

Effect of Sowing Date on Noug Leafminer in Northwestern Ethiopia

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Abstract

Recent surveys in northwestern Ethiopia showed that the noug leafminer *Sphaeroderma guizotiae* (Selman) (Coleoptera: Chrysomelidae) is an increasingly destructive pest of noug (*Guizotia abyssinica*). In an attempt to develop an integrated pest management programme against this pest we conducted a sowing date experiment. Five dates, at 10-day intervals were used beginning on May 30 at Adet Research Centre during the 1994 and 1995 cropping seasons. Results of this experiment showed that infestation levels ranged between 11 and 35 percent, depending on the season. Infestations increased and yields decreased significantly as the sowing date was delayed. Leaf area damage ranged between 23 and 45 percent, the highest record being observed in last (July 14) sown plots. Planting noug at the beginning of June at Adet has an advantage to reduce the pest attack and obtain increased yield.

Introduction

Noug (*Guizotia abyssinica*) is the principal oilseed crop in Ethiopia (Abebe et al. 1992) particularly in northwestern parts of the country (Getinet & Nigussie 1992). Gojam is the largest producer, followed by Gondar (Getinet & Nigussie 1992). Like many other oilseeds, noug is an important source of edible oil and generates income for farmers. The yield per unit area is low and pests, among other factors, are responsible for such low yield (Tadesse & Bayeh 1992).

Tadesse and Bayeh (1992) reported 14

insect pests and Wassie (1994) nine insect pests of potential importance on noug. A recent survey in northwestern Ethiopia revealed a new pest, the noug leafminer [*Sphaeroderma guizotiae* (Selman), Coleoptera: Chrysomelidae] that became a real threat to the future of noug production (Abadi et al. 1994). An extensive damage on leaves of the noug crop is very common in northwestern Ethiopia. This insect has not been known as an economic pest in Ethiopia in the past but its identity was recently confirmed from specimens sent to the International Institute of Entomology (IIE) in London

from the Adet area. The IIE report also indicated that this species was originally described from Addis Ababa, near the Little Akaki River (2300 m above sea level) apparently mining leaves of *Guizotia schimperi*, a relative species of noug. It has also been observed mining leaves of the weed *Guizotia scabra* in and around Adet (Melaku & Amare 1996). According to the IIE report this pest is known only from Ethiopia.

Our observations on farmers' fields suggested that early planted crop always seemed to be less vulnerable to the attack by this pest and this simple observation stimulated us to undertake this study. Adjusting sowing date is a simple choice for resource-poor farmers where no additional investment is needed.

Materials and Methods

The experiment was carried out during the 1994 and 1995 cropping seasons at Adet Research Center experimental field on black soil. It was laid out in a randomized complete block design replicated three times. The plot size was 5 m x 1.8 m, consisting of 6 rows spaced 30 cm apart, with 1 m spacing between plots. The improved noug variety 'Fogera-1' was drilled at the recommended seeding rate of 10 kg ha⁻¹. The treatments consisted of five sowing dates at 10-day intervals, beginning on May 30 and ending on July 14. Sampling began at about two months

after sowing and continued every week (in 1994) or every two weeks (in 1995). Five plants per plot were randomly selected and the number of leaflets damaged and undamaged were counted, recorded, and percentage leaf damage was thus calculated.

Estimated leaf area damage was also recorded on a sample of 10 leaflets per plot in 1995 once at the peak stage of infestation. Grain yield data were taken from the central four rows. The data thus recorded were subjected to analysis of variance.

Results

The leaflet damage significantly varied from season to season. It was lower in 1994 than in 1995. Maximum leaflet damage in 1994 and 1995 was 11 and 35 percent, respectively (Tables 1 & 2). Infestation increased with the delay in planting while at the same time the yields significantly decreased (Table 3).

As sampling was continued for each sowing date separately, infestations generally decreased after August 23. This showed that the highest infestation is expected at about the last week of August. It steadily decreased thereafter as can be seen on Tables 1 and 2.

Leaf area damage ranged between 23 and 45 percent (Table 4). The maximum record of leaf area damage was recorded from the last sowing date of July 14.

Discussion

The data show that the leafminer *Sphaeroderma guizotiae* is a serious pest of noug that can cause heavy leaf destruction on noug. The pest problem is rather important in outbreak seasons like the one in 1995 where up to 35% leaflet damage (burning of the entire leaves) and 45% leaf area damage were recorded. The planting of the crop early (about the beginning of June) at Adet has proven to be of advantage to reduce the pest attack and at the same time obtain increased seed yield.

Control of pests by manipulating sowing date has several advantages. It is a simple cultural practice which is affordable and safe, and also serves as one component for the future development of an integrated management of the pest. The decreasing trend of the pest after the end of August indicates, among other factors, that may be associated with an increase in the activity of internal parasitoids. Other environmental factors such as temperature or rainfall might also be responsible. Besides, the growth stage of the crop may also be another possible factor associated with the reduction in the pest damage towards the end of the season. These are subject to further study. This sowing date adjustment, supplemented with the future studies on the role of leafminer natural enemies, will lead to an integrated pest management approach that makes use of naturally existing, environmentally friendly control options.

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