



Resource management for apple scab and sanjose scale control of apple in Kashmir Valley of J&K State

M.A. Beigh¹, Quadri Javeed Ahmad Peer^{2*}, F. Sibat³ and Sheikh Mehraj⁴

^{1,3}Division of Extension Education & Communication, Sher-e-Kashmir University of Agricultural Science & Technology Kashmir (J&K), INDIA

²Division of Agriculture Statistics, Economics and Extension, FOA, Wadura, Sher-e-Kashmir University of Agricultural Science & Technology, Kashmir (J&K), INDIA

⁴Division of Fruit Science, Sher-e-Kashmir University of Agricultural Science & Technology Kashmir (J&K), INDIA

*Corresponding author. E-mail: qadriavid2008@gmail.com

Received: November 13, 2014; Revised received: May 13, 2015; Accepted: June 2, 2015

Abstract: The study on resource management for apple scab and sanjose scale of apple in Kashmir Valley of J&K State was conducted purposively in Sopore and Patten tehsils of Baramulla district covering 4 villages with a sample size of 200 apple growers selected through random sampling method. The study revealed that all the apple growers (100%) from rainfed and irrigated areas were applying the resource management practices such as checking the expiry of chemical before purchase, undertake precautions while using chemicals and sprayers, purchase economical and convenient packings of plant protection chemicals, check the working condition of the sprayers on regular basis, undertaking care and maintenance of sprayers regularly and were able to repair the minor defects of sprayers by self followed by (66%) apple growers who had decided to planed plant protection schedule in advance. The data further showed that hired labour for disease and pest management of apple were available easily and locally, and as per requirement (100%). As regards prevailing wage rates (88%) farmers from rainfed and (91%) from irrigated area reported that these were reasonable. Plant protection chemicals needed for control of disease and pest of apple were found adopted by cent per cent farmers. The plant protection chemicals were also available in suitable packings (97%) and before the expiry date (96%). The critical evaluation of the plant protection chemicals and equipments before their use with regard to their quality being taken care by all the apple growers would help in eradication of the disease from the region.

Keywords: Apple scab, Resource management, Sanjose scale

INTRODUCTION

Apple (*Malus domestica* Borkh.) belongs to Rosaceae or rose family is undoubtedly the most ubiquitous of all fruits (Brown, 1966). The centre of origin of apple is in the southwestern Asia, in the Caucasus area near Gilan in Turkistan (Vavilov, 1951). Apple is the most important temperate fruit of the world with a total production of 69587240 MT spread over an area of 4860010 hectares (Anonymous 2013-14). China leads both in area (2000466 ha) and production (29851163 MT) with a productivity of 14.9 MT/ha whereas in India its cultivation is spread over an area of 274000 hectares with a production of 1985000 MT and productivity of 7.2 MT/ha. Out of the total area under apple in India, Jammu and Kashmir State occupies 133000 ha under apple with a total production of 1332000 MT and productivity of 10.0 MT/ha (FAO, 2009). The growth of agricultural production in India assumes crucial importance due to an ever-increasing demand for agricultural products generated by the

world's second highest population. However, in the hilly states of India like Himachal Pradesh, Jammu and Kashmir, Uttarakhand, etc, agriculture suffers from certain limitations especially in the production of traditional crops and food grains. Consequently the relative contribution of horticulture is increasing significantly in these states. Insects, pests and diseases frequently causes havoc to crops (Sharma, 2000a) to be one of the major shortcomings of horticulture. According to (Sharma *et al.*, 2004), due to premature leaf fall, the quality of produce was affected adversely and fruit bearing capacity was reduced. A study by (Sharma, 2000b) revealed that the root cause of the problem was a fungal disease called Marssonina Blotch or more commonly 'Apple Blotch'. Similarly, Apple scab, another monumental disease the world over and a major disease in apple growing areas of India has been known to cause tremendous loss since 1973 when it spread to the Red Delicious variety. As per (Thakur, 2000), the large scale damage and spread of apple scab created an alarming situation and the

Table 1. Application of resource management practices for disease and pests control of apple.

Management Practices	Percentage of reporting farmers		
	Rainfed (n=100)	Irrigated (n=100)	Whole group (n=200)
Planning and deciding in advance about plant protection schedule	69.0	63.0	66.0
Ensuring the availability of finance before hand	65.0	60.0	62.5
Ensuring the arrangement of subsidy on plant protection equipments	27.0	22.0	24.0
Checking the expiry of chemical	100.0	100.0	100.0
Undertaking precautions while using chemicals and sprayers regularly	100.0	100.0	100.0
Undertaking care and maintenance of sprayers	100.0	100.0	100.0
Purchasing economical and convenient packing's of plant protection chemicals	100.0	100.0	100.0
Undertaking the minor defects of sprayers by self	100.0	100.0	100.0

problem managed to engage the attention of the Indian Council of Agricultural Research, Directorate of Plant Protection, Quarantine and Storage and the Govt. of India when it was promptly declared as one of the five main problems of national importance. Although measures were taken to control the disease effectively in Jammu and Kashmir where it was first detected, it made an appearance in Himachal Pradesh in 1977. Within six years it assumed epidemic proportions and affected 40,000 hectares of the state, made 10 per cent of the fruit unfit for market consumption and caused a loss of Rs.1.5 crore to the state's exchequer in the 1983 epidemic. In India crop losses due to pests range from 10 to 30 per cent annually, and has been estimated at Rs. 60-70 billion (Jayaraj,1989 and Nagarajan, 1990). Thus it is imperative that disease and pest management in crop production is quite important and should be studied covering all its dimensions. Apple crop is affected by many diseases and insect-pests. But 'Apple Scab' disease and 'San Jose Scale disease' pest play an important role in down grading the quality of Kashmir apple, and causing financial losses of very high magnitude. Apple Scab alone accounts for loss of more than 60 per cent of crop and results in greater losses to the farmers in particular and the state in general.

Technology and resource management are the two basic requirements for control of diseases and pests in crop production. The technology may be sound, feasible, relevant and quite useful, but unless it is supported by proper resource management, one cannot

achieve the increased production and productivity. The plant protection resources mainly include labour, plant protection chemicals, equipment's and the finance, without which the resource management would hardly be possible. Keeping in view of this, an investigation was undertaken in J&K state of Kashmir division to study the availability of plant protection resources for control of San Jose Scale and Apple Scab in apple cultivation.

MATERIALS AND METHODS

The present investigation was carried out in Kashmir Valley of J and K State. The district Baramulla was selected purposively on the basis of maximum area and production under apple crop. Two villages from teshil Sopore namely Bomei and Logripora were selected purposively on the basis of maximum irrigated area under apple cultivation and Two villages from teshil Patten namely Chechilora and Warpora were selected purposively having maximum rainfed area under apple cultivation . After the selection of villages, from each village, 50 respondents were selected randomly, making a total sample size of 200 apple growers. The interview schedule was pre-tested in a non-sampled area and then making necessary modifications after the data were collected in person from the farmers by using well structured interview schedule. The data was analysis by using statistical tools such as frequency, percentage.

Table 2. Hired labour for disease and pest control of apple.

Dimension	Percentage of reporting farmers		
	Rainfed (n=100)	Irrigated (n=100)	Whole group (n=200)
Easily/locally	100.00	100.00	100.00
When needed	100.00	100.00	100.00
As per requirement	100.00	100.00	100.00
At reasonable wage rates	88.00	91.00	89.50
Skilled labour for plant protection work	100.00	100.00	100.00

RESULTS AND DISCUSSION

Resource management practices for disease and pests control of apple: On the perusal of the data presented in Table 1, it is evident that all the apple growers (100%) from Rainfed and irrigated areas were applying the resource management practices such as checking the expiry of chemical before purchase, undertake precautions while using chemicals and sprayers, Purchase economical and convenient packing's of plant protection chemicals, check the working condition of the sprayers on regular basis, undertaking care and maintenance of sprayers regularly and were able to repair the minor defects of sprayers by self. The study further indicated that 66% of respondents were found to plan and decide about the plant protection schedule well in advance. This reflects a well imaginative behavior and farsightedness of the apple growers. Infact, this is an ideal resource management practices which takes care of all the dimensions of the resource availability and their use, problems/constraints if any and the measures to solve them. The findings revealed that only 62.5% of the total apple growers ensured the availability of finance before hand and the remaining 37.5% did not go for it. It is of course a serious problem with the small farmers. So efforts have to be made to ensure the availability of finance before hand, it implies that apple growers should identify well in advance the resources

of finance in case credit / loan facility is required. The results also showed that 27% farmers from rainfed area and 22% from irrigated area availed the subsidy on plant protection equipments from the Govt. agencies. The results are, however, not encouraging since about 73% of the total respondents were unable to meet this facility. They may be well to do rich farmers and don't require the subsidy. Majority of the farmers reported that they were not able to avail this facility due to cumbersome procedure, required visits, malpractices, very much time taking exercise and their unawareness about the provision of subsidy.

Hired labour for disease and pest control of apple: Disease and pest management of apple uses both family labour and hired labour in J&K state. Since labour requirement for plant protection work is not very high, the small farmers generally manage it within the family labour. Hired labour is mostly required by the farmers having large scale apple orchards. It is evident from the table-2 that hired labour for disease and pest management of apple were available easily and locally when needed and as per requirement, as reported by the respondents (100%). Similarly, all the farmers (100%) stated that the available labour was 'skilled' and could perform the plant protection work efficiently. As regards prevailing wage rates 88 % farmers from rainfed and 91 per cent from irrigated area reported that these were reasonable and only 12 and 9 per cent, respectively, could find the prevailing

Table 3. Plant protection chemicals for disease and pest control of apple.

Dimension	Percentage of reporting farmers		
	Rainfed (n=100)	Irrigated (n=100)	Whole group (n=200)
Easily available	100.00	100.00	100.00
Locally available	0.0	0.0	0.0
When needed	100.00	100.00	100.00
As per requirement	100.00	100.00	100.00
At reasonable prices	2.0	3.0	2.5
On subsidized rates	0.0	0.0	0.0
Before expiry date	95.0	97.0	96.0
Without adulteration	18.0	10.0	14.0
In convenient packings	98.0	96.0	97.0

Table 4. Plant protection equipments for disease and pest control of apple.

Dimension	Percentage of reporting farmers		
	Rainfed (n=100)	Irrigated (n=100)	Whole group (n=200)
On purchase			
reasonable price	13.0	17.0	15.0
subsidized rates	27.0	22.0	24.5
On hire/custom services			
Easily and Locally	97.0	99.0	98.0
At reasonable hire charges	90.0	95.0	92.5
Repairing facility			
Easily	100.0	100.0	100.0
Locally	0.0	0.0	0.0
When needed	100.0	100.0	100.0
At reasonable repairing charges	100.0	100.0	100.0
With satisfactory repairing work	92.5	90.0	91.5

wage rate for hired labour as 'not reasonable'. Generally, the wage rates remain Rs. 250-300 per day during the normal periods. However, at the peak seasons, when paddy transplanting remains in operation (2nd week of May to 3rd week of June), the wage rates for hired labour go up to Rs. 400 per day. In fact, it is the availability of the hired labour during the peak season which is considered as the major problem for disease and pest management of apple and not the extent of wage rates. These results are in agreement with the findings of Bhat (2010) who had reported that the shortage of labour is main problem at the time of harvesting stage of apple when it gets synchronized with paddy harvesting. Consequently, the growers are overburdened with additional wages to complete the work in time because of the perishable nature of apple.

The Finance (credit/loan): Refers to the amount taken by the farmers as credit/loan for plant protection work. As a result of discussion with the respondents, it was found that there was hardly any facility for advancing loan/credit to apple growers by the government agencies for disease and pest management of apple. However, the needy farmers, to meet the expenses of plant protection measures, would take some advance money against their expected apple production from private agencies like commission agents/dealers/traders etc. This facility of getting advance money was easily available when needed and as per their requirement. The amount taken is adjusted at the time of the sale of their produce. However, loan/credit facility should be provided to the farmers well in time, as per their requirement and at reasonable rate of interest. It was also found by the researcher that respondents were reluctant to take loan/credit from government agencies, since it required repeated visits, too much time involvement, lengthy and complex procedure and the rate of interest not reasonable. Thus there is need to remove the above mentioned barriers etc. These findings are in line with the findings of Bhat (2010) who had reported that most of the apple growers in the state are marginal and small orchardists. The rising cost of inputs for maintenance of orchards has made the cultivation of the crop away from their reach. They have no capacity to invest in better production technology. Their access to financial institution has been beset with innumerable problems. The most prominent among them are timely and insufficient availability of credit, lack of finance at reasonable rate of interest and lack of co-operative agencies

Plant protection chemicals for disease and pest control of apple: Data in Table 3 shows the findings on various dimensions of plant protection chemicals needed for control of disease and pest of apple. These responses, in terms of percentage of reporting farmers revealed that all the farmers (100%) reported that the recommended chemicals for management of San Jose Scale and Apple Scab were available easily, as per

requirement and when needed. Further, plant protection chemicals were also available in needed packings (97%) and before the expiry date (96%). There was no provision of providing plant protection chemicals by the government agencies and farmers could only purchase these chemicals from the private dealers/sales agencies etc. which were not existing in the village itself. One has to travel about 10-12 kms to buy these chemicals. Regarding the price, only 4 to 5 farmers from the total sample of 200 were of the opinion that cost of chemicals were reasonable. It was also reported only by 14 per cent of the total respondents that the recommended chemicals was available to some extent without adulteration. Interestingly, the findings revealed that availability of plant protection chemicals did not show any marked difference between the response given by farmers of rainfed and irrigated areas. High prices of chemicals, their non-availability in the village itself and adulteration chemicals were the three dimensions of availability which had negative reflection. These results are in agreement with findings of (Baba *et al.*, 2012) wherein they found that in J and K there are several unlicensed dealers and retailers who are not completely aware about the sale of pesticides, also sell pesticides primarily to earn big margins. The unorganized system of pesticide trade in the state is expected to result in unstable prices, availability of sub-standard/spurious chemicals and distress sale of farmers' produce.

Plant protection equipments: The plant protection equipments include various types of sprayers. However, in J&K state, apple growers were mainly using foot sprayers and power sprayers available from government agencies on subsidized rates and also from private agencies on market price. The provision of subsidy runs to the tune of one third or even more on the cost of sprayers which is available after completing certain official formalities. The power sprayers are available to the respondents on custom/hire service from private agencies (fellow farmers) by paying nominal rent. However, there is no such provision of custom service from government agencies. As regards the repair of sprayers for keeping them in good working condition, there is no provision of repairing facility from government agencies and the farmers generally get the plant protection equipments repaired from private agencies. It is evident from the figures presented in Table 3 shows that 15 % of the total respondents reported that the market price of the sprayers charged by private dealers was reasonable. Remaining 85 per cent said that the price of the sprayers was not reasonable and they could not afford this much amount. About one fifth of the total apple growers (24.5%) said that the sprayers were available on subsidised rates from government agencies and the remaining three-fourth were unaware about the provision of subsidy on purchase of sprayers or were reluctant due to cumbersome procedure involved in

availing the subsidy. Majority of the respondents reported that hire/custom. services were available easily/locally (98%), when needed (98%) and at reasonable hire charges (92.5%). Regarding the availability of repairing facility, it was reported by all the farmers of the sample (100%) that the said facility was available easily, when needed and at reasonable repairing charges. However, none of the respondents said that repairing facility was available within the village itself. They required to travel more than 10 kms away from their residence to get the sprayers repaired, however, they were satisfied with the repairing services provided by private agencies. These findings are in agreement with the findings of (Dixit *et al.*, 2014) who had reported that the traditional tools and implements are still in use with farmers. There are no specialized markets for the production and marketing of farm implements in the State except some manufacturing and marketing units in Jammu. Traditional hand tools and implements are made and maintained by local craftsman. Divisional level Govt. Agricultural Engineering workshops exist in the State which manufacture and market subsidized hand tools and implements for farmers through various programmes of the State Government.

Conclusion

From the present study it can be concluded that management of resources and pest control of apple implies the effective and efficient operation of the needed input and services by the farmers. The important resources in this context are labour, credit and loan, pesticides, fungicides and sprayers etc. Among the various resource management practices, the critical evaluation of the plant protection chemicals and equipments before their use with regard to their quality etc. were being taken care by almost all the apple growers. Majority of the apple growers also decided about plant protection schedule and ensure the availability of finance well in advance. The hired labour for disease and pest management of apple was available easily and locally and even family members can help in managing the disease and pest very well. Generally, the wage rates remain Rs. 250-300 per day during the normal periods but during the peak seasons, when paddy transplanting remains in operation (2nd week of May to 3rd week of June), the wage rates would go up to Rs. 400 per day. The orchardists were reluctant to take loan/credit from government agencies, because of the too much lengthy, complex procedure and at high rate of interest. The facilities for purchasing plant protection chemicals were lacking and the adulteration of the chemicals were high which leads to more number of sprays for managing the diseases

and pests. In J&K state, apple growers were mainly using foot sprayers and power sprayers available from government agencies on subsidized rates and also from private agencies on market price. The critical evaluation of the plant protection chemicals and equipments before their use with regard to their quality taken care by all the apple growers would help in eradication of the disease from the region.

REFERENCES

- Anonymous (2013-14). Annual Progress Report. Department of Horticulture J&K Government, Srinagar, pp.1-2.
- Baba, S.H., Wani, M.H., Zargar, B.A. Wani, S.A and Kurbrevi, S.S. (2012). Pesticide Delivery System in Apple Growing Belt of Kashmir Valley. *Agricultural Economics Research Review*. 25:435-444.
- Bhat, J. (2010). Problem of apple marketing in Kashmir. *National Monthly Journal of Research in Commerce & Management*, 1(6): 106 -111.
- Dixit, J., Sharma, S. and Mudasir Ali. (2014). Present status, potential and future needs for mechanization of agricultural operations in Jammu and Kashmir state of India. *Agric Eng Int: CIGR Journal*, 16(3):87-96.
- FAO. (2009). Food and Agriculture Organisation. Production year book. Volume III, 2008, Rome, FAO
- Jayaraj, S. (1989). Pest control - Advances in biological means. In: The Hindu Survey of Indian Agriculture, pp. 181-187, Madras India.
- Nagarajan, S. (1990). Pest management integrated approach vital. In: The Hindu Survey of Indian Agriculture, pp. 155-159, Madras, India.
- Sharma, J. N. (2000a). Premature Leaf Fall in apple: Symptoms, Causes and Cure. In V.K. Sharma, & K. C. Azad (Eds.), *Horticulture Technology- Vision*. (2000). and Beyond (Vol. 2, pp. 32-36). New Delhi: Deep and Deep Publications Pvt.Ltd.
- Sharma, J. N., Sharma, A. and Sharma, P. (2004). Out-break of Marssonina Blotch in Warmer Climates Causing Premature Leaf Fall of Apple and its Management. *Acta Hort.(ISHS)*, 662, 405-409.
- Sharma, R. C. (2000b). Need for Research for Improving the Quality of Fruits and Vegetables for Processing Industry. In V. K. Sharma, & K. C. Azad (Eds.), *Horticulture Technology: Vision 2000 and beyond* (2000ed., Vol.2, p. 11). New Delhi: Deep and Deep Publications Pvt. Ltd.
- Thakur, V.S. (2000). Apple Scab Forecasting and Management. In V. K. Sharma, & K. C. Azad (Eds.), *Horticulture Technology : Vision 2000 and Beyond* (Vol. 2, pp. 37-61). New Delhi: Deep and Deep Publications Pvt. Ltd.
- Vavilov, N.I. (1951). Wild progenitors of the fruit trees of Turkestan and the Caucasus and the problems of the origin of fruit trees. *Proc. 9th Int. Hort. Cong.* pp. 271-66.