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IMPACT OF SCAB ON APPLE PRODUCTION IN BARAMULLAH, KASHMIR : A CASE STUDY

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Short Profile

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ABSTRACT:
Kashmir is said to be the apple bowl of India, famous for the unique and delicious production of apple varieties throughout the world. The production of apple of Jammu and Kashmir has adversely been effected by Scab (Venturia inaequa lis), which starts out as a black spots on the leaves that gradually spread throughout the leaf surface causes premature leaf fall and results decrease of apple production and minimize the revenue to the apple growers. An attempt has been made to study the impact of scab on different varieties of apples. The sample size of 192 has been taken from eight different varieties of apples, using survey method. It has been found that scab has more effect on Delicious variety, while as Red Delicious and Kullo Delicious has been least affected.

KEYWORDS
Apple orchards, Scab, Apple varieties.

INTRODUCTION:

In apple orchards, the most dangerous disease is apple scab (Ventura inaequalis), attack of scab can be so strong that it destroy a yearly production and reduces the value of fruit. Apple scabs badly hit the flowering crab trees and apple trees in the year 2013. The sign of this disease starts out as black spots on the leaves that gradually spread throughout the leaf surface. It causes premature leaf drop on the trees and also affects the branches of the trees .This disease is very common in flowering crab trees and is an on-going problem. In cool seasons, wet springs can causes the disease to worsen. The disease is a severe problem that slowly weakens the health of the tree over time. (Carisse and Dewdney, 2002).

The mainstay of Jammu and Kashmir is apple production, constituting about 85% of the total fruit production (Anonymous, 2005). Venturia inaequalis (Cke.) Wint., the causal pathogen of apple scab, has been a constant threat to the profitable cultivation of apple throughout the world. According to experts nearly 30 -40 percent of the fruit has been affected in Jammu and Kashmir by the fungal disease scab, which according to them is fast spreading due to the humidity in the atmosphere. Production of apple was 17 lakh metric tonns in year 2013 and the hope of the industry to produce 17 lakh boxes of apple in 2014 has been dashed by the disease, the effect of the disease on the apple was never so severe. Different areas of Kashmir surveyed has revealed that affect on the crop has been most severe. In Shopian and Baramulla,10 percent and 5 percent of the area has been affected by scab respectively. The ongoing weather has also affected the fruit and the fungal disease has spread due to the humidity in the atmosphere. However, the apple growers blamed the spurious pesticides and chemicals being available in the market and supplied by the government. The fungal disease has spread across Kashmir and among the areas worst hit include the fruit belts of Ganderbal, Sopore, handwara, Shopian and Wagoora. (Akhter hussain, 2013).

The fruit prices a big hit as our estimates suggested that nearly one third of the fruit production will be affected here. There is no market for the scab- hit apple. A box sells for Rs 200, while as more money goes into its production. (Bashir, 2013)

REVIEW OF LITERATURE

Core literature related to disease on apple and particularly apple scab has been discussed in the following section,Sandskar, B (2003) revealed in his study that apple is considered an attractive and healthy fruit to eat all over the world. The study revealed that the organic production of apples is increasing abroad but is still at low levels in Sweden. The study had dealt with major disease and pest problems out of them the most severe disease on apple is apple scab (venturia inaequalis).It was found that foliar and fruit scab were strongly correlated when the scab infection Was high(1998-1999),compared to when it was low(2000).Apple scab incidence was recorded in the experimental organic orchard,2000-2001 and was found that level of scab is low in organic orchard.

Nissar ah et, al. 2008 studied the impact of inoculums distance on the spread and progress of infection. In this study a marked delay in disease was observed with increase in isolation distance from source. A considerable reduction in spread and progress of scab (Venturia inaequalis) depends on the isolation distance. Maximum reduction of 74.1, 66.9 and 50.8 percent in overall progress of disease was observed at 120 m isolation distance during petal fall , fruit –let and pre –harvest stages. The study revealed that spray plan can be delayed by adopting proper hygiene measures and by maintaining isolation distance of at least 90 m away from any inoculums source.

Erin Lizotte and Nikki Rothwell inferred that many growers have observed green tissue in their

apple orchards due to the unseasonably warm weather in northwest Michigan. Early season control of primary scab is vital to mediating infection later in the season as leaf area expands. The mantra of the season for Michigan growers is to control scab early. . In many years, we applied scab sprays at green tip, but following a season like 2009, we are concerned with the high levels of inoculums in orchards. Growers should get a jump on scab control by not allowing the fungus to infect the evident green tissue in the orchard. With high levels of inoculums, the warm temperatures, and predicted rain over the weekend, growers need to be on top of primary scab this season, even if that means applying fungicides earlier than normal. Growers that had good scab control in 2009 may not need to spray this coming weekend to protect green tissue.

G.N. Qasba 1983 highlighted that apple is one of the temperate fruit and being cultivated in Kashmir since a long ago, apple is number one in production because of favourable agro –climatic conditions. It has been shown that apple production is increasing year after year and its has also revealed increasing tendency from 1974- 1961.But a dreadful disease commonly known as " apple scab" is the major hurdle in apple production as well as apple productivity. this disease does not affect apple production in Kashmir alone but it occurs in Europe, Australia , north and south America. (Aiticinton 1971)

METHODOLOGY

The present study is based on primary and secondary data. Primary data has been collected from the field survey. While as secondary data has been collected from journals, newspapers, published thesis and government records. The study examined the impact of scab on the varieties of apples in Kashmir. On the basis of high apple production, two villages viz. Panjipora Sopore and Haigam has been selected randomly from District Baramulla. In these two villages different varieties of apple has been observed in order to identify the effect of scab on apple production.

OBJECTIVES

1.To know the effect of scab ((Venturia inaequalis)) on different varieties of apple.
2.To workout the scab infect variety among the apple varieties
3.To suggest suitable ways to curb the Scab diseases.

DATA ANALYSIS

Two villages has been selected for studying the scab impact on apple production and four apple orchards were selected from each village, eight varieties of apples has been sleeted from all the four apple orchards viz Delicious, American, Maharaji, Hazratbali, Razaqwar, Chumara, Red delicious, Kulo Delicious. Simple percentage method has been adopted for analysing the data.

Table 1, portraits orchard wise and grade wise varieties of apples taken from village Panjipora for testing the impact of scab on various varieties of apples. Four apple orchards has been selected from village Panjapora. Out of 25 sample trees from orchard 1, 15 apple trees were taken from delicious, 4 from American, 2 from Maharaji and 4 apple trees from Hazratbali for studying the impact of scab on different varieties of apples. The sample size for studying the impact of scab from orchard 2 was 26 of which 18 apple trees were taken from delicious, 4 from American, 2 from Razaqwar and 2 from Chumara variety. From orchard 3, 27 samples were selected, of which 15 apple trees from delicious, 4 apple trees

from Red Delicious, 4 apple from Kulo Delicious, 4 apple trees were selected from American variety. Out of the 26 sample trees from orchard 4, 17 apple trees from delicious, 3 apple trees from Razaqwar, 4 apple trees from American and 2 apple trees from Maharaji were tested to stuy the impact of scab.

After observing the scab impact on different apple varieties selected from 4 different orchards. It was found that from orchard 1, Delicious apple trees were more infected by scab followed by American, Maharaji and Hazratbali. Orchard 2 revealed high level infection of scab on Delicious variety as out of 18 apple trees from delicious, 12 were infected followed by American, Razaqwar and Chumara. It was observed from Orchard 3 that out of the 27 apple trees tested majority i.e. 8 apple plants of Delicious were infected by scab followed by American. Red delicious and Kulo Delicious were the only two varieties with no Scab infection. Orchard 4 highlighted higher level of Scab infection on Delicious variety as out of total 26 apple trees tested, majority i.e. 9 delicious apple trees were infected followed by American, Maharaji and Razaqwar.

From the above inferences, it is concluded that Delicious variety of apples were the most Scab infected as compared to other varieties.

Table 2, revealed orchard wise and grade wise varieties of apples from village Haigam of district Baramulla of Kashmir Region for testing the scab impact on various varieties of apples .Four apple orchards has been selected. Out of the 22 sample trees selected from orchards 1, 13 apple trees has been taken from delicious, 4 apple trees from American, 2 apple trees from Maharaji,3 trees from Hazratbali for studying the impact of scab on different varieties of apples. The sample size for studying the impact of scab from orchard 2 was 22,of which 14 apple trees were taken from Delicious, 3 from American,2 from Razaqwar and 3 from Chumara. From orchard 3, 25 sample trees were selected, of which 15 trees from delicious,3 from Red Delicious,4 from Kulo Delicious and 3 from American. Out of 19 sample trees from orchard 4, 12 trees from Delicious, 3 from Razaqwar, 2 from American and 2 from Maharaji were tested to study the impact of scab.

After observing the scab impact on apple varieties selected from 4 different orchards. From orchard 1 Delicious apple trees were more infected by scab followed by American , Maharaji and Hazratbali. Orchard 2 also revealed high level of infection of scab on Delicious, as out of 14 apple trees from Delicious 10 were infected by scab followed by American, Razaqwar and Chumara. It was observed from orchard 3 out of 25 apple trees tested majority i.e. 8 apple trees of Delicious were infected by scab followed by Red Delicious and American. Kulo Delicious was the only variety not affected by scab. Orchard 4 highlighted higher level of scab infection on delicious variety as out of 19 apple trees tested majority i.e. 8 Delicious apple trees were infected followed by Razaqwar, American and Maharaji.

The above study revealed that Delicious variety is the most Scab infected were as Kulo Delicious and Red delicious varieties were having the least scab infection.

Table 1: Village 1: Orchard Wise and Grade Wise Varieties of Apples

Orchard 1	No. of plants tested	No. of planted infected	**Orchard 2**	No. of plants tested	No. of planted infected	**Orchard 3**	No. of plants tested	No. of planted infected	**Orchard 4**	No. of plants tested	No. of planted infected
Delicious	15	9	Delicious	18	12	Delicious	15	8	Delicious	17	9
American	4	2	American	4	2	Red delicious	4	0	Razaqwar	3	1
Maharaji	2	1	Razaqwar	2	1	Kulo Delicious	4	0	American	4	2
Hazratbali	4	1	Chumara	2	1	American	4	2	Maharaji	2	1

Sources: computed

Table 2: Village 2: Garden Wise and Grade Wise Varieties of Apples

Orchard 1	No. of plants tested	No. of planted infected	**Orchard 2**	No. of plants tested	No. of planted infected	**Orchard 3**	No. of plants tested	No. of planted infected	**Orchard 4**	No. of plants tested	No. of planted infected
Delicious	13	9	Delicious	14	10	Delicious	15	8	Delicious	12	8
American	4	1	American	3	1	Red delicious	3	1	Razaqwar	3	1
Maharaji	2	1	Razaqwar	2	1	Kulo Delicious	4	0	American	2	1
Hazratbali	3	1	Chumara	3	1	American	3	1	Maharaji	2	1

Sources: Computed

Table 3, revealed varieties of apple and the proportion of infected apple trees from village Panjapora of district Baramulla of Kashmir Region. Four apple orchards has been tested to know the percentage of scab affected apple varieties viz. Delicious, American, Maharaji, Hazratbali, Razaqwar, Chumara, Red Delicious and Kulo Delicious .Out of 104 samples tested from the surveyed villages 65 were Delicious, 16 were American, 4 were Maharaji, 4 were Hazratbali, 5 were Razaqwar, 2 for Chumara, 4 Red Delicious and 4 trees were Kulo Delicious.

Out of the sample trees, 38 (58.46%) of Delicious were found infected, followed by American 10 (62.5%), Maharaji 2 (50%), Chumara 1 (50%), Hazratbali with 1 (25%), Razaqwar with 2 (40%). However, it is interesting to note that Kullo Delicious and Red Delicious variety were having zero percent scab impact. It can be inferred that delicious variety of apple is having the highest scab impact where as Kulo Delicious and Red Delicious were having no scab impact.

Table 3: Village 1: Apple Varieties And Scab Infection

S. No.	Name of Apple Variety	Total samples	No. of infected samples	Infected samples (percentage)
1	Delicious	65	38	58.46
2	American	16	10	62.50
3	Maharaji	4	2	50. 0
4	Hazratbali	4	1	25.0
5	Razaqwar	5	2	40.0
6	Chumara	2	1	50.0
7	Red Delicious	4	0	0.0
8	Kulo Delicious	4	0	0.0

Sources: Computed

Figure 1, Village 1.

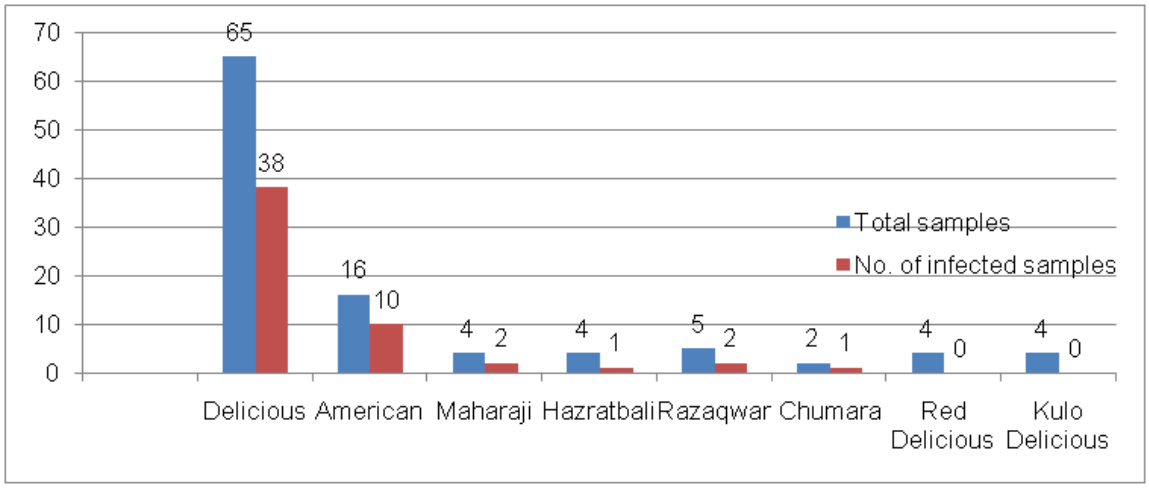


Table 4 shows varieties of apples and the proportion of infected apple plants from village Haigam of district Baramulla of Kashmir region. Four apple orchards has been tested to know the percentage of scab affected apple varieties like Delicious , American , Maharaji, Hazratbali , Razaqwar , Chumara, Red Delicious and Kulo Delicious

Out of 88 samples tested, 54 sample trees were taken from delicious, 12 from American, 4 from Maharaji and 3 from Hazratbali, 5 from Razaqwar, 3 from Chumara 3 from Red delicious and 4 apple trees from Kulo Delicious from the surveyed village to study the impact of scab.

After observation, it was found that out of 54 delicious trees tested, 64.8% were infected by scab followed by Razaqwar with 4 percent, Red Delicious with 33.3%, Hazratbali with 33.3 per cent and Chumara with 33.3 percent. Whereas Maharaji with 50% scab infection followed by American with 33.33 percent and Kulo Delicious with no Scab infection. It is interesting to note that only Kulo Delicious variety of apple trees were without scab infection.

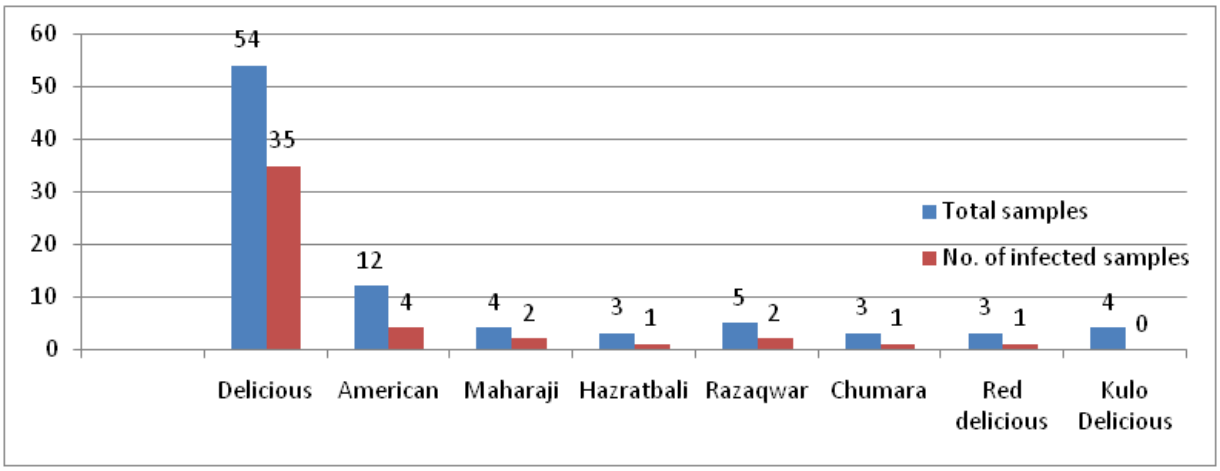
It can be referred that delicious variety of apple is having the highest scab impact were as American least scab effect and Kulo Delicious with zero scab infection.

Table 4: Village 2: Apple Varieties And Scab Infection

S. No.	Name of Apple Variety	Total samples	No. of infected samples	Infected samples (percentage)
1	Delicious	54	35	64.8
2	American	12	4	33.33
3	Maharaji	4	2	50.0
4	Hazratbali	3	1	33.3
5	Razaqwar	5	2	40.0
6	Chumara	3	1	33.3
7	Red delicious	3	1	33.3
8	Kulo Delicious	4	0	0.0

Sources: Computed

Figure 2, Village 2.



Different apple varieties surveyed from both sample villages has been shown in table 5. The table contains total sample of all the 8 varieties along with percentage of scab infection. 8 apple orchards were selected to study the impact of scab on 8 apple varieties viz. Delicious, American, Maharaji and Hazratbali, Razaqwar, Chumara, Red Delicious and Kulo Delicious.

The total number of 192 apple trees was selected to study the impact of Scab on different apple varieties from the surveyed villages. The sample for Delicious apple trees were 119, 28 for American, 8 for Maharaji , 7 for Hazratbali, 10 for Razaqwar, 5 for Chumara, 7 Red delicious and 8 plants for Kulo Delicious

Out of 119 delicious trees, 61.34 per cent were found infected by Scab followed by Maharaji with 50 percent, Razaqwar with 40 percent, Chumara with 40 per cent, Hazratbali with 28.6 per cent, Hazratbali with 28.6 per cent, American with 50 per cent and Red delicious with 14 per cent from both the surveyed villages. However, it is interesting to note that Kulo Delicious were the only variety from both the surveyed villages with no scab infection.

It is concluded from the above inferences that Delicious variety of apples were having the highest scab impact, whereas Red Delicious and Kulo Delicious were having the least impact of Scab in both the surveyed villages. Delicious variety is the only variety which has been grown at large quantity, hence state government and agricultural scientists should work out the remedies so as to boost the state

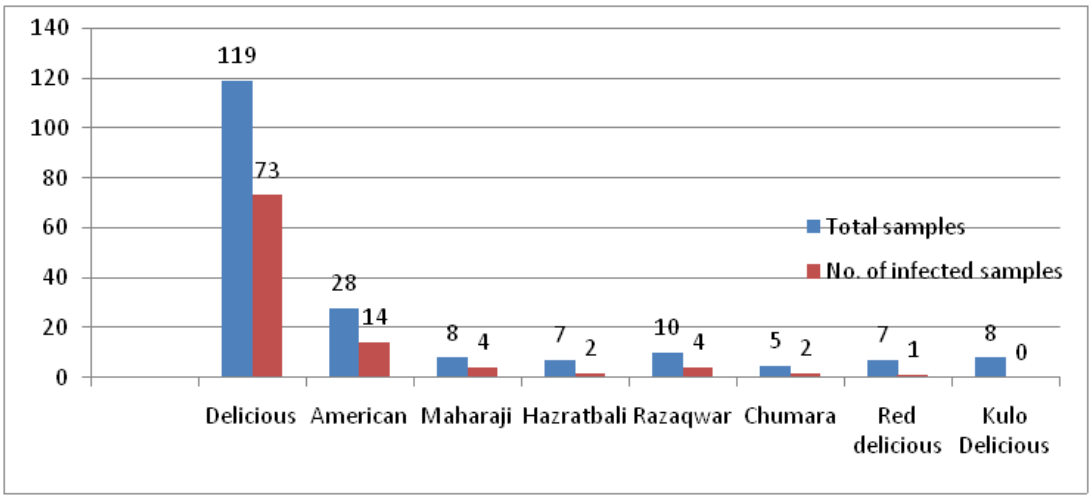
economy.

Table 5: Total apple varieties with Scab Diseases

S.No.	Name of Apple Variety	Total samples	No. of infected samples	Infected samples (percentage)
1	Delicious	119	73	61.34
2	American	28	14	50.0
3	Maharaji	8	4	50.0
4	Hazratbali	7	2	28.6
5	Razaqwar	10	4	40.0
6	Chumara	5	2	40.0
7	Red delicious	7	1	14.0
8	Kulo Delicious	8	0	0.0

Sources: Computed

Figure 5: Total apple varieties with Scab Diseases in both villages



FINDINGS

1.Delicious varieties of apples were the most Scab infected as compared to other varieties in village 1.
2.Delicious variety is the most Scab infected, whereas Kulo Delicious and Red delicious variety were having the least scab infection in both villages.
3.Delicious variety of apple is having the highest proportion of scab infection whereas Kulo Delicious and Red Delicious were having no scab impact in village 1.
4.Delicious variety of apple is having the highest proportion of scab infection, American least scab effect and Kulo Delicious with no scab infection in village 2.
5.Delicious variety of apples was having the highest scab impact whereas Red Delicious and Kulo Delicious were having the least impact of Scab in both the surveyed villages.

SUGGESTIONS

On the bases of prevailing conditions for the apple cultivations in the surveyed villages in Kashmir, following suggestions has been pointed out.

I.Specified pesticides should be used for particular variety of apple in order to improve the quality and in turn the cost of returns.
II.Since from the findings it was revealed that Red Delicious and Kulo Delicious were having the least impact of Scab,so delicious must be replaced with the mentioned one so as to avoid long run losses.
III.Since each apple grower has past experience in dealing with scab should be considered while cultivating different varieties of apples.
IV.Zones must be created in apple orchards in order to use a pesticide, once a particular zone shows the good results then only the particular pesticide should be used to the whole apple orchard.
V.Apple cultivation and geographical conditions are interrelated, Therefore a particular pesticide may not suitable to every region throughout the year..
VI.Farmpik shoppe should be introduced in every village ,so that apple grower can gain maximum benefits to improve the quality of apple varieties.
VII.The apple growers should have to plant disease resistant varieties like, Kullo delicious and Red Delicious.

CONCLUSION

This study was an attempt to know the impact of scab on different varieties of apple. This study has been carried out in two villages Panjipora and Haigam. Among the eight sample varieties of apple, Delicious gets easily affected by scab compared to other sample varieties. While as Red Delicious and Kulu Delicious are least effected by scab. In order to keep the apple growers safe from the diseases, it is suggested to replace the delicious with other varieties to have least impact of scab on production of apples. The agricultural department has to open new incentives for the apple growers in the form of subsidies so that apple growers can effort to use costly pesticides. Therefore, the need of the hour is to reform existing agricultural programmes and policies, but make sure new policies will be effective only if efficiency prevails.

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