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Enhancement in Production of Sunflower in North India through Conductance of Cluster Front line Demonstrations

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ABSTRACT

The domestic requirement of the oilseed had been manifold as of a modern living standard which has been fulfilled through the imports that leads to imbalance the Indian economy. To fulfill the domestic demand and to boost the production and productivity, front line demonstrations (FLDs) on sunflower were conducted at farmer's field in 2 KVKs of Punjab and 1 KVK of Haryana during spring season 2015-2016. In KVKs at Jalandhar, Kapurthala and Yamunanagar, 20, 20 and 10 FLDs were conducted on an area of 8.00, 8.00 and 4.00 ha respectively. The technologies i.e. improved variety; IPM, seed treatment and head rot management were followed to demonstrate the FLDs. Thus, 9.82 and 15.53 per cent higher yield was recorded over the local check in Punjab and Haryana. From demonstrations it was concluded that the vegetable oil production could be boosted by encouraging the farmers through recommended technologies which were followed in the FLDs.

Key Words: American bollworm (*Helicoverpa armigera*), FLD, Sunflower, Grain yield, IPM

INTRODUCTION

Sunflower (*Helianthus annuus* L.) is regarded as an important source of vegetable oil and has become the fourth most important oilseed crop in India. In Punjab and Haryana it is grown in spring season as of its short duration crop characteristics and it fits well in multiple cropping systems. Generally, potato and sugarcane based cropping system suits well for sunflower cultivation. The availability of early and medium duration varieties and sunflower hybrids, responsive to high input management and its relatively less thermo-and photo-insensitivity renders sunflower an ideal crop for all seasons. Due to its wider adaptability, the crop is ideally suited for intercropping system. It is estimated that about 10 per cent of the area of sunflower is under intercropping. In India it is cultivated on an area of 672 thousand ha with an annual production and productivity of 504 thousand MT and 750 kg/ha, respectively during 2013-14 (Anonymous, 2017). It has been reported that sunflower oil is good source of nutrients, vitamins, minerals and antioxidants. The sunflower oil is gaining more importance as it is free from acid and rich in Vitamin-A, roasted sunflower seeds are also used as snacks. Because of increment in domestic consumption of sunflower edible oil, its cultivation is in critical situation in India. To fulfill this domestic requirement 40 per cent of the oil had been imported. To sustain this production and consumption system, the Department of Agriculture, Cooperation & Farmers Welfare (DAC&FW) had sanctioned the project "Cluster Frontline Demonstrations on Rabi Oilseed 2015-16" to ICAR-ATARI, Ludhiana through National Mission on Oilseeds and Oil Palm (NMOOP), a scheme sponsored by central government. This project was implemented in Krishi Vigyan Kendras (KVKs) of Zone-1 with main objective to boost the production and productivity through Frontline demonstrations (FLDs) with latest and specific technologies.

MATERIALS AND METHODS

The present investigation of FLDs was conducted during spring season 2015-16 by the KVKs of northern states i.e. Punjab and Haryana in different

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blocks of the selected districts in Zone-I (Table 1). The FLDs were conducted with the objectives (i) self reliance in edible oils (ii) reduction in import of edible oil (iii) to raise oilseed production. The KVKs were funded by the ICAR-ATARI, Zone-I, Ludhiana. The funds provided to the KVKs were Rs.6,000/-ha for providing the quality inputs to the farmers in sunflower cultivation. The inputs i.e. recommended variety seed along with material of demonstrated technology was provided by the KVKs for conducting FLDs to the farmers (Table 1). The input materials provided to the farmers and they were trained to follow the package and practices for sunflower cultivation as recommended by the State Agricultural Universities.

The farmers followed the full package of practices like seed treatment, bio fertilizer inoculation, fertilizer application, water and weed management, insect-pest management etc. In case of local check, the traditional practices were followed in existing varieties by the farmers. The yield data were collected from both FLD plots as well as farmers practice plot (local check) and compiled results has been given in Table 2.

RESULTS AND DISCUSSION

The total number of twenty Frontline demonstrations on sunflower variety PSH-1962 was laid out in an area of 8 hectares in farmer's field in Nurmahal, Shahkot and Mehatpur blocks of Jalandhar district in Punjab. The inputs provided to the farmers for laying the demonstrations were Thiram @ 2gm/kg seed and application of 200 ml Nuvan and1 liter Dursban 20 EC and for controlling the tobacco caterpillar and American bollworm insect that cause head rot disease in sunflower. The recorded yield in the demonstrations was 24.21 per cent higher than the local check in Jalandhar district

In Kapurthala, PSH 1962 variety was demonstrated on 8 ha area at twenty farmers' fields in Sultanpur lodhi and Kapurthala blocks of the district in Punjab. This, variety gave the average yield of 19.5 q/ha in district. After the improved treatment with Thiram 2g/kg of seed and ridge sowing by dibbling method was applied for sowing. Pre-emergence herbicide stomp @ 2.5l/ ha was applied and 125 kg urea + 187.5 kg SSP. The famer's fields were regularly monitored by the scientists for applications of suitable technologies.

Sadaura, Radaurand and Mustafabad blocks of Yamunanagar district in Haryana were selected to demonstrate Pioneer 64A57 variety of sunflower in four hectares at 10 farmers' field. The crop was sown after potato and sugarcane during the last week of February and first week of March. The results of the demonstrations, 15.53 per cent higher yield was recorded than the local check 16.1q/ha. This improvement in yield might be due to the application of DAP @125, Urea @125, gypsum @500kg/ha at time of sowing and after 3rd irrigation application of Chorpyriphos@1875ml/ ha for control of *helicoverpa armigera* insect in sunflower crop.

Use of SSP and micronutrient

As an oilseed crop, sunflower needs more application of sulfur containing nutrient and micro nutrients. So, KVKs were allowed to concentrate to distribution of SSP and micronutrient as an input.

Table 1. Details of Frontline demonstrations conducted by the KVKs of sunflower in different districts during summer 2015-16.

KVK	Variety	Demonstrated technology	Block
Jalandhar	PSH 1962	Improved variety, IPM	Nurmahal, Shahkot and Mehatpur
Kapurthala	PSH 1962	Full Package of Practices	Sultanpurlodhi and Kapurthala
Yamunanagar	Pioneer 64A57	Improved variety, Sulphur (Gypsum)	Sadaura, Radaurand, Mustafabad

Table 2. Details of yield of FLDs conducted of sunflower during summer 2015-16

KVK	FLDs (No.)	Area (ha)	Demo yield (q/ha)	Local Check yield (q/ha)	Per cent increase
Jalandhar	20	8.00	11.80	9.50	24.21
Kapurthala	20	8.00	19.50	19.00	2.63
Total	40	16.00	15.65	14.25	9.82
Yamunanagar	10	4.00	18.6	16.1	15.53
Total	10	4.00	18.6	16.01	15.53

Constraints faced while conducting FLDs

The Frontline demonstration yields obtained by farmers have always been lower than those potential yields attainable under best practices. The farmers' yields are affected by various environmental and socio-economic factors like irregular supply of power for irrigation, non-availability of quality seed, poor quality of inputs, prevalence of biotic stress (mustard aphid, white rust, Alternaria blight and Sclerotinia rot), abiotic stress (rain, hail and abrupt rise in temperature in the months of February-March) causes severe yield loss, delayed sowing of the crop after harvesting of Kharif crops leads to lower yield, lack of sowing implements like Ridger Seeder for raya sowing in limiting moisture, use of recommended dosage of fertilizers, especially Sulphur is not practiced leading to decline in productivity and production. These constraints are being faced by the scientists working with the farmer's fields.

CONCLUSION

It was concluded that the yield gap between demonstration yield and local check can be minimized through the wider publicity of the improved package of practices through various extensions activities organized in FLDs programmes in the farmer's fields. So, for fast and wide dissemination of technologies generated by SAUs a large number of FLDs should be conducted and the scientific visits to the fields should be augmented with the training to the farmers by Krishi Vigyan Kendras who are working at grass root level with the farmers. However, it has reported been that as per the constraints in oilseed production can be reduced by providing the quality inputs and scientific knowledge to the farmers.

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