

Integrated weed Management Approach in Sugarcane

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Introduction

Sugarcane (*Saccharum officinarum* L.) is a member of the Poaceae family and has tillers or stems bunched in to primary shoots, with a sucrose content of 10-18% and fiber content of 10-15% at harvest. Sugarcane is the main crop that supplies sugar, and the second for ethanol production, grown in tropical and subtropical areas, which provides around 80% of the world production of sugar and 35% of the ethanol. There are many constraints in sugarcane production such as pests, diseases and weeds. One among them is weeds are a major threat that reduce the productivity of sugarcane. Here comes an integrated approach for better weed management in sugarcane.

Need for chemical control

- Labour is becoming scarce and costly.
- Conventional methods are inefficient.
- Initial weed growth cannot be controlled by conventional methods.
- Timely weeding is becoming difficult by conventional methods and becoming time consuming and costly.

Weed management in ratoon crop

- The maximum cane yield could be obtained by three hoeing at 30, 60 and 90 days after harvest.
- Spray of Atrazine @ 2.0 kg/ha as pre-emergence herbicide.
- Pre-emergence spraying of metribuzine @ 1 kg a.i/ha followed by spraying of 2, 4-D @ 1 kg a.i/ha at 45 days after ratoon initiation results in lesser number of weeds and weed dry weight with higher weed control efficiency (80.38%).
- 2,4-D @ 1.25 kg/ha as post-emergence at 90 days after harvesting.
- Directed spray of glyphosate 1.0 kg/ha at 150 days after harvesting.



Weed management in Sugarcane intercropping system

- Pre-emergence application of Thiobencarb @ 1.25 kg a.i / ha.
- PPI of fluchloralin or trifluralin and pre-emergence application of alachlor

Sugarcane+ wheat intercropping system

- Ready-mix herbicides sulfosulfuron (32 g/ ha)+ metsulfuron (35 g/ha) and mesosulfuron (14 g/ha) + iodosulfuron (35 g/ha) were also found promising against complex weed flora in sugarcane + wheat intercropping system.
- Pinoxaden alone and in combination with metsulfuron (50+4 g/ha), 2,4-D (50+500 g/ha) or carfentrazone (50 fb 20g/ha) were as good as weed free check

Sugarcane - vegetable intercropping situation

- The intercropping of autumn sugarcane with garlic, peas and cabbage did not reduce cane yields and enhanced the net monetary returns than sole sugarcane.
- In these intercropping systems, pre emergence application of Oxyfluorfen application @0.234 kg/ha or Pendimethalin @ 0.75 kg/ha provided effective weed control and improves overall profitability.
- Deep application of herbicide on the opened furrows

Cyperus management in sugarcane fields

Halosulfuron methyl @75% WG (Sempra) @67.5 g a.i./ha at 45 days after sowing was realized to be the optimum *C. rotundus* in sugarcane for effective control of crop

Striga management in sugarcane fields

- Earthing up at 100 days after planting.
- Herbicide mixture of either Atrazine + 2,4-D or Metribuzin + 2,4-D at 100% or 75% of their recommended doses after earthing up and subsequent 2-3 applications at an interval of 30-40 days.

- Higher doses of N fertilizers and frequent irrigations are to be applied specially in the *Striga* infested patches.
- After final herbicide treatment in these patches, mulching is to be done.

Efficacy of 2,4-D Na salt on *Striga asiatica*Efficacy of 2,4-D Na salt + urea on *Striga asiatica*

Ipomea management

- Herbicides spray such as Diuron + hexazinone + sulfometuron (1386.9 + 391 + 33.35 g a.i. ha⁻¹)
- Amicarbazone (1225 g a.i. ha⁻¹)
- Association of amicarbazone + isoxaflutole (840 + 75 g a.i. ha⁻¹)

Brown manuring with post emergence herbicide on weed management in planted sugarcane

- Pre-Emergence application of Pendimethalin @ 2.0 kg ha⁻¹ + Sesbania (brown manuring) + hand hoeing at 90 Days after planting.



Integrated Weed Management - given by Indian Institute of Sugarcane Research, Lucknow

- Application of Atrazine @ 1.0 kg a.i./ha with 1000 litres of water after 2-3 days of sugarcane planting under moist condition controlled weeds up to 40-45 days.

- To manage broad leaved weeds, application of 2,4-D Sodium Salt @ 1.0 kg a.i/ha with 600 litres of water was done at 60 days after planting.
- Finally, one manual hoeing at 90 days after planting was also followed.

This technology is known to control all types of weeds in sugarcane field. Integrated Weed Management technology produced 79 t/ha cane yield with Rs.52,530/ha as net return which were 30% and 48 % higher than the farmers' practices, respectively.



Integrated Weed Management – given by Tamil Nadu Agricultural University

Critical period of weed control	4 to 5 months
Cultural method	Remove the weeds along the furrows with hand hoe.
Mechanical method	Work with the junior-hoe along the ridges on 25, 55 and 85 days after planting for removal of weeds and proper stirring
Chemical method	<ol style="list-style-type: none"> 1. Pre-emergence herbicides like atrazine (2 to 3 kg/ha) Simazine (2 to 3 kg/ha), Alachlor(1.3 to 2.5 kg/ha) etc., will generally last for 8 to 12 weeks 2. To obtain best results sequential application of Pre-emergence and post emergence herbicides or post-emergence herbicides like Glyphosate (0.8 to 1.6 kg/ha) and Paraquat (0.4 to 0.8 kg/ha).



IWM given by University of Agricultural Sciences, Dharwad

- 2-3 DAP of sugarcane @ 10 kg /ha of Atrazine 50 WP has to be mixed in 300 litres of water and soil applied. This helps in prevention of weeds upto 30-35 DAS
- Weeds present in between the rows could be controlled by spray of 1 kg/ha of 2,4 –D Sodium (80% WP) as to be mixed in 300 litres of water and soil applied.
- Inter cultivation with blade harrow between the rows at 30, 60 and 90 DAP has to be done.
- Brown manuring with soyabean/ field bean/ sesbania could be carried out with the above mentioned herbicide spray.

Case studies

Deep application of oxyfluorfen (0.25 kg/ha) at 90 DAP fb 2, 4-D (2 kg/ha) and mulching at 140 DAP to Striga infested plant sugarcane and ratoon sugarcane were more productive (143.6 & 82.2 t/ha, respectively) and profitable (₹ 201.3 & 96.8 thousand/ha, respectively) for Bagalkot district areas.



1. Application of 150 % RDN, vermicompost (2.5 t/ha) and oxyfluorfen (0.25 kg/ha) at 90 DAP fb 2, 4-D (2 kg/ha) fb mulching to Striga infested plant sugarcane and ratoon sugarcane was more productive (174.7 & 101.6 t/ha, respectively) and profitable (₹ 279.8 & 137.6 thousand/ha, respectively) for Belagavi district area.

Conclusion

Sugarcane being a long duration crop with wider spacing weeds pose a major problem, which can be effectively controlled by combination of various cultural and mechanical methods along with the chemical methods. IWM proves to be both economical and effective for weed management in sugarcane crop.

