of the collection is slide mounted while others are persevered in 80% alcohol. An electronic database is available. The number of samples added to the collection depends very much on the number of field collections undertaken and the cooperation with other researchers in the field and may vary from year to year. The average will be between 300 to over 500 samples analyzed yearly.

Siphonaptera and Phthiraptera

The collection consist of slide mounted material (± 3000 slide mounted), representing 50 species found on livestock, wild life and birds in southern Africa. Some type specimens are housed in the collection. Some specimens need remounting and the collection needs to be digitize. New acquisitions depend on samples received for diagnostic identification. No electronic database is available. Paper records are available.

Simulium

The *Simulium* collection consists of more than 800 collections made along South African rivers. At least 16 species are represented. Due to personnel shortages no

new samples are added to the collection. No electronic or paper records are available.

Other insects of veterinary importance

The Diptera collection includes *Musca* spp., *Stomoxys* spp., *Glossina* spp., mosquito (*Anopheles* spp., *Aedes* spp., *Culex* spp.), larva of myiasis producing flies and *Culicoides* spp. Only paper records are available. New acquisitions depend on samples received for diagnostic identification.

Colonisation of tsetse flies at ARC-OVI (C. de Beer)

Tsetse eradication is assuming increasing importance within Africa as it has become evident that the tsetse and trypanosomiasis is a contributing factor to perpetuating rural poverty. Therefore, the adoption of an area-wide approach for integrated pest management where conventional methods are used in combination with the Sterile Insect Technique (SIT) to eliminate tsetse can have a major impact on socio-economic development by increasing land available for agricultural exploitation and increase livestock development. The use of SIT involves the colonisation and mass rearing of the target insect species, sterilisation through the use of gamma radiation and releasing them into the field on a sustainable basis and in sufficient numbers to achieve appropriate sterile to wild insect ratios. No offspring result from the mating of sterile males with fertile wild females which results in a reduction and finally elimination of the pest population. Two tsetse fly species, *Glossina brevipalpis* and *G. austeni*, occur in the northern KwaZulu Natal province and cause nagana in animals. They occur mainly in the game reserves and rural communities close to the reserves. This project is done in collaboration with the Department of Agricultural (DoA) (KwaZulu Natal Veterinary services) (KZNVS) in an IAEA project SAF5/009 (Preparations for the creation of a zone free of *G. brevipalpis* and *G. austeni* in South Africa using SIT based area wide IPM approach). As part of this project, colonies of both species have been established at the ARC-OVI from seed material obtained from TTRI, Tanga and Seibersdorf, Austria. Current studies deal with aspects on the mass rearing and maintenance of the ARC-OVI tsetse fly colonies for tsetse fly research and development to support control and eradication actions in NE. KZN. At present the ARC-OVI houses the only *G. brevipalpis* colony in the world.