International Journal of Agriculture Sciences
ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 11, Issue 14, 2019, pp.-8779-8781.
Available online at https://www.bioinfopublication.org/jouarchive.php?opt=&jouid=BPJ0000217

Research Article

IMPACT OF FRONT LINE DEMONSTRATION ON THE MANAGEMENT OF BANANA *PSEUDOSTEM WEEVIL* IN BANANA

KAVITHA K.*, LATHA R. AND THIRUKUMARAN K.
ICAR-Krishi Vigyan Kendra, Thirupathisaram, Kanyakumari, 629 901, Tamil Nadu Agricultural University, Coimbatore, 641003, Tamil Nadu, India
*Corresponding Author: Email - kavithagobi@gmail.com

Received: July 03, 2019; Revised: July 24, 2019; Accepted: July 26, 2019; Published: July 30, 2019

Abstract: Banana occupies an area of 8500 ha as pure crop as well as intercrop /mixed crop in coconut /rubber/spice based cropping systems in Kanyakumari district. The low production and profitability are mainly due to inefficient farming practices, nutritional imbalances and rampant pest and disease problems. *Pseudostem weevil* is gaining importance as a serious pest causing heavy losses to the growers. The present study on demonstration of management practices for banana *Pseudostem weevil* was conducted by ICAR- Krishi Vigyan Kendra, Thirupathisaram in Kharif season during 2016-17 in 10 farmers' fields of Kanyakumari district in an area of 4 ha. The following technologies *viz*. Pseudo-stem injection with Monocrotophos 36WSC @ 4 ml (1:7 ratio) and application of *Beauvaria bassiana* @ 25g on the pseudostem of banana (pseudostem trap @100/ha) were demonstrated for the management of pseudo stem weevil in banana. The results revealed that farmers practice recorded 23.36 percent weevil incidence whereas the demo plots recorded only 10 percent incidence of *Pseudostem weevil* which is 57.19 percent reduction over farmers practice. Higher yield of 635 q/ha was recorded in demo plots which is 14.82 percent increase over the farmers practice (553q/ha). Adoption of integrated pest management technologies in banana along with other improved production technologies could substantially increase the income as well as improve the livelihood of farming community.

Keywords: *Front Line Demonstration, Banana, Pseudostem weevil, yield, B:C ratio*

Citation: Kavitha K., *et al*., (2019) Impact of Front Line Demonstration on The Management of Banana *Pseudostem weevil* in Banana. International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 11, Issue 14, pp.- 8779-8781.

Academic Editor / Reviewer: Vinod S Kukanur

Introduction

India produces large quantity of banana and plantain in the world. Of the 82.63 million tonnes of fruits produced in India, banana occupies the top position with an annual output of 29.72 MT. Among the 28 banana producing states in India, Tamil Nadu is the largest producer (5136 MT) followed by Gujarat and Maharashtra. Banana occupies an area of 8500 ha as pure crop as well as intercrop /mixed crop in coconut /rubber/spice based cropping systems in Kanyakumari district. The low production and profitability is mainly due to inefficient farming practices, nutritional imbalances and rampant pest and disease problems. Of them, insect pests play a major role in reducing yield and quality. *Pseudostem weevil, Odoiporus longicollis* Olivier (Coleoptera: Curculionidae) is gaining importance as a serious pest causing heavy loss to the growers. The female weevil lays eggs in the outer sheath of pseudostem. The emerging grubs tunnels the pseudostem for feeding and pupate inside the pseudostem to become adult to complete its lifecycle. Pseudostem becomes hollow, weak and bears undersized fruit or no fruit depending upon the extent of the damage [1]. Farmers use different management practices which include clean planting material, intercropping, destruction of residue after harvest, and pseudostem traps.

Materials and Methods

The present study is a part of the mandatory programme of Krishi Vigyan Kendra, Kanyakumari, Tamil Nadu. Participatory rural appraisal (PRA), group discussion and transect walk were followed to explore the detail information of study area. In between the technology intervention HRD components (Trainings / method demonstrations/ field day etc.) were also included to excel the farmers understanding and skill about the demonstrated technology on banana. Field demonstrations were conducted under close supervision of Krishi Vigyan Kendra, Kanyakumari.

Totally 10 front line demonstrations under real farming situations were conducted during Kharif season of 2016-17 at three different villages namely; Vendalikodu, Kulasekaram and Aruvikkarai respectively under Krishi Vigyan Kendra operational area. The area under each demonstration was 0.4 ha. The soil was sandy loam in texture with moderate water holding capacity. The soil test analysis of the demo fields showed the following fertility status *viz*., low to medium in organic carbon (0.31-0.63%), low in available nitrogen (175-273 kg/ha), low in available phosphorus (5.4-9.9 kg/ha), low to medium in available potassium (76-154 kg/ha) and soil pH was slightly acidic to neutral in reaction(6.0-6.7). The treatment comprised of demonstration practice (variety Red banana, integrated nutrient management based on soil test based analysis @ 100:112:345g NPK per plant/year with application of 20g in each of Azospirillum and Phosphobacteria at planting and N and K in 3 splits on 3rd, 5th and 7th month, Phosphorous at 3rd month of planting. Crop was planted between 15 June to 30 June 2016 with spacing of 2.1 x 2.1 m. The following crop protection technologies *viz*. Pseudo-stem injection with Monocrotophos 36WSC @ 4ml (1:7 ratio) (54 ml of monocrotophos with 350 ml of water) @ 4ml/plant (2ml at 45 cm from the ground level another 2 ml at 150 cm from the ground level) were injected into the stem through banana pseudostem injector at monthly interval from 5th to 8th month and application of *Beauvaria bassiana* @ 25g on the pseudostem of banana (pseudostem trap @100/ha) were demonstrated for the management of pseudo stem weevil in banana. The symptoms *viz*., presence of small pin head holes, fibrous extrusions, exudation of a gummy substance and presence of adult weevil were recorded at monthly interval. The number of damaged plants was recorded and percent infestation was calculated. Fields were irrigated at the critical stages of crop and the crop was harvested. Farmer's practice constituted imbalance dose of fertilizers (110:200:340 g NPK per plant/year), non usage of biofertilizers, indiscriminate use of plant protection measures.

Table-1 *Pseudostem weevil incidence, yield, technology gap, extension gap and technology Index of Banana under FLDs*

Particulars	Area	No. of farmers	Pseudostem weevil incidence (%)	Bunch weight (Kg)	Yield (q/ha)	Potential yield (q/ha)	Technology gap (q/ha)	Extension gap(q/ha)	Technology Index (%)
Demonstration practices	4.0	10	10.00	28.22	643.7	700.0	56.3	106.2	8.04
Framers practice	4.0	10	23.36	24.58	537.5	700.0			

Table-2 *Economics of Front Line Demonstration of Banana by demonstration practices as well as farmer's practices under irrigated conditions*

Particulars	Gross Cost (Rs./ha)	Gross Return (Rs./ha)	Net Return (Rs./ha)	BCR
Demonstration practices	107413	508000	400588	4.73
Framers practice	111425	442370	330945	3.97

Before the conduct of demonstration, training to farmers was imparted with respect to envisaged technological interventions. All steps *viz*., location selection, farmers selection, demonstration layout and farmers participation were followed [2]. Visits of farmers and extension functionaries were organized at demonstration plots to disseminate the technology at large scale. Yield data was collected from farmers practice and demonstration plots. The gross returns, cost of cultivation, net returns and benefit cost ratio (B:C ratio) were calculated by using prevailing prices of inputs and outputs and finally the extension gap, technology gap and technology index were worked out. To estimate the technology gap, extension gap and technology index, following formulae have been used [3].

Technology gap = Potential yield - Demonstration yield

Extension gap = Demonstration yield - farmer's practice yield.

$$Technology\ Index\ = \frac{Potential\ yield - Demonstration\ yield}{Potential\ yield} \times 100$$

Results & Discussion

The pseudo stem weevil incidence and yield attributing parameters *viz*., bunch weight and yield obtained under demonstration practice as well as farmers practice are presented in [Table-1]. The results revealed that demonstration plots recorded only 10 percent weevil infestation whereas control recorded 23.36 percent weevil infestation which is 57.19 percent higher than demonstrated plots. The results are similar to the findings of [3] that Injection of monocrotophos reduced the weevil infestation by 76.07 % and increased the fruit yield with better cost benefit ratio in red banana. Similarly, application of *Beauvaria bassiana* in split pseudostem caused 50% mortality of weevils that were attracted to these traps [4]. Similarly, higher bunch weight of 28.22 kg was recorded in demo plots whereas untreated control recorded a bunch weight of 24.58 kg. The increase in bunch weight and yield following recommended practice than the farmers practice could be due to the adoption of integrated nutrient management and integrated pest management on banana and similar results have been reported earlier [4 and 5]. The productivity of banana ranged from 588.7 to 671.2q/ha with average yield of 643.7 q/ha under demonstration plots in farmers field compared to yield in farmers practice which ranged from 537.5 to 564.3 q/ha with a mean of 537.5 q/ha. In comparison to farmers practice 19.75 percent increase in yield was observed in improved practice. The inputs and outputs prices of commodities of demonstrations were taken for calculating cost of cultivation, net returns and benefit cost ratio [Table-2]. The cost of cultivation by adopting improved practices ranged from Rs. 100125 to 111250 /ha with a mean value of Rs.107413/ha against farmers practice where in cost of production varied from Rs. 105750- Rs. 105750/ha, with an average of Rs. 111425/ha. Cultivation of banana under demonstration practices gave higher net return of Rs. 400588/ha compared to Rs. 330945/ha under farmers practice. The additional net income was Rs. 69643/ha over farmers practice. The average benefit cost ratio of demonstration practices was 4.73 and that of farmers practice was 3.97. Similar results have been reported earlier on banana [5]. The extension gap was 106.2 q/ha during the period of study which emphasized the need to educate the farmers through various means for the adoption of improved agricultural production to reverse the trend of wide extension gap [Table-2]. The technology gap in the demonstration plot yield over potential yield was 56.3q/ha which could be due to dissimilarity in the soil fertility status [6]. Use of latest crop production technologies will reduce the extension gap. Adoption new technologies would ultimately lead to the farmers to break off the traditional practice and adopt improved technology [7, 8 & 9]. The technology index was 8.04 percent which showed the feasibility of the evolved technology at the farmer's field. The lower the value of technology index, the more is the feasibility of the technology.

Conclusion

The results from the present study revealed that demonstration of integrated pest and nutrient management practice would reduce the weevil infestation and increase the yield in banana. The yield of banana could be increased higher with the intervention on adoption of integrated pest management and integrated nutrient management in Banana in the Kanyakumari district. Favorable benefit cost ratio is self-explanatory for the economic viability of the demonstration and convinced the farmers for adoption of improved technology in banana production.

Application of research: Adoption of improved production technologies with integrated pest management package in banana would reduce the pest incidence and increase the yield which ultimately enhances the production, productivity and livelihood of farmers.

Research Category: Technology dissemination, Front line Demonstration

Abbreviations:

MT-Metric tonnes
q- Quintal
ha-Hectare
Rs.- Rupees
BCR-Benefit Cost Ratio
Kg- Kilograms
FLD- Front Line Demonstration
WSC -Water soluble concentrate
g- Gram
ml-Milliliter
NPK- Nitrogen, Phosphorous and Potassium
PRA -Participatory Rural Appraisal
%- Percentage

Acknowledgement / Funding: Authors are thankful to ICAR, New Delhi and Director, ICAR-ATARI, Zone X, Hyderabad towards the funding for conducting the Front Line Demonstration. Authors are also thankful to ICAR-Krishi Vigyan Kendra, Thirupathisaram, Kanyakumari, 629 901, Tamil Nadu Agricultural University, Coimbatore, 641003, Tamil Nadu, India

****Principal Investigator or Chairperson of research: Dr K Kavitha**
University: Tamil Nadu Agricultural University, Coimbatore, 641003, Tamil Nadu
Research project name or number: ICAR-Krishi Vigyan Kendra, Kanyakumari, Frontline Demonstration

Author Contributions: All authors equally contributed

Author statement: All authors read, reviewed, agreed and approved the final manuscript. Note-All authors agreed that- Written informed consent was obtained from all participants prior to publish / enrolment

Study area / Sample Collection: ICAR-Krishi Vigyan Kendra, Thirupathisaram, Kanyakumari, 629 901

Cultivar / Variety name: Red Banana

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.
Ethical Committee Approval Number: Nil

References

[1] Padmanaban B., Sundararaju P. and Sathiamoorthy S. (2001) *Indian Journal of Entomology* 63(2), 19-24.

[2] Choudhary B.N. (1999) *Publication, Division of Agricultural Extension, ICAR*, 73-78.

[3] Samui S.K, Maitra S., Roy D.K., Mondal A.K. and Saha D. (2000). *J. of Indian Soc. of Coastal Agriculture Research* 18, 180-183.

[4] Nankinga C. M. (1999) *Ph.D. dissertation. University of Reading, UK*. 277.

[5] Irulandi S., Eraivan Arutkani Aiyanathan K. and Srivara Buddhi Bhuvaneswari S. (2012). J. *Biopest, 5 (Supplementary)*,68-71.

[6] Mukherjee, N. (2003) *Participatory, learning and action. Concept, Publishing Company, New Delhi*, 63-65.

[7] Raj A. D., Yadav V. and Rathod J. H. (2013) *International Journal of Scientific and Research Publication*s, 3 (9), 1-4.

[8] Tiwari B.K., Tiwari K.P., Sahare K.V. and Tripathi P.N. (2015) *Plant Archives,* 15 (2), 1079-1082.

[9] Hiremath S.M and Nagaraju M.V. (2010) *Karnataka J. Agric. Sci*., 23 (2), 341-342.