

# **FINAL REPORT**

Identification of termites causing damage in  
maize in small-scale farming systems  
M131/80

Project Manager: Dr MS Mphosi  
Co-workers: SH Nthangeni, UM du Plessis,  
AL Rossouw

## **DETAILS**

PROJECT NUMBER : M131/80  
PROJECT TITLE : Identification of termites causing damage in maize  
in small-scale farming systems.  
PROJECT MANAGER : MS Mphosi  
CO-WORKER(S) Internal : SH Nthangeni, UM du Plessis, AL Rossouw  
External : Limpopo Department of Agriculture, University of  
Limpopo, ARC-PPRI  
PROJECT STATUS : Terminated  
DURATION : 01/04/2008 to 31/03/2009

## **Summary**

This report reflects the survey results only, and it must be noted that the identification phase of this project was terminated due to financial reasons.

The survey was conducted in the Limpopo Province from April to July 2008. Limpopo was selected for this study because of high levels of concern regarding termite infestations. Villages selected for this survey include; Gamashashane, Indermak, the Oak and Venda Mapokoni. The survey revealed that maize, sorghum and legumes are the most widely grown, as well as termite-infested crops in Limpopo Province. The percentage of maize, sorghum and legumes grown by farmers ranged from 28% to 70% across the sampled villages. Ninety five percent of the resource-poor farmers from the areas stated that termite damage is their greatest production constraint relative to other damaging pests.

## Background

Termites (Isoptera) are social insects and include over 3 000 species, which are widely distributed throughout the tropics. Uys (2002) reported that southern Africa harbours an unusually high number of genera, partly due to great habitat diversity. Among soil engineers, termites constitute a major component of savannah and forest ecosystems in tropical and subtropical areas in southern Africa because of their strong impact on soil physical and chemical properties. To understand these impacts, species are usually considered along two functional (or feeding)-groups: viz soil feeding and fungus-growers, according to similarities. Although much work has been done on the southern African fauna, at least a third of the genera are in need of taxonomic revision (Jouquet *et al.* 2005). This include key genera such as the fungus-growers *Odontotermes* and *Microtermes*. Fungus-growing termites (Macroterminae) are characterised by exosymbiosis with a fungus (*Termitomyces sp.*), which completes degradation of the litter on which they feed. They also enrich their constructions with saliva, which contains easily degradable carbon, and fine particles, especially clays. These genera are known for their economic damage on cereal crops such as maize and sorghum in the southern Africa (Munthali *et al.* 1999). Damage caused by the fungus-growing termites has been reported in a wide range of crops in southern Africa, including maize, cowpea and sorghum (Harris 1971). Smit and Van den Berg (2003) also reported that fungus-growing termites are important pests of maize in South Africa. Termite damage has in fact been recorded in the majority of crops grown in the southern African region (Smit and Van den Berg (2003).

All stages of crop growth are subject to attack but post-harvest loss is common on many small-scale farms (Munthali *et al.* 1999).

During 2006 - 2007 small holding farmers in Limpopo raised serious concerns about termite damage in their maize producing fields. Termites in those areas are known to be in abundance during dry conditions. The objective of this project was to determine the extent of termite damage on small-holder farms that produce maize for consumption.

## **Materials and Methods**

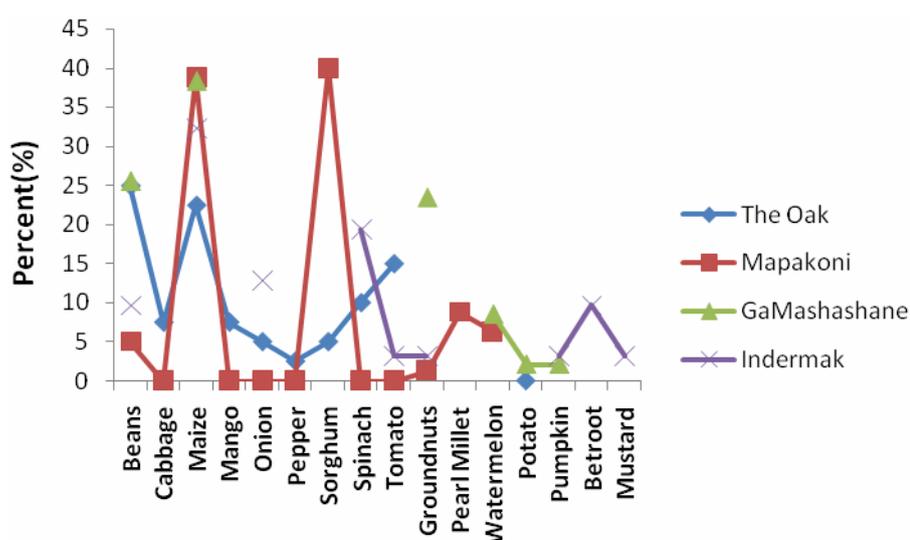
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A participatory rural appraisal approach (PRA) was used. At the beginning of each PRA meeting the farmers were informed about the purpose of the study, which is to generate information about problems affecting the cultivation of staple-food crops on their farms. The researchers avoided any mention of termites at the onset of the meetings. This helped making farmers open up with the problems that they were facing, including termite infestations.

The farmers were then taken through a semi-structured questionnaire with the help of extension officers and temporary assistants who were appropriately briefed beforehand. The information required included types of staple food crops planted on resource-poor farms, problematic pests, crops affected by termites, the extent of termite damage, types of termites as perceived by them and time in the season during which termite damage was highest. Farmers were also briefed on termite collection methods.

## Results and Discussion

The survey revealed that maize, sorghum and legumes are the most commonly grown, as well as termite infested crops in the Limpopo Province. The percentage of maize, sorghum and legumes grown by farmers ranged from 28% to 70% across the sampled villages (Figure 1).

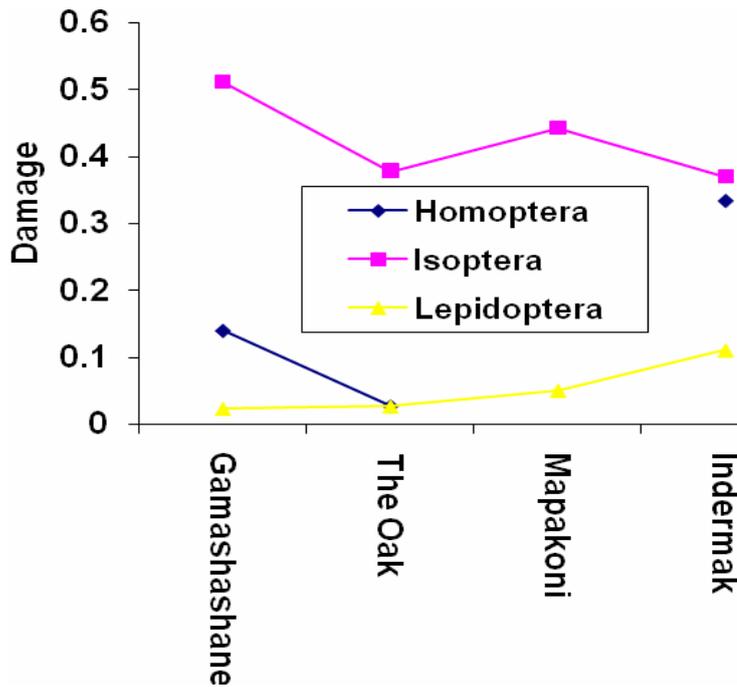


**Figure 1. The percentage of crops grown at the Oak, Mapakoni, Gamashashane and Indermak.**

The crops are predominantly planted in an intercropping arrangement. It was confirmed that termite infestation is a serious concern in small-scale farming systems where subsistence farming is practiced under low rainfall conditions.

### Damage by other insect pests

In order to determine the impact of other insect pests, insect were grouped according to orders (Figure 2). The order under which termites are classified is Isoptera and this order was ranked highest in crop damaged according to resource-poor farmers in Limpopo (Figure 2).

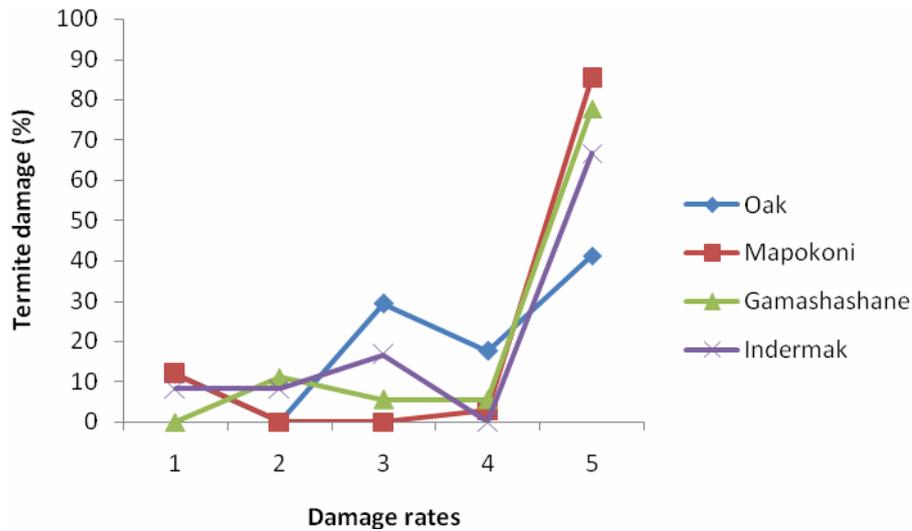


**Figure 2. The proportion of insect pests' damage based on their orders.**

Ninety- five percent of the resource-poor farmers from the areas surveyed stated that termite damage is their greatest production constraint relative to other damaging pests (Data not presented).

### **Termite damage**

The incidence of damage caused by termites in 2008 at Mapakoni, Gamashashane and Indermak was 85 %, 78 % and 67 % on maize, respectively (Figure 3). The farmers indicated that termite infestation became increasingly severe from about 10-12 weeks, until plants reached maturity (*ca.*16 weeks) and senescence was set in. Plants either remained standing or lodged (fell over). Lodged plants were subject to further attack by termites resulting in partial or total destruction of cobs.



**Figure 3. Incidence of termite damage under small-holder farming conditions across different villages.**

In this case, the damage cannot be attributed to a single termite species but to a number of genera of the fungus-growing sub-family, Macrotermitinae (Munthali et al. 1999). Specialist grass-feeder harvester termites, such as *Hodotermes mossambicus* and *Microhodotermes viator*, may be responsible for severe damage to vigorously growing seedlings and young plants through defoliation or by cutting through at the base of the stems and carrying them away piecemeal. Where seedlings, young and mature plants were attacked, externally at or just below the soil surface, we suspected larger Macrotermitinae such as *Macrotermes* spp., *Odontotermes* spp., and *Pseudacanthotermes* spp.

The time at which termite damage was highest varied across the villages surveyed but the majority of farmers at all locations consistently reported that termite damage was visible from December to March under dry conditions. This information helped researchers to expand the collection period

(December 2008 to March 2009). Due to late but heavy rainfall, most farmers planted very late and by the end of February, there was no termite infestation in their fields. This is not surprising because under heavy rainfalls conditions termite damage is always seen when plant have reached physiological maturity.

In conclusion, cereal and legume crops are the most vulnerable crops to termite damage in resource-poor farmers of Limpopo province under low rainfall conditions. Termite species causing crop damage need to be properly identified for correct control strategies to be developed in future. This study has revealed a need for the assessment of major insect pest s and their negative impact on economic staple crops.

## **Acknowledgements**

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## References

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