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ROLLING BRUSH STEM APPLICATOR FOR THE MANAGEMENT OF SUCKING PESTS IN COTTON

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ABSTRACT

The present study is on the evaluation of the use of rolling brush stem applicator in comparison with traditional method of hand spraying in cotton for sucking pests' management. The study revealed that rolling stem applicator was more effective than spraying as it is ecofriendly, low cost, input saving and drudgery reducing rolling brush method required one labour for three times application at the time of 30, 45 and 60 days after sowing. Total investment for rolling brush was Rs. 650-1500 against spraying which required two labour for five times (local farmers practice) with cost of Rs. 1400- 3500. The cost for monocrotophos was Rs.105/ application with rolling stem applicator and Rs.420/ l for spraying.

Key words: Cotton, sucking pests, rolling brush stem applicator, sprays, cost benefit, labour, drudgery reduction, environmental pollution, ease of application, yield, monocrotophos

Cotton (*Gossypium hirsutum*) is an important fibre and cash crop in India (Praveen and Sudharani, 2018) In Telangana, it is cultivated in 17.73 lakh ha, with a productivity of 358 kg/ ha (Agriculture at a glance, 2016). After introduction of Bt cotton in 2002, most of the pesticide sprays got reduced and achieved increased productivity (Sharma and Pampathy, 2006), but sucking pests become serious (Kalkal et al*.,* 2009; Murugesan et al., 2009). Though Bt cotton has been found successful against bollworms, sucking pests increased due to reduction in pesticide sprays at early stage (Jeyakumar et al., 2009). In an unprotected field, the effect on yield losses in Bt cotton due to sucking pests was about 26.21% (Makwana et al*.,* 2018). The repeated use of insecticides poses hazards to environment, humans, and resistance. Newer molecules such as pyridine carboxamide control sucking pests in cotton (Gourkhede et al., 2015). Farmers spray such insecticides and it is a tedious and laborious process, increase cost of cultivation and not ecofriendly. Non-availability or shortage of labour adds to the problems (Kumar et al., 2019). With a gender mainstreaming perspective in agriculture men and women farmers need to be involved equally. Krishi Vigyan Kendra (KVK), Wyra, Khammam designed a rolling brush for stem application in cotton for the control of sucking pests as an ecofriendly, low cost, input saving and drudgery reduction technology for. The KVK, Rudrur conducted On Farm Trail (OFT), Front Line Demonstration (FLD) and entrepreneurship activity from 2015-16 to 2019-20, and the results are presented herein.

MATERIALS AND METHODS

The study was conducted in the adopted villages viz. Suddulum, Takli, Sunkini and Hegdoli of Krishi Vigyan Kendra, Rudrur, Nizamabad district, Telangana state. Feedback of beneficiaries on the use of rolling brush for stem application and farmers normal practice of spraying were consolidated and compared. The cost involved and quantity of insecticide required in hand spraying and rolling stem applicator were assessed. The rolling stem applicator bought from the KVK, Wyra, Khammam consisted of a pipe of 75 x 2.5 cm dia, a foam holder with high density foam (sponge), with its weight being 250 g. As per the recommendation of Professor Jayashankar Telangana State Agricultural University (PJTSAU) Vyavasaya Diksuchi for sucking pests in cotton, monocrotophos and water (1:4) at 30, 45 days of sowing and imidacloprid and water (1:20) at 60 days of sowing were used. The procedure of mixing was 250 ml monocrotophos in 1 l water in a bucket and dipped rolling stem applicator into the spray fluid bucket. The spray fluid gets absorbed in the high-density foam (sponge) used, which can be applied to the base of the stem for about 15- 20 plants. With one rolling stem applicator by hiring one labour, the chemical can be applied to 10500 plants in 1 ha. The applicator can be again reused for many crop seasons. The control plot was maintained with traditional hand spraying. The parameters evaluated include- quantity of insecticide required, time taken for application, cost of chemical and labour, and ease of application. From 2015-16 to 2019-

20, Krishi Vigyan Kendra, Rudrur has been promoting the stem application method in cotton through trainings and method demonstrations in FLD fields. During first and second year difficulties in the adoption and spread of this technology were experienced.

RESULTS AND DISCUSSION

The results revealed that spraying against sucking pests require more labour and more quantity of chemical. For a small and marginal farmer, it was observed to be more burden when the cost of cultivation increases. Rolling stem application was observed to serve as effective ecofriendly tool as it is very easy to handle and apply, less risk to human beings, environment and beneficial insects (Kumar et al., 2019). With respect to time consumption for stem application, 18 hr was required in a crop season with 250 ml of monocrotophos. But with spraying, 30 hr with quantity of 1 l monocrotophos is required. For application by rolling brush cost also got reduced. With regard to labour charges, rolling brush method required one labour for three times i.e. during 30, 45 and 60 days after sowing. Total investment for rolling brush was Rs. 650-1500/-. But spraying of chemical required 2 labours for 5 times (local farmers practice) with total cost of Rs. 1400-3500 (Table 1).

Rolling brush stem application technique is being practiced for three years in 15 locations of Rangareddy district. It showed better performance when compared to the farmer's practice of spraying (Praveen and Sudharani, 2018). The cost incurred for monocrotophos was Rs.105/- with rolling stem applicator as against Rs.420/- per litre for spraying. With the small quantity of spray fluid, the application by rolling brush was easy and labour required was less. The number of sprays required for control of sucking pests were reduced by 3-4 sprays and an amount of Rs. 1970/- to Rs. 2170/- got reduced on cost of insecticide for three years (Praveen and Sudharani, 2018). The time required for rolling stem applicator was very less and in 6 hr 1.5 – 2 ha can be covered in a day as against 1-.8 ha/ day with 3 hr by spraying. Thus, more area can be covered in a short time which enables the farmer to go for timely plant protection . Thus, rolling stem applicator reduces the cost of cultivation and reduces drudgery, also input saving and safe to natural enemies.

The present results are in contrast with the findings of Nemade (2017), who concluded that three sprays of flonicmid 50 wp@100ga.i.ha^{-1}, floniamid 50 wp@75g a.i.ha^{-1}, buprofezin 25% SC@250g a.i.ha^{-1} and difenthiuron 50 wp @ 300g a.i.ha^{-1} were very effective against major sucking pests of Bt cotton. The FLD on stem application in cotton for sucking pest management taken up and implemented by District Agriculture Advisory and Technology Transfer Centre (DAATTC), Rangareddy PJTSAU helped the farming community. The area under stem application for management of sucking pests increased to 400 ha. Stem application is thus ecofriendly, cost effective, reduced the cost and labour usage in cotton. It gained wide popularity with the cooperation of KVK, CRIDA, ATMA and the State Department of Agriculture (Praveen and Sudharani, 2018).

Farmers expressed the following benefits of rolling stem applicator:

1. Labour saving, application can be done easily, and requirement of water and quantity of chemical is less; and once the spray fluid is

Table 1. Consolidated feedback of beneficiaries on the use of rolling brush for stem application

S. No	Parameters			Result
	Time required to spray/apply chemical and no. of labour	Chemical dosage	Labour charges	
Rolling brush method	Less time (6 hr / day- one labour- 3 times in a crop season= 6 hr x 1 x 3 = 18 hr	250 ml Monocrotophos/ ℓ/ acre	Rs. 650-1500/ acre	• Less time • Less chemical dosage • Less no. of labour • Less investment • No environment pollution • Physical stress reduction
Farmer's normal practice of spraying	More time (3 hr)- 2 labours- 5 times in crop season= 3h x 2 x 5 = 30 hr	1 L Monocrotophos /200 ℓ water/ acre	Rs.1400-3500/ acre	• More time • More chemical dosage • More no. of labour • More investment • Environment pollution

ready, it can be applied.

2. Insecticide saving because the chemical absorbed into the sponge will be directly applied to the plant without any wastage.
3. No environmental pollution because the chemical is not exposed.
4. No drudgery because the applicator can be carried without much energy and not required to bag it on the shoulders.
5. Easy in application because the equipment is light in weight; does not need any costly equipment and involves no skill.
6. No harm to natural enemies as the chemical is not exposed to the wind, also there is no risk of exposure to human beings.
7. Cost incurred is very less.
8. The technique is well suited for areas where there is severe water scarcity.

The feedback from men and women farmers reveal that women experienced safe and smooth performance. The farmers also are seeing and observing the benefits as furnished in the Table. Krishi Vigyan Kendra, Rudrur believed in the success of the technology and identified Smt. G. Shilpa, the most needy, economically poor and interested farm women to start entrepreneurship on rolling brush marketing. One rolling brush making charges is Rs. 150 and its selling price is Rs.180. Smt G. Shilpa thus earned by selling total profit of Rs. 900. Cotton is a premier commercial crop in India, and in the Bt era sucking pests are becoming more serious. Stem application in cotton with monocrotophos (1:4) is an effective and cost saving ecofriendly IPM method.

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