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Researh Article

THE PROBLEMS OF *CITRUS* CROP CULTIVATION IN KUMAUN HIMALAYA, UTTARAKHAND

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ABSTRACT

The diverse agro-climatic and biogeographic zones in Western Himalaya, especially in Kumaun hills, have given rise to different forms of *Citrus* in cultivation and many other forms in semi-wild and wild conditions. The Shiwalik series of Indian Himalaya, from Northwest to Northeast India along the foothills is considered to be abode of *Citrus* genetic resources. The *Citrus* growing farmers, horticulture department, and the small scale *Citrus* based industry people has been encountered during the entire study period. The exploration aims to make a taxonomic account of the *Citrus* wealth of Kumaun Himalaya, with prime objective of collection, documentation, socio-economic relevance and the problems in *Citrus* crop cultivation.

INTRODUCTION

The Himalaya enjoys a remarkable position in the *Citrus* belt of the world due to its rich wealth of *Citrus* genetic resources, both wild and cultivated. *Citrus* is a familiar term and genus of flowering shrubs in the Rutaceae family (Class: Magnoliopsida, Order: Sapindales). The vast majority of *Citrus* fruits and their wild relatives are native to South East Asia, particularly, Indo-Malaysia, China, New Guinea, East-central Australia to New Caledonia. Different workers have suggested quite similar views as regards the origin of *Citrus* (Swingle, 1943; Bowman, 1956; Dutta, 1958 and Tanaka, 1958). *Citrus* are large evergreen shrubs or medium tall trees, between 5-15 m, often with sharp spines on the stems (Timmer *et al.* 2000). A native of South-East Asia, particularly Indo-Malesia and China, and now under cultivation in the tropics and subtropics throughout the world; ca 17 species with innumerable cultivars and hybrids; 11 species reported from Kumaun Himalaya. *Citrus* has great commercial potential. The dietary, nutritional, medicinal, aromatic, antioxidant and other therapeutic values of *Citrus* fruits are well known (Nair and Nayar, 1997). In addition, the genetic resource spectrum of Indian *Citrus* includes several primitive cultivars/ land races of some interesting indigenous *Citrus* fruits, such as Kumaun lemons, rough lemons, *galgal*, *madkakri*, etc., which sporadically occurs throughout the Kumaun Himalaya. The Shiwalik series of Indian Himalaya, from Northwest to Northeast India along the foothills is considered to be abode of *Citrus* genetic resources. Infact, Tanaka (1954) has denotified the region as 'Lemon-Medica chain'. The hills of Kumaun enjoy a remarkable position in the *Citrus* belt of the world due to its rich wealth of *Citrus* genetic resources. In addition, the genetic resource spectrum of Himalayan *Citrus* includes the 3 interesting commercial *Citrus* species such as *Citrus aurantifolia* (Christm & Panz.) Swingle, *C. sinensis* (L.) Osbeck. and *C. limon* (L.) Burm. f. The Himalaya, owing to its unique topography, mountainous terrain, macro- as well as micro-climatic realms, coupled with other seasonal as well as local climatic variants, have given rise to different commercial and economically important *Citrus* forms. The traditional *Citrus* farmers have faced various problems in Kumaun hills *viz.* biological, technical, average productivity, lack of transport facility, poorly organized marketing channels, as well as the recurrent problem of *Citrus* pests.

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MATERIAL AND METHOD

The Kumaun Himalaya falls under the central sector of Indian Himalaya and lies between 28° 44'- 30° 49' N Lat. and 78° 45'- 81° 03' E long. It has occupy an area 21,033 sq km and thus includes the five Districts-Almora, Bageshwar, Champawat, Nainital and Pithoragarh. An extensive survey was carried out during 2009 to 2012 in hills along the valleys of Kumaun region. Here all the districts of Kumaun Himalaya with the well known low lying valleys *viz.* Kali valley, Gori valley, Ramganga valley and Pindari valley are very rich in *Citrus* diversity. The collection of *Citrus* specimens from the farmers and villagers was done mostly with the help of local populace, traditional knowledge holders, tribes, middlemen and the Department of Horticulture. The field notebook as an indispensable item was filled on the spot to record the data such as date, place, locality, habitat, elevation, local name, uses, commerce, mode of selling and problems etc.

RESULTS AND DISCUSSION

In Kumaun Himalaya the farmers planted different species of *Citrus* crops of which oranges are the main *Citrus* grown in commercial scale while lime and lemon are confined in a limited production and sale. Other *Citrus* are grown just for home consumption. Majority of farmers sell their fruits through middleman (contractor) because they have no groups and have no access to distant market. Therefore, there exists a big gap between producers and consumers and farmers have no bargaining power of their produce and are deprived of higher profits. The study also indicates that *Citrus* farming is associated with higher income families rather than poor subsistence farmers. However, productivity is limited and farmers and technicians are not ware of increasing *Citrus* productivity through cultivation of high yielding varieties, landrace conservation and maintenance of disease free fruiting plants.

Citrus farmers have faced various problems in Kumaun hills (hailstorms), biological (Insects and disease pests, wild animals) and technical (experiences, skills, training etc) difficulties. There is no record of complete failure of crops for past 5-10 years, but majority of the farmers lost part of their crops due to unpredicted hailstorms, increasing pests and lack of irrigation facility. Only 10-15% of the farmers have been practicing control measures of which majority spray different chemicals, while a few also apply their indigenous knowledge of pest management technique. The limiting growing conditions, limiting water resources and high incidence of pests and diseases warranting great care from planting till the plants come to bearing in order to sustain a productive life of a minimum of 15-20 years. *Citrus* plants are very sensitive to various biotic and abiotic stresses. Therefore selection of an ideal rootstock is a continuing challenge for the cultivation of *Citrus*. Currently used rootstocks *viz.* rough lemon and karna have gone through a lot of variation over the last three decades, while the conventional rootstock citron is very rare in Kumaun hills. Here in hilly areas, planting is done on terraces against the slopes and on such lands, high density planting is possible as more aerial space is available than in flat lands.

The important insect-pests of *Citrus* are *Citrus* blackfly and whitefly, *Citrus* psylla, *Citrus* thrips leaf miner, scale insects, bark eating caterpillar/trunk borer, fruit fly, fruit sucking moth, mites, etc. Other pests attacking *Citrus* particularly mandarin orange, especially in humid climate the mealybug and nematode, etc. are common in low lying valleys. The major problems in Kumaun Hills pertaining *Citrus* cultivation, faced by the farmers include: low productivity, lack of transport facility, poorly organized marketing channels, as well as the recurrent problem of *Citrus* pests. The limiting growing conditions, compounded by limited water resources and high incidence of pests and diseases warrant greater care right from planting till the plants come to bearing, in order to sustain a productive life of a minimum of 15-20 years.

CONCLUSION

However, in the Kumaun hills, productivity remains constant and as such farmers are showing insignificant interest in expanding the cultivation of *Citrus.* Added to it, the technicians, as well as the scientific community lack interest as relates to increasing the *Citrus* productivity through cultivation of high yielding varieties, landrace conservation and maintenance of disease free fruiting plants.

Therefore, the main step should be the conservation and productivity enhancement for poverty alleviation of majority of the hill farmers through implementing ecologically and economically sustainable income generating activities with the promotion of small scale or home industries for juice, pickle and jelly production. If, the Government provides sound market in the hills of Kumaun there are definitely some attractions in *Citrus* farming, which are being described below;

1. High production and income compared to other traditional crops.
2. Low initial investment and low expenses for the long-term production.
3. Comparatively low pest problems as compared to other cash crops.
4. Easy and safe transportation compared to fresh vegetables.
5. *Citrus* crops give high benefit return per unit area compared to other cereal crops growing.
6. Intercropping is possible during early stage of *Citrus* plant growth which provides additional incomes and efficient and economic uses of human labour throughout the year.

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