

## Developing bean foliage beetle management strategies with small scale bean growers in Tanzania.

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Bean foliage beetles (*Oothea* spp.) are widely distributed in eastern Africa where they attack beans and other leguminous crops. An evaluation of a cross section of the available germplasm suggested that host plant resistance might not be a management option as no resistant lines were identified. Characterization of collections of *Oothea* spp. from Tanzania by taxonomists at the Plant Protection Research Institute, South Africa suggests that *O. bennigseni* is the predominant species in the country.

In collaboration with extension officers and farmers in Hai and Lushoto Districts of northern Tanzania, farmers' fields were surveyed and the pest biology and ecology were studied in a participatory manner to improve understanding of the pest and to develop strategies for its management. Results on the pest's biology are described in Table 1. Pupation starts in July/August and adults begin to form in August/September. The adults remain in diapause in the soil until March-April the following year when they emerge with the rains and attack emerging bean crops and restart the cycle.

Table 1. A summary of *Oothea* life cycle in relation to bean planting cycle in northern Tanzania.

Period	Developmental activity
March / April	Adult emergence in synchrony with rains and planting of beans. They cause defoliation to bean seedlings Adults mate and oviposit in soil near bean plants. Emerging larvae feed on bean roots removing secondary roots and causing injury to the primary roots. They also poach nodules.
May / June	Larval damage to rooting system disturbs nutrient flow from the soil and causes plants to senesce prematurely and bear few pods, each with few seeds.
July	Beans are harvested but <i>Oothea</i> larvae are left in the soil, populations may exceed 100/m <sup>2</sup> Land is left to fallow and <i>Oothea</i> population development continues.
August	Pupation starts in the soil.
September	Adults are formed but remain in soil and undergo diapause.
October to March/April	Adults remain in diapause until the beginning of the rains when they emerge to attack newly planted beans.

An analysis of the vertical distribution of the insects within the soil indicates that 75% of the insects remained within the top 10 cm of the soil at all times (Figure 1).

In Lushoto District the effect of tillage systems on *Oothea* population development was investigated. The results suggested that tillage soon after harvest exposes the developing insects to natural enemies and environmental extremes that induce mortality among them. Ploughing and harrowing just before planting facilitates emergence of adults and increases the size of the population that attacks the crop.

A better understanding of *Oothea* biology and phenology was diffused through participatory research with farmers and extensionists in northern Tanzania. The knowledge has helped farmers to develop simple strategies such as: 1. delayed planting, 2. minimum tillage at time of planting, and 3. rotating bean field with non-hosts, for *Oothea* management.

Depth of soil

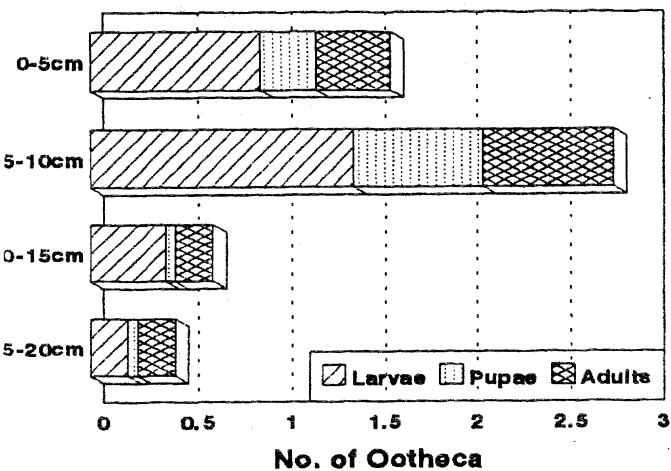


Figure 1. Vertical distribution of subterranean forms of *Oothea*

No. of insects emerging

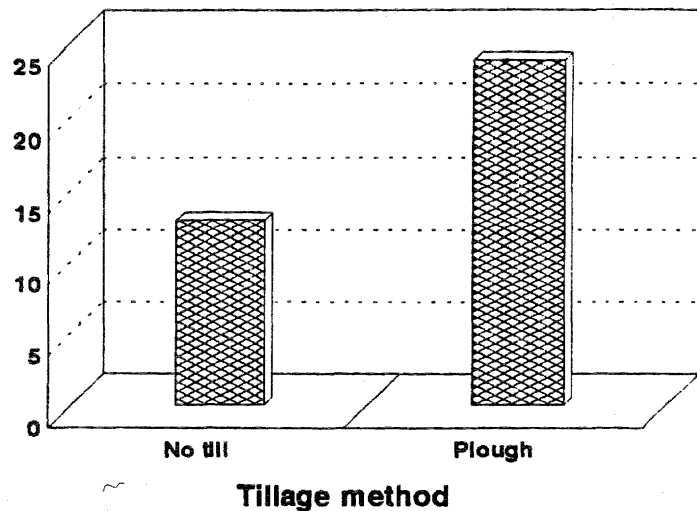


Figure 2. Effect of tillage method on *Oothea* emergence from soil