

Effectiveness of training-cum-demonstration for the management of coconut crown choke problem in the farmers' field

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In coconut, crown chocking is a nutritional disorder caused by deficiency of boron, and causing heavy damage to the young seedlings and yield of adult palms. Severity of the disorder was found to be high in coconut growing tracts of Assam.

Abstract

A farmer participatory exploration cum identification task of coconut crown choke problem was carried out in the eight small villages under Bezera Development Block of Kamrup Dist., Assam. A team consisting of Scientists, Technical personnel, Research Associates of CPCRI, Kahikuchi and local farmers were involved during the exploration and identification of crown choke affected palms. A comprehensive extension programme including training and demonstration of technology was followed in the farmers' field for management of crown choke disordered coconut palms. Observation on the recovery of treated palms indicated that, out of 60 palms showing boron deficiency symptoms, 51 (85 per cent) palms recovered to the fullest extent. The techno-social aspects like awareness, knowledge about the problem and skill, adoption behaviour with regard to the technology have been remarkably

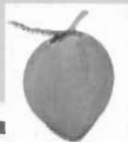
changed among the farmers during the study.

Introduction

National Agricultural Research System has generated a large number of farm technologies in the research station as well as in laboratory for the socio-economic development of farmers. But pace of transfer and diffusion of these generated technologies to the rural farmers is very low. Though there is full-fledged technology transfer programmes, technology adoption rate is low in the farmers' field. Even with the crores of marginal, poor and illiterate farmers, it is difficult to convince the farmers about farm technologies through print media as well as electronic media and sometimes many technologies are proved to be not feasible or suitable to all categories of farmers as there are diversified resource based farmers in our country.

Coconut, the queen of all palms is one of the important plantation crops in Assam. Due to its

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multifaceted usages, it is also known as *Kalpavriksha*. Like other crops it is also infested by a group of pests and diseases. Though pests and disease problem is low in this region, crown choke disorder is quiet commonly observed and causes heavy damage to the young coconut plantation in the growers field.

Status of the technology

In coconut, crown chocking is a nutritional disorder caused by deficiency of boron, which is a micronutrient and essential for strengthen the cells of the growing plant tissues. Boron is mostly absorbed as boric acid (H_3BO_3). Boron is essential for cell division and development, particularly of vascular elements. It is important for cell maturation by regulating the formation and lignifications of the cell wall. It is involved in the translocation of sugars, synthesis of nucleic acids and plant hormones, phenol metabolism, auxin (IAA), and tissue differentiation, membrane function, pollen germination and pollen tube growth, and involved in carbohydrate and protein metabolism. Under high rainfall conditions boron is readily leached from soil as $B(OH)_3$. Plant species differ characteristically in their capacity to

take up boron when grown in the same soil. Deficient plant exhibit necrosis and disorganization of tissues. Boron deficiency is normally detected in the growing points of roots, shoots and youngest leaves and results in the death of growing point. Symptoms of boron deficiency in the shoots are noticeable at the terminal buds or youngest leaves (Fig. 1), which becomes discoloured and may die. Terminal leaflets are welded together with their tips deformed as 'hook leaf'. Emergence of shorter leaves with deformed, crinkled and rudimentary leaflets with severe tip necrosis - crown choke.- at the last stage, the palm left with a bulbous growing point which stopped developing. Youngest leaf fail to unfurl gives bushy or rosette appearance. Fall of flowers and developing fruits and malformation of inflorescence may also occur in bearing palms. Severe boron deficiency leads to the death of seedlings/bearing palm, if corrective measure is not adopted. On the other hand it will drastically reduce the yield of adult palms.

With the above background, an attempt was undertaken in the farmers' field by a comprehensive extension programme in the form of

training and technology demonstration to study and manage the above problem of coconut in the growers' garden.

Materials and Methods

A farmer participatory exploration cum identification task of coconut crown choke problem was carried out in the eight small villages under Bezera Development Block of Kamrup Dist., Assam during the months of March-April, 2003. A team consisting of Scientists, Technical personnel, Research Associates of CPCRI, Kahikuchi and local farmers were involved during the exploration and identification of crown choke affected palms for accomplishing the task. Techno-social aspects of the farmers such as awareness, knowledge, skill and adoption level regarding the crown choke problem and its management were collected before the initiation of the technology demonstration and after the demonstration period. After identifying the crown choke disorder palms, a comprehensive extension programme training cum demonstration was undertaken for management of crown choke disorder in the farmers field. Critical inputs such as NPK fertilizers and borax were supplied free of cost to each individual farmer for conducting demonstration successfully.

Technology for crown choke disorder

Application of borax @50 g per palm for early and middle stage disorder and @100 g per palm for advanced stage disorder at half yearly interval along with recommended dose of fertilizers was the corrective measure adopted.



Fig. 1. Symptoms of Crown choke in coconut



Technology intervention was started during June-July 2003 and continued up to September-October 2005. Observations on recovery of disorder were recorded periodically.

Results and Discussions

An insight of the coconut farmers' garden

Based on field survey, information gathered regarding crown choke disorder of coconut is summarized in Table 1. The techno-social aspects of the farmers were collected and it was found that majority of farmers were marginal

observed, which accounts about 18.2 per cent. It was found that the disorder was common among seedlings of less than 5.5 years of age group (93.3 per cent). The identified palms with crown choke disorder were classified and found 17 nos. with early stage symptom having 1-2 leaves showing unfurling, 28 with middle stage symptom having 3-4 leaves showing unfurling symptom and 15 with the advanced stage symptom having 5 and >5 leaves showing unfurling symptom, inflorescence necrosis and barren nuts.

presented in Table 2. Observation on the recovery of treated palms indicated that, 51 palms were recovered (85 per cent) out of 60 palms showing boron deficiency symptoms (Fig.2). Further it was observed that, all the palms (100 per cent) showing early stage symptom were recovered to the fullest extent. In the category of middle stage symptom, 26 palms (93 per cent) could recover from the symptom out of 28 palms and 2 palms died. In the advanced stage symptom only 8 palms (53 per cent) could be recovered out of 15 palms, and 7 palms died.

Table 1. General information regarding the status of the crown choke disorder of coconut palms

Total nos. of villages visited	8
Total nos. of households visited	37
Total nos. of palms observed	329
Total nos of palms shown crown choke disorder	60
Disorder condition/status	Early : 17 nos. Middle : 28 nos. Advanced : 15 nos.
Stage of the crown choke disorder palms	Seedling stage : 54 nos. Bearing stage: 6 nos.
Average age of the disorder palm	5.5 years

Table 2. Impact of technology on recovery of crown choke symptom in coconut

Category	Before demonstration	After demonstration
Early stage	17 (28.3%)	17 – Recovered (100%)
Middle stage	28 (46.7%)	26 – Recovered (93%) 2 – Died
Advanced stage	15 (25.0%)	8 – Recovered (53%) 7 – Died

to small farmer category. The coconut cultivation was mainly observed in homestead garden (commonly called as bari), along the road side and around the fish pond which were grown without any scientific management practices. The number of palms in each household ranged from 2 to 8 palms and generally grown under rainfed condition. It is vivid from the Table 1 that about 60 palms showed crown choke disorder out of 329 palms

Impact of technology demonstration

Impact of the technology in reducing the disorder intensity is

Table 3. Distribution and percentage of farmers regarding techno-social characteristics of farmers on crown choke disorder of coconut palms before and after training cum demonstration

Characters	Not at all		Poor		Medium		High	
	Before	After	Before	After	Before	After	Before	After
Awareness	14 (37.8%)	-	11 (29.7%)	2 (5.4%)	5 (13.5%)	4 (10.8%)	7 (18.9%)	31 (83.8)
Knowledge	31 (83.8%)	2 (5.4%)	6 (16.2%)	5 (13.5%)	-	8 (21.6%)	-	22 (59.4%)
Skill	33 (89.2%)	-	2 (5.4%)	1 (2.7%)	2 (5.4%)	2 (5.4%)	-	34 (91.9%)
Adoption	32 (86.5%)	-	3 (8.1%)	3 (8.1%)	2 (5.4%)	4 (10.8%)	-	30 (81.1%)

Impact of training cum demonstration on techno-social characteristics of the farmers

Impact of the technology intervention with regard to techno-social aspects of the farmers is presented in Table 3. It is evident from the data that, there was a drastic change in the awareness, knowledge, skill level and adoption behaviour of the farmers after imposition of the technology intervention in their field.

Awareness: About 37.8 per cent of the farmers were not at all aware of the symptom, and 13.5 per cent and 18.9 per cent had medium to high level of awareness of the crown choke problem before the training. Awareness about the disorder have been increased remarkably after the training in the growers field. It was



Fig. 2. Coconut recovered from crown choke disorder

observed that, 83.78 per cent respondents had high level of awareness followed by medium (10.81) and poor (5.40) level of awareness about the symptoms of coconut crown choke problem.

Knowledge: Knowledge level about the disorder had increased remarkably after the training in the grower's field. Among the respondents, 31 (83.8 per cent) farmers were not at all had the knowledge about the cause of the disorder. There were only few farmers (16.2 per cent) who had poor knowledge about the causes of the disorder before the training. After the training, about 22 (59.4 per cent) respondent farmers had high level of knowledge regarding causes of the disorder followed by medium (21.6 per cent) and poor (13.5 per cent) level of knowledge. It was also observed that 5.4 per cent of the total respondents not at all gained the knowledge about the causes of the problem.

Skill: Skill to overcome the disorder had increased remarkably after the technology demonstration in the grower's field. Among all the respondent farmers, 33 (89.2 per cent) farmers were not at all had the skill to control the disorder. There were only few farmers (5.4 per cent) who had poor to medium skill to overcome the disorder before demonstration whereas after demonstration about 34 (91.9 per cent) respondent farmers had high level of skill regarding controlling of the disorder followed by medium (5.4 per cent) and poor (2.7 per cent) level of skill.

Adoption: Adoption level of respondent farmers was very poor before the training cum demonstration. The data revealed that, about 32 (86.5 per cent) respondent farmers had not at all adopted the technology to control the disorder. But there were farmers who had poor (8.1 per cent) to medium (5.4 per cent)

level of adoption of technology to control the disorder. After introduction of the technology demonstration in the grower's field, 30 (81.1 per cent) respondent farmers had the high adoption level followed by medium (10.8 per cent) and poor (8.1 per cent) adoption level.

Conclusion

In coconut, crown chocking is a nutritional disorder caused by deficiency of boron, and causing heavy damage to the young seedlings and yield of adult palms. Severity of the disorder was found to be high in coconut growing tracts of Assam. Observations on the recovery of treated palms indicated that, out of 60 palms showing boron deficiency symptoms, 51 palms recovered (85 per cent) to the fullest extent. The techno-social aspects like awareness, knowledge, skill and adoption level with regard to the technology for the management of coconut crown choke have positively been changed among the respondents during the study. This kind of extension approach may be followed in the area of technology transfer for the rural farmers.

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