

# ANNUAL PROGRESS REPORT

## DETAILS

PROJECT NUMBER	P05000100
PROJECT TITLE	On-farm monitoring of selected soil fauna and beneficial microbes as bio-indicators in local soils under conservation agriculture regimes
PROJECT MANAGER	OHJ Rhode
CO-WORKER(S)	Internal Mr MA Prinsloo, Ms C Myburgh, Ms CCM Abrams External North-West University, Stellenbosch University, ARC-Nietvoorbij/Infruitec
PROJECT STATUS	Continue
DURATION	01/04/2019 to 31/03/2022
REPORT PERIOD	01 October 2019 to 30 September 2020

## ACTIONS TAKEN TO DATE

Soil sampling was performed during the first growing season, once before planting and during grain filling stage of maize crops at the trial sites at Brooksby, and Lareystryd in the Lichtenburg and Mafikeng areas. Various laboratory analyses were performed on these samples. These analyses included the Haney test, microbial soil enzyme assays viz. B-glucosidase, alkaline phosphatase and urease as well as mycorrhizal and soil fauna testing.

## PROGRESS MADE

During the first season of the project, various procedures were mastered such as the soil fauna and mycorrhiza protocols.

## RESULTS ACHIEVED TO DATE

After data was obtained for the second sampling at the two trial sites, results were obtained and are presented as follows: Selected soil enzyme assays (B-glucosidase, alkaline phosphatase and urease) revealed no significant differences between the various treatments at Lareystryd. However, The soil alteration index three (AI3 showed a more negative value in the maize plots compared to other treatments at Lareystryd. The AI3 index quantifies the balance between the three enzymes into a singular numerical value. A more negative value indicates an improvement in soil quality. This means the soil quality could be better in the maize plots compared to the rest of the treatments. Furthermore, this is also supported by the higher colonization (34%) percentage of maize treatments compared to cowpeas (12%) and soybean (13%) (Table 1). We also find that in the maize and sunflower treatments the mites:springtails ratio is lower than in soybean treatments (Table 1). At Brooksby the selected soil enzymes showed no significant differences among treatments. A more negative value for the AI3 index was also obtained in the maize plots. A similar finding for the mites:springtails ratio occurred in the soybean and cowpea treatments that was higher compared to the sunflower and maize treatments (Table 2). Mycorrhiza colonization was also higher in the maize and sunflower treatments compared to the legume treatments (Table 2).

Table 1: Soil flora and fauna results for Lareystryd

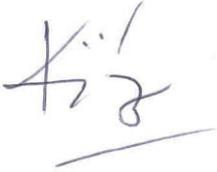
Treatment	Mites (per m <sup>2</sup> )	Springtails (per m <sup>2</sup> )	Mites: Springtails ratio	Mycorrhizal colonization (%)
1- Maize	600	1800	1:3.0	44
2- Soyabean	300	2300	1:3.2	13
3- Cowpeas	620	1950	1:3.14	12
4-Sunflower	490	1500	1:3.3	25

Table 2: Soil flora and fauna results for Brooksby

Treatment	Mites (per m <sup>2</sup> )	Springtails (per m <sup>2</sup> )	Mites: Springtails ratio	Mycorrhizal colonization (%)
1- Maize	300	900	1:3.0	31
2- Soyabean	130	850	1:6.5	21
3- Cowpeas	210	820	1:3.9	15
4-Sunflower	450	750	1:1.67	28

**PROBLEMS ENCOUNTERED**

Due to lockdown interaction between CA study group and researchers were limited. Also some analyses are still in progress. Results for the Haney test for the second sampling is still being analysed.

A handwritten signature in black ink, appearing to be 'K. J. 2020', with a horizontal line underneath.

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Handtekening van Snr Navorsingsbestuurder  
*Signature of Senior Manager Research*

1 Sptember 2020  
Datum/  
Date