Replacement of Standard Apple Cultivars with Coloured Strains for High Profitability in Shimla District of Himachal Pradesh, India: A Success Story

N. S. Kaith*, Bandana, Neelam Kumari, Ashok K. Thakur and Tanuja Banshtu

Dr YSP University of Horticulture and Forestry, Krishi Vigyan Kendra, Rohru, Shimla, HP (171 207), India

Corresponding Author

N. S. Kaith
e-mail: narenderkaith63@gmail.com

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Abstract

The Delicious cultivars of apple, grown traditionally in Shimla district of Himachal Pradesh (India), possess some inherent problems like low spur formation, less fruit set, poor coloration at lower elevation and valley area and delayed maturity at higher elevation. These problems lead to declined productivity and returns. The introduction of spur cultivars overcome these problems as these are precocious, spur bearing with better colour development. KVK Shimla provided the planting material of spur cultivars for establishing new orchards as well as converting the Delicious cultivars into spur by top working. KVK also imparted trainings on various top working techniques and training and pruning of spur cultivars. The diligent efforts of KVK Shimla resulted in shifting of >25% area (9500 ha) to spur type and coloured strains. An average increase of 10 t ha^{-1} in yield was observed in spur cultivars compared to Delicious cultivars.

Keywords: Apple, quality, spur cultivars, success story, yield

1. Situation Analysis and Problem Statement

Shimla district is situated in temperate zone of Himachal Pradesh. The climate of the district varies from cold zone to temperate and sub- tropical zone depending on the terrain and height of the area. In the district apple is an important fruit crop covering an area of approximately 39,728 ha with the production of 265987 MT (Directorate of Horticulture, 2016). Traditionally, farmers of district Shimla were known to produce Delicious cultivars of apple. The farmers were facing problems like low spur formation, less fruit set, poor coloration at lower elevation and valley area and delayed maturity at higher elevation (Sharma and Kaith, 2015). With the cultivation of Delicious cultivars of apple with less proportion of pollinizing cultivars, the production of apple start declining continuously for the last many years, in spite of increase in area.

With the availability of large biodiversity in apple cultivars various self fruitful, spur type and other coloured strains are available which needed to be adopted according to the problem faced by the farmers in this area.

2. Plan, Implement and Support

Keeping in view the decline in production as well as fruit quality in the mid and lower area of Shimla district the intervention was undertaken to replace the variety with coloured/spur strain with the aim to increase the production of quality fruit by supplying the quality planting materials to the farmers of various blocks in the district (Table 1).

The technological intervention of the KVK was in the form of diagnostic visit of KVK scientists to the different mid, low and valley area to solve the problem of low productivity and colour of fruits, which was hampering the market, giving lower

Table 1: The detail of the planting material supplied by the KVK for the last ten years

Years	PCSS	NF	Scion wood of coloured strains supplied	NF
2005–06	2123	45	2650	52
2006–07	4127	80	2720	58
2007–08	846	15	1980	40
2008–09	1877	32	2250	46
2009–10	3519	62	2820	56
2010–11	355	10	2140	36
2011–12	8876	125	2335	41
2012–13	4408	85	2855	61
2013–14	2552	43	3250	66
2014–15	3225	61	2792	64
2015–16	5035	174	3350	65

PCSS: Plants of coloured strains supplied; NF: No. of farmers

return to the farmers (Figure 1). The farmers were trained in all

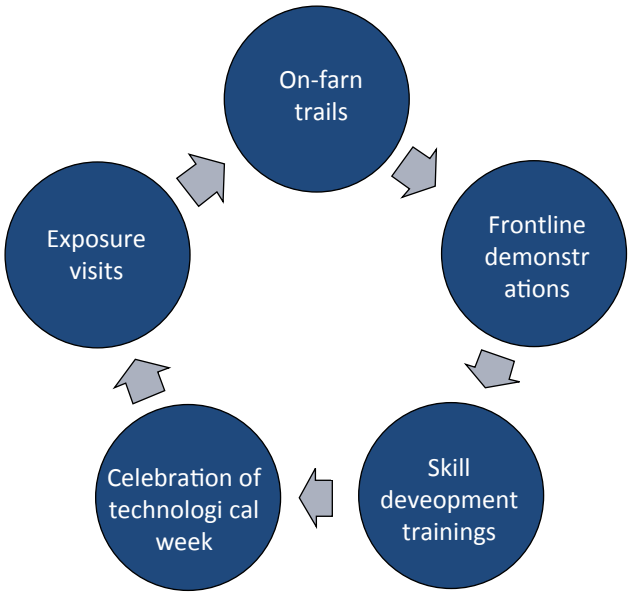


Figure 1: Plan, implementation and support to farmers

packages and motivated to change the varieties with coloured strains/spur types. The farmers were also supplied the spur type cultivars of apple from own KVK farm as well as from the university, research stations for plantation in a closer spacing in comparison to the Delicious cultivars of apple (Figure 2).

In addition to the supply of quality planting material, scientist of the KVK also helped the farmers in laying out and planting in a scientific way in different parts of the district. In sloppy area planting was done in the contour system. In the area where terrace was already available, farmers were helped to plant tree in the middle of the terrace at a distance required with the varieties. In the valley area, farmers were advised to do planting in a layout system like square system, hexagonal system and rectangular system etc. Farmers were also encouraged to go for high density planting in area, where the soil were fertile, life saving water was available and flat soil free from high wind velocity. For more horizontal spread of these varieties KVK Shimla at Rohru has developed bud wood bank for all spur type and coloured strains. This bud wood bank is helping the farmers in changing their existing varieties through the supply of quality planting materials in the form of both plants and scion wood. Through exposure visit of farmers to KVK farm and location specific training camps, the farmers were motivated and helped to develop their own mother plants of desired varieties as per area suitability (Figure 3).

3. Output

With the introduction of suitable coloured strains/varieties in the mid and lower area of the district, which were regular in bearing, having less chilling requirements, better growth performance and result in good colour development and quality fruit production. Many orchardists from the other parts of the district approached the Krishi Vigyan Kendra for

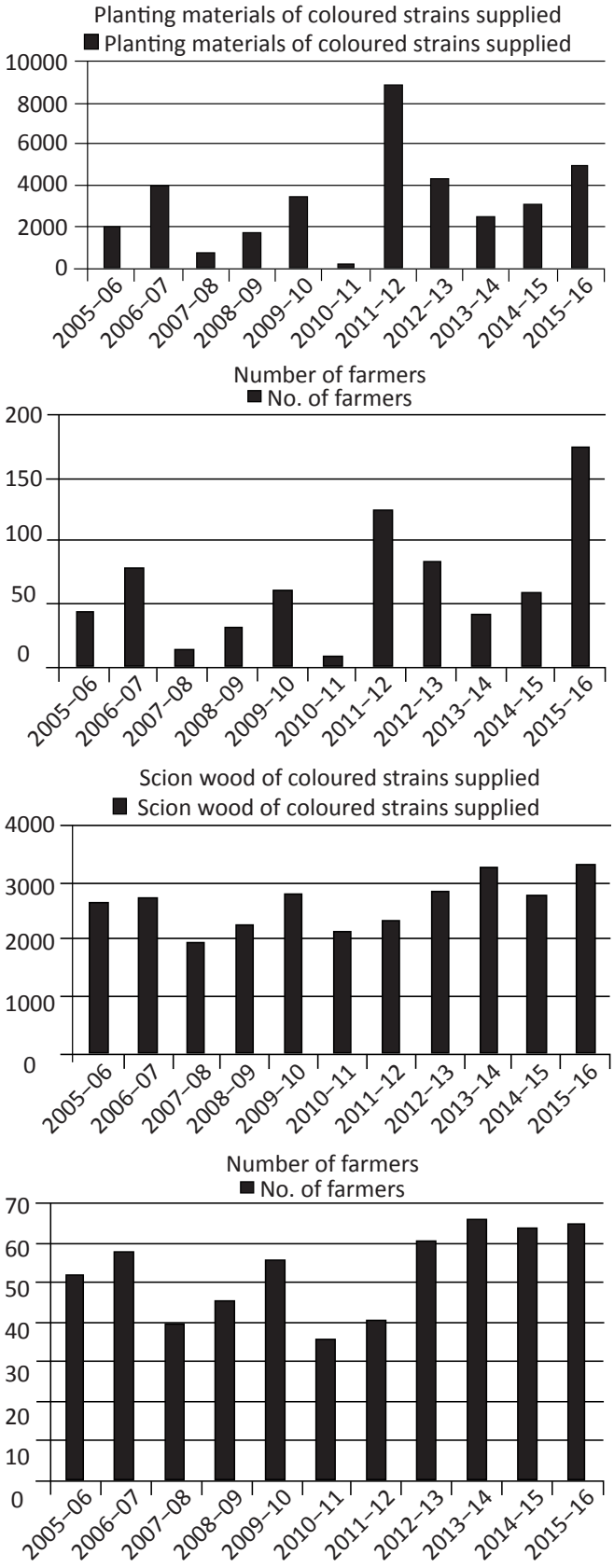


Figure 2: The detail of the planting material supplied by the KVK to the farmers for the last ten years

the supply of quality planting material to change their old and senile orchards and also to do planting in the vacant area to harvest more quality fruit yield. This shift in the plant varieties helped in the intensive orcharding, more return to the farmers and also helped in the generation of more employment to the unemployed rural youths. Presently more than 25% area, which comes around 9500 ha, has been shifted to spur type and coloured strains orchard with the intervention and continuous efforts from scientists of Krishi Vigyan Kendra, Shimla in collaboration with university and state Horticulture department. The average yield of apple in Delicious variety, which was around 7 to 8 t ha^{-1}, has now increased to 18 to 20 t ha^{-1} due to replacement of varieties as per area suitability in different parts of the Shimla district. The data were collected from the different blocks of the district for fruit yield and return to the orchardists from both traditional varieties and coloured strains given in Table 2.

The tabular analysis for different blocks indicates that fruit yield and net return of coloured strains was much higher than the standard cultivars of apple and indicates the biggest achievements of Krishi Vigyan Kendra Shimla in improving the living standard of the orchardists of the Shimla and also increasing the income many fold (Figure 4). This has also helped in the generation of employment to the unemployed rural youths and also stopped the migration of these youths from villages to the cities.

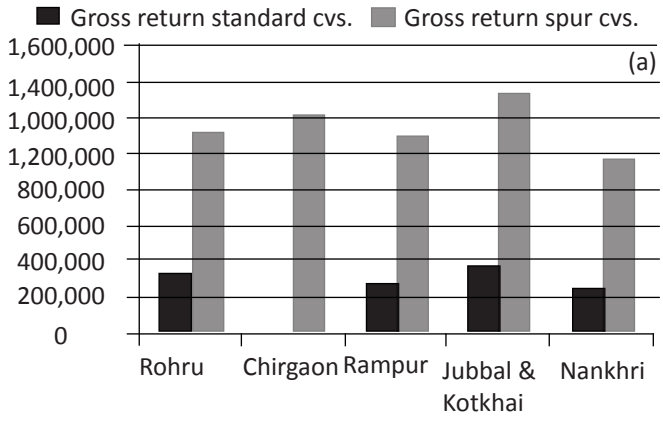
Figure 3: Supply of healthy planting material of coloured strains of apple to the farmers (a&b); Spreading awareness among farmers through on- campus and off campus trainings, farmer scientist interactions, field visits (in collaboration with ATMA) (c-f).

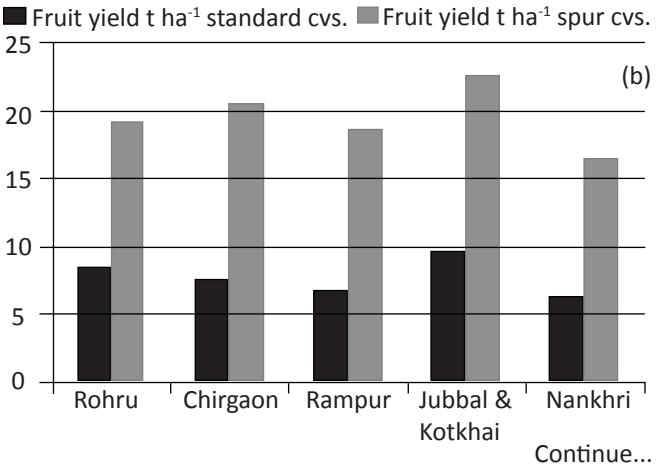
Table 2: Performance of standard and spur cultivars of apple with respect to yield, gross return, net return and benefit cost ratio

Development block	Fruit yield (t ha^{-1})		Gross Return (INR)		Net Return (INR)		B:C ratio	
	Standard cultivars	Spur cultivars	Standard cultivars	Spur cultivars	Standard cultivars	Spur cultivars	Standard cultivars	Spur cultivars
Rohru	8.5	19.2	3,40,000	11,52,000	1,90,000	9,02,000	2.26	4.61
Chirgaon	7.6	20.5	3,0,4000	12,30,000	1,54,000	9,80,000	2.02	4.92
Rampur	6.8	18.6	2,72,000	11,16,000	1,22,000	8,66,000	1.81	4.46
Jubbal and Kotkhai	9.6	22.5	3,84,000	13,50,000	2,34,000	11,00000	2.56	5.40
Nankhri	6.2	16.4	2,48,000	9,84,000	98,000	7,34,000	1.65	3.94

4. Outcome and Impact

The Delicious varieties of apple are successful only in the





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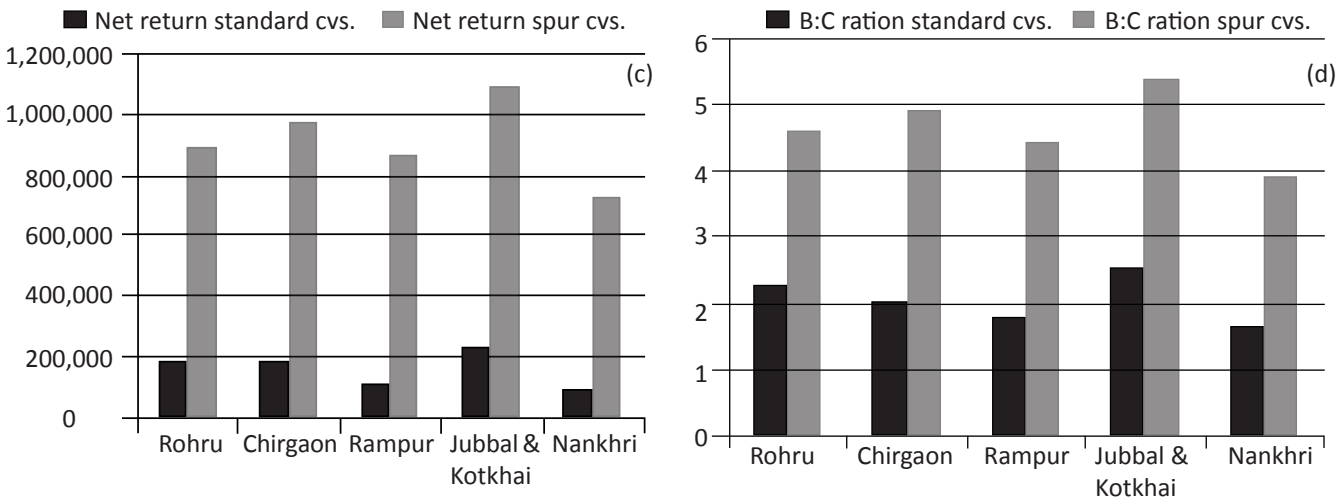

Figure 4: Performance of standard cultivars and spur cultivars of apple with respect to yield (a), gross return (b), net return (c) and benefit cost ratio (d)

higher elevation due to high chilling requirements. In Delicious varieties of apple there is also problem like alternate bearing and poor coloration especially in lower and mid hill area (Figure 5). With the technical guidance and intervention of KVK through survey of area for the suitability of varieties, the farmers showed a keen interest in the cultivation of spur type of varieties (Figure 6). The impact of training and demonstration was such that the movement which was started by about ten farmers has now increased in thousands. For more horizontal spread of these varieties KVK has developed bud wood bank for all spur type and coloured

Figure 5: Royal Delicious plant with poor colour formation in fruits

strains. This bud wood bank is helping the farmers in changing their existing varieties through top working as well as by planting new plants. Through exposure visit of farmers to KVK farm and location specific training camps, the farmers were advised and motivated to develop their own mother plants of desired varieties. In addition to the supply of planting material by the KVK, University and State Horticulture Department, this motivation helped the farmers in availability of more planting

Figure 6: Colour formation in coloured strains of apple

material, which ultimately resulted in wide spread of these varieties in the lower and mid hill areas of the Shimla district.

5. Conclusion

As of now, >25% area under apple in district Shimla has shifted to spur cultivars due to the conscientious efforts of KVK Shimla and resulted in increased yield (average 10 t ha^{-1}), better colour development and improved fruit quality. Hence, farmers are getting higher prices for the quality produce from spur cultivars.

6. References

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