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Walnut (Juglans Regia L.) Production and its Disease Management in Jammu and Kashmir

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***Abstract*: The aim of the present study was to shown walnut production and their disease management in the UT of Jammu and Kashmir. The Jammu and Kashmir is the major walnut producing Union Territory with production of around 2.66 lakh metric tons on 89,000 hectares of land and contributes to more than 98 percent of the total walnut production in India. Kashmiri walnut has seen growing demand and acceptability in the domestic and international market but the production is decreasing due to many factors like, shortage of quality planting, poor orchard management and long gestation period, lack of export oriented policies of the government, the exports have not grown much and the last hindering factor is walnut diseases and their improper management**

***Keywords*: Walnut (Juglans regia L.), production, disease management.**

1. Introduction

Walnut (Juglans regia L.) is one of the important nutritious dry fruit grown around the world in Mediterranean climate with cold winters and mild summers. It is economically significant tree species, highly valued for its timber and edible nuts (Pollegioni et al., 2017). Walnut has the age of hundreds of years and it grows up to the height of 25 to 30 meters. A walnut tree is harvestable after 4 to 6 years and reaches its full productivity by 11 or12 years of age (Simpson, 2016). Rich in Vitamin E and Vitamin A and a perfect source of Omega 3 is considered best for the human brain. Walnut kernels are used for bakery and confectionaries, whereas oil is also extracted from this dry fruit. Walnut is the most commonly grown nut which tremendously possessed the most essential place in the horticulture sector of India. India is one of the major producer as well as exporter of walnuts. It enjoys good demand in the international market due to its superior quality. North western Himalayan in general and Jammu and Kashmir in particularly is the bowl of walnut production. It has a special value in Indian foods, and medicine as well as in traditional sweets (Uniyal et al. 2002). The Jammu and Kashmir is one of the first Union Territory among the other Indian UT where the walnut was found. It contributes around 98% of the country‟s output. The walnut is one of the precious dry fruit of the state and its production about 86263 tons from area 61723 hectares. Districts like Poonch, Budgam, Bandipora, Baramulla, Ganderbal, Buderwa, Srinagar, and Anantnag are famous for walnut production. Ananthnag, Kupwara and Kulgam stand first, second and third respectively in walnut production, with the production of 41021 MT 2500 MT and 21319 MT respectively. India ranks at eighth number of walnut production in the world like, 36000MT which is 1.05% in the global production. The present situation of the walnut production in Jammu and Kashmir is terrible because of climate changes. High rains, diseases and hailstorms badly affect the quality, color and production of this fruit (Ajaz Hakim 2018). Pest management is really a big constraint in the walnut because of the difficulty faced to sparying the giant trees. In fact, walnut (Juglans regia) competes with many insect and disease pests to produce a marketable and acceptable crop. Traditional control strategies work reasonably well for most pests. Walnuts are susceptible to several diseases and pests, and even though most of them threaten the life of plants and they may ruin a sizable portion of the edible nuts and the visual appearance of the fruits. However, environmental concerns, loss of certain pesticides and new or impending regulations threaten the use of many traditional techniques for control of many of the pests. The aim of this study is show the walnut production and its disease management in Jammu and Kashmir.

2. Materials and Methods

The study is primarily based on the secondary sources of data. The information pertaining to the walnut industry has been accrued from several reputed agencies. Some governmental agencies which were consulted for data collection are Jammu and Kashmir Horticulture Planning and Marketing, Directorate of Horticulture Kashmir, National Horticulture Board etc. Besides these several newspapers, articles and journals were studied for this purpose. Tables and diagrams were prepared with the help of Microsoft Excel 2010. Further for the referencing, Mendeley Referencing Management Software was brought in to use.

3. Walnut Production in Jammu and Kashmir

The present study analyzes the growth pattern in production

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Table 1
Walnut production and area in Jammu and Kashmir

Year	Area (Lakh Ha)	Production (Lakh MTs)	Productivity Per hecter
2010-11	3.25	22.22	6.83
2011-12	3.42	21.61	6.32
2013-14	3.55	21.17	5.96
2014-15	3.56	17.12	4.76
2015-16	3.38	24.94	7.38
2016-17	3.26	20.32	5.33
2017-18	3.20	19.44	5.61
2018-19	3.12	19.21	5.35
Source- Horticulture department Jammu and Kashmir.			

Table 2
Some common walnut diseases and their management

S.No.	Disease Name	Damaging Part	Management
1	Leaf Blotch and Anthracnose (Kaul, 1962).	leaves, young shoots and nuts.	The fallen leaves should be collected and burnt. Spray zineb or captan (0.25%) or Bordeaux mixture (0.8%) at (i) leafing stage i.e. when leaf starts unfolding, (ii) at full leaf stage and (iii) two weeks after the second spray. Successful disease control has also been achieved by the application of copper oxychloride, mancozeb and dithianon.
2	Crown Gall (Jindal and Dwivedi 1994).	Root and trunk	Susceptible nursery stock known to be infested with the pathogen should not be planted in fields. All nursery stock with symptomatic roots and visible galls should not be destroyed. Nursery planting sites should be rotated frequently i.e. at least in 4 to 5 years. Infested fields should be planted with corn or other grain crops for several years before they are planted with walnut nursery stock. Nursery stock should be budded rather than grafted because of the much greater incidence of galls on graft than on bud unions. Biological control has been achieved with a non-pathogenic strain K-1026 isolate of A. radiobacter. Root dips of nursery stock into a suspension containing strain of K-1026 have proved very successful in preventing this disease on nut fruits.
3	Stem Cankers and Dieback Diseases (Puttoo and Chaudhary, 1984).	Trunk and branches	Proper pruning will help to reduce canker problems. Pruning should be done in early spring, prior to bud break, or in mid-June after leaf expansion. Remove dead and weak branches and those which are rubbing against others creating wounds. Cuts should be made such that no stubs are left and the resulting wound is as small as possible
4	Mistletoe (Motial and Gilkar, 1970).	Flowers and fruits	Prevention of mistletoe infection is very difficult since birds disseminate the seeds over large areas. The most effective method for controlling mistletoe and also preventing its spread is to prune out infected branches, if possible as soon as the parasite appears. Severe heading (topping) is often used to remove heavy tree infestation. Mistletoe shoots may be controlled by the application of ethephon (ethylene) @ 2% a.i. through spraying on mistletoe foliage at the time of dormancy of walnut tree. Mistletoes are best controlled by boring of two rows of holes along the trunk with a carpenter's auger, at an interval of 15cm at an angle of 45º to reach the sapwood. Filling with the mixture of 8g CuSO4 and 1g fernoxone (83%. 2,4-D Sodium salt) into each hole during dormancy period is the most effective treatment to control this parasite
5	Walnut Blight (Adhikari et al., 1988).	leaves, nuts, catkins, bud and shoots	In India, local cultivars are reported to be free while exotic collections recorded 16 to 47 per cent fruit infection. Cultivation of resistant cultivars such as Sorrento, Marbot, Meylannaise, Plovdisvskii and Parisienne is recommended.

and area in walnut cultivation in the UT of Jammu and Kashmir for a period of almost one decade (2010-2019). The walnut production in the UT during 2010-11 was 22.22 MT and the fruit was grown on an area of 3.25 hectares of land area. The production of walnut shown highest growth of 24.9 MT in 2015-16 and the lowest growth of about 4.76 MT in 2014-15. Anantnag and Kupwara is leading in both production and area of walnut in UT. The variations in production of walnut have been attributed to the differential variations in temperature and precipitation.

4. Walnut Diseases and their Management

Walnuts are susceptible to several diseases and pests, and even though most of them threaten the life of plants and they may ruin a sizable portion of the edible nuts and the visual appearance of the fruits. Hence some most common diseases of walnut and their management are given in Table-2.

5. Conclusion

Jammu and Kashmir is the major walnut producing Union Territory with production of around 2.66 lakh metric tons on 89,000 hectares of land and contributes to more than 98 percent of the total walnut production in India. Kashmiri walnut has seen growing demand and acceptability in the domestic and international market but the production is decreasing due to many factors like, shortage of quality planting, poor orchard management and long gestation period, lack of export oriented policies of the government, the exports have not grown much and the last hindering factor is walnut diseases and their improper management.

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