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Application of nitrogen fertilizers to control *Striga* in maize

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Small-scale maize farmers in the province of KwaZulu-Natal face many soil fertility challenges. Continuous training through farmers' days and other platforms has revealed that, in certain parts of the Province, *Striga asiatica* impacts negatively on maize yields.

Striga

Striga asiatica (commonly known as witchweed) is a parasitic plant that grows by attaching its roots to the host plant, which may be maize or other grasses. The host plant becomes severely stunted with resultant yield loss. The parasitic nature of *Striga* can be seen in Figure 1.

FIGURE 1: *Striga asiatica* attached to the roots of a maize plant. Photo: Bright Mashiyana

Life cycle

Striga plants have green, opposite leaves and bright irregular flowers with the corolla tube slightly bent at the middle. There is a considerable variation in flower colour. The flowers are pink, red (as in Figure 2 next to maize host), white or yellow. The seeds can remain viable in the field for as long as 14-20 years. The length of the life cycle of the parasite, from germination to seed production, is about 4 months (Sibhatu, 2016). Germination of the *Striga* seed occurs in response to chemicals from the roots of the host. The germinating plant develops an organ of attachment, the haustorium. This serves as a bridge between the parasite and its host, and deprives the host of water, mineral nutrients and carbohydrates, causing drought stress and wilting. After several weeks of underground development, the parasite emerges above the soil surface and starts to flower and produce seeds (Kroschel, 2001).

Symptoms

Symptoms of *Striga* in the host plant (in this case maize) are **stunting**, **wilting**, and **chlorosis**. The plant becomes nutrient deficient, especially in nitrogen (as shown in Figure 2).

FIGURE 2: Symptoms of *Striga* parasite in maize. Photo: Bright Mashiyana

Control Measures

Soil Fertility

In an N P K field trial, N application resulted in up to 93% reduction in the incidence of *Striga* (Farina *et al*. 1985).

In a small-scale soil acidity demonstration trial in Stulwane near Bergville KZN, where lime was applied to neutralize acidity and phosphorus and nitrogen applied to increase yields, a plot where nitrogen was not applied had a high incidence of *Striga* and crop stunting. This was despite having applied the same amount of phosphorus and lime as were applied on other plots.

FIGURE 4: Application of nitrogen fertilizer at planting and top dressing times will significantly reduce the incidence of *Striga* and improve yields. Photo: Bright Mashiyana

Intercropping

Intercropping can be an effective technique to increase productivity and control *Striga* in maize-based cultivation systems considering the limited resources of small-scale subsistence farmers. It can be used as a tool to familiarize farmers with *Striga* control techniques because intercropping is a common cultivation practice in sub-Saharan Africa. Furthermore, it offers a variety of options to farmers. Best results in terms of productivity are achieved if maize and intercrops are planted simultaneously (Oswald *et al*., 2002). Inter-cropping maize with cowpea and sweet potatoes can significantly reduce the incidence of *Striga* (Oswald *et al*., 2002). A trial in Ndwedwe, KZN, showed that where maize was intercropped with sweet potatoes there was reduced *Striga* infestation.

FIGURE 5: Intercropping maize with sweet potatoes reduces incidence of *Striga*. Photo: Alan Manson

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