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Performance of broccoli variety TSX-0788 under Bishnupur District, Manipur

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Abstract

Broccoli is a high value nutritive crop grown in small pockets without the proper knowledge of cultivation and selection of proper variety is the main concern in Manipur. Most of the farmers in Manipur grow random broccoli varieties found in the authorized shops like Delbros, Khoyathong, Manipur. Hence, to find out the yield potential and its economic impact, two high yielding broccoli varieties, TSX-0788 and Green Magic were chosen for the study at five different locations viz., Leimaram, Toubul, Kwasiphai, Moirang and Kumbi of Bishnupur district, Manipur using Front Line Demonstration (FLD) technique. The adopted package of practices was seed rate 400 g/ha, spacing 60x45 cm, FYM 500Kg/ha. NPK 120:80:60 Kg/ha. Results indicated that the variety TSX-0788 was found superior to Green Magic in terms of yield and net return. Broccoli variety TSX-0788 could obtain the yield of approximately 112.50 q/ha with a net return of Rs.2,65,150/- and a benefit cost ratio of 4.66:1; while the check variety Green Magic obtained 103.53 q/ha with a net return of Rs.2,38,210/- and a benefit cost ratio of 3.65:1. The percent increase in yield over the check variety was 58.1%. The technology gap, extension gap and technology index were 72.5 q/ha, 8.98 q/ha and 37.5% respectively. From the current findings it can be concluded that selection of broccoli variety TSX-0788 could help to improve the economy of the farmers.

Keywords: Broccoli, head yield, front line demonstration, economics

Introduction

Broccoli (*Brassica oleracea* L. var. *italica*) belongs to the family Brassicaceae, is native to the Mediterranean region. It is grown during cool-season for its nutritious green flowering head. The plant contains high amount of vitamins (A and B₂) and minerals (K, P, Ca and Fe). It has low amount of sodium and is calories and fat free ^[1]. It also contains thiamine, riboflavin and niacin. Broccoli is the richest source of protein among cole crops ^[2]. Intake of high amount of broccoli reduces the risk of cancer as it contains glucoraphanin compound and also prevents heart disease ^[3]. Though India is the second largest producer of broccoli after China, the crop is grown in small pockets in Manipur and yet to popularize the production technology with recommended fertilizer dose.

Bishnupur district is one of the valley districts in the Imphal valley of Manipur covering a total area of 496 sq. km., out of which an area of 42,366 ha. is of cultivable land and an area of 9,129 ha. is under horticultural crops ^[4]. The soil of the district is acidic with a pH ranging from 4.5 to 5.5 and the texture is mostly of clay loam. It has a great potential for production of horticultural crops and occupies first position in terms of production of vegetables in the state of Manipur. With the view of increasing the income of local farmers, several locational field trials were conducted to find out the yield per hectare and economic returns of broccoli variety TSX-0788 and check variety Green Magic by selecting two progressive farmers each from five different regions of the district.

Materials and Methods

A Front line demonstration was conducted on the yield performance and economic returns of broccoli variety TSX-0788 at farmers' field at Leimaram, Toubul, Kwasiphai, Moirang and Kumbi of Bishnupur district, Manipur (Fig. 1). The soil of the experimental fields were nearly the same with a texture of clayey loam having an average pH of 5.57, high in organic matter (1.82%), medium in available nitrogen (346.7 kg/ha), phosphorus (72.6 kg/ha) and potassium (220.4 kg/ha). The details of the technology followed were: seed rate @400 g/ha, spacing 60x45 cm, FYM 500 kg/ha, N:P:K 120:80:60 kg/ha.

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Seedlings were raised on nursery bed of 1 m in width with 15 cm bed height with a convenient length to the selected areas. The beds were prepared in the east and west direction. The soil of the nursery beds were made prepared into fine tilth loam soil, high in organic matter with the provision of drainage to avoid water logging. All the unwanted debris were removed and proper leveling was done for proper growth of the seedlings. Prior to seed sowing, well decomposed FYM @ 4kg /m² was applied uniformly to the nursery beds and then the parallel lines were demarcated with a width of 12 cm each from line to line. The seeds were then sown on the marked lines and then covered immediately with fine sieved FYM after sowing. To enhance germination and to protect against pests and birds, the beds were covered by gunny bags until germination. Later, a light irrigation was given with the help of rosecan. Seeds started germination after 4 days. When the seeds started germination, the mulch was removed carefully to avoid damage to the emerging plumules. To avoid the harsh sunlight, it is always recommended to remove the

mulching in evening hours during sunny days. Irrigation was given once everyday until the seedlings have 4-5 well developed leaves. Hardening of seedlings was done by holding irrigation to the plants for 5 days before transplanting to harden better against unfavorable abiotic conditions such as hot day and high temperature. The seedlings were ready to transplant at 28 days after sowing. Prior to transplanting in the main field, FYM, half dose of Urea (N), full doses of SSP (Phosphorus) and MOP (Potassium) were applied during the final land preparation. Later, 1/4th of the urea was applied at 35 days after transplanting and another 1/4th at 50 days after transplanting. Harvesting of the broccoli head was done after 60 days after transplanting. The yield data were recorded for the consecutive two years and later converted into average yield /ha. The Percentage increase yield, and extension tools viz., technology gap, extension gap and technology index were calculated by using the method [5]. The potential yield of the broccoli variety TSX-0788 was taken as 185 qtl/ha [6].

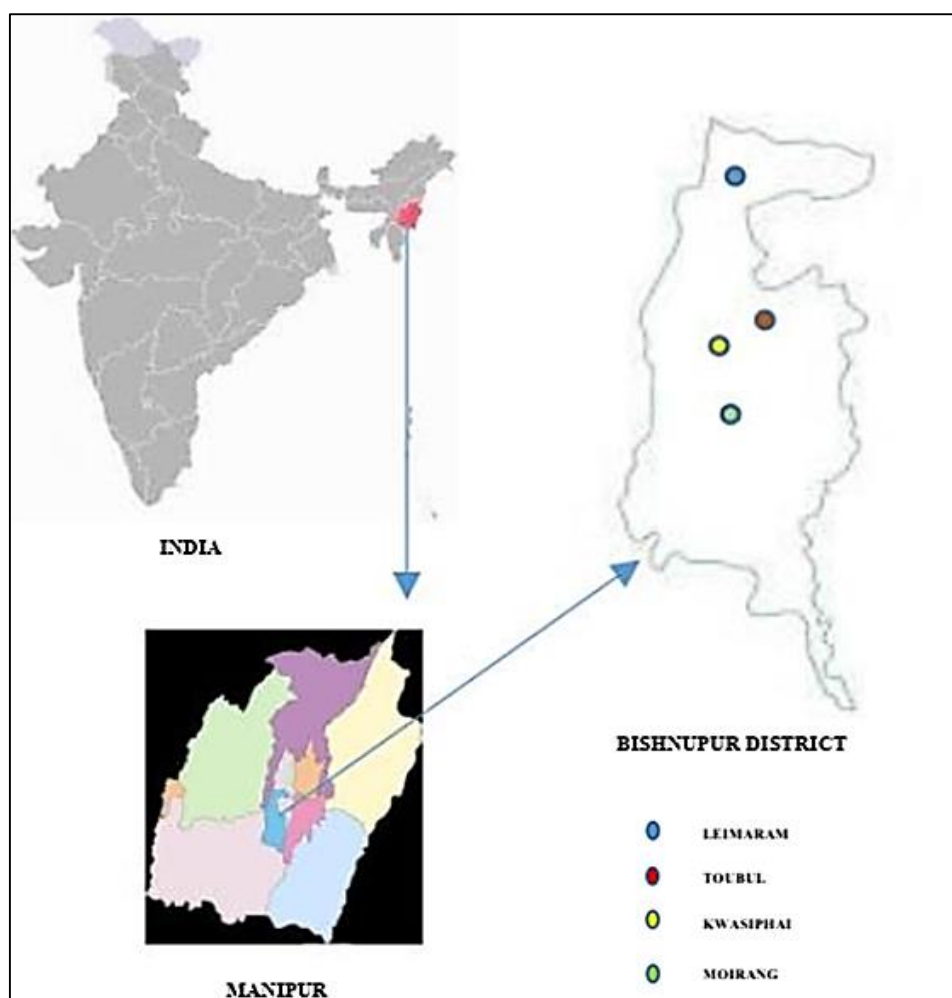


Fig 1: Map of the study site

Results and Discussion

The field study showed that the average yield of Broccoli variety TSX-0788 could be increased by 58.1 per cent (Table 1). The yield of the broccoli variety TSX-0788 improved over the yield obtained from the broccoli variety Green Magic may be due to the fact that the variety TSX-0788 favours the edaphic condition (in terms of pH and nutrients present in the soil), and the superiority of the variety in performance under the same environmental condition was found favourable

enough for growth and development of the plant, thereby producing bigger heads as compared to that of the checked variety Green Magic which produced smaller heads. The performance of the technology demonstrated was found superior than the farmer's practice under same environment in paddy [7] and Chilli [4].

The average technology gap of 72.5 qtl/ha and extension gap of 8.98 qtl/ha (Table 1) was found which may be due to variation in the character of the varieties and lack of

knowledge regarding this new variety by the farmers. To bridge this gap, the farmers should be educated through various extension activities like training programmes, introduction, assessment of new varieties or technologies etc. The result is in line with that of Singh *et al.* [8] and Devi *et al.* [4] which mentioned that the introduction of new technology and use of high yielding varieties will change the trending technology rapidly and hence reduce the extension gap. The study found that a technology index of 37.5 per cent which indicated that there is a good accomplishment of technology interventions. The finding is in conformity with that of Singh *et al.* [8], Devi *et al.* [4] and Singh *et al.* [9] where the technology index of 20.65% in paddy, 26.4% in chilli and 30.38% in chick pea respectively. This indicates that adoption of demonstrated technological intervention will boost the yield performance of broccoli.

The average head yield of 112.50 q/ha was found with the

variety TSX-0788 while the check variety (Green Magic) yielded only 103.52 q/ha (Table 2). Difference in yield varies from varieties to varieties. The difference in yield among different varieties cultivars was demonstrated by Bhangre *et al.* [10] and Tejaswini *et al.* [11]. Difference in yield among cultivars may be due to their own-genetic makeup and the suitability of varieties to the weather conditions of this zone in Broccoli [10], [11], [12], [13].

Broccoli variety TSX-0788 could obtain a net return of Rs. 2,65,150/- with benefit cost ratio 4.66:1 whereas the check cultivar (Magic Green) could obtain an amount of Rs. 2,38,210/- as net income with 3.64:1 benefit cost ratio. The variation in net return and benefit cost ratio was due to difference in yield among the two cultivars.

Varietal Performance of Broccoli

Table 1: Yield gap and yield index analysis of broccoli var. TSX-0788 and Green Magic

Variable	Average yield (qtl/ha)	Increase (%) over farmer's practice	Technology gap (qtl/ha)	Extension gap (qtl/ha)	Technology Index (%)
Green Magic	103.52	-	-	-	-
TSX-0788	112.50	58.1	72.5	8.98	37.5

Table 2: Yield and Economic impact of broccoli var. TSX-0788 and Green Magic

Variable	Average yield (qtl/ha)	Cost of cultivation (Rs.)	Gross Return (Rs.)	Net Return (Rs.)	B:C Ratio
TSX-0788	112.50	72,350	3,37,500	2,65,150	4.66:1
Green Magic	103.52	85,100	3,31,056	2,38,210	3.65:1

*While calculating the cost of cultivation, all the inputs and expenditures were included.

Conclusion

The broccoli variety TSX-0788 performed better than the variety Green Magic in terms of yield in all the five experimental locations though both variety are high yielding varieties. From the current study it can be concluded that the productivity gained under Front Line Demonstration (FLD) over current practices of broccoli cultivation will create greater awareness and motivate the other farmers to adopt suitable production technology of broccoli in the district. Hence, the broccoli variety TSX-0788 could be considered as a promising variety for Bishnupur district of Manipur for getting higher returns of the farmers.

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