Volume 4 Issue 1 July 2016 ISSN: 2321 – 788X

CARROT CULTIVATION IN INDIA: A CRITICAL REVIEW

S. Sangeetha[1] and S. Shanthakumar[2]

[1]Research Scholar, Department of Economics, Government Arts College, Udhagamandalam
[2]Assistant Professor, Department of Economics, Government Arts College, Udhagamandalam

Abstract

The present paper examines the carrot cultivation in India. The studies reviewed in the study discussed various problems in carrot cultivation in India and all over the world. This review would help the researcher to bring more research and pave way for sustainable yield of carrot in India. New techniques in the field of carrot cultivation would help in improving the production and earn additional income to the agrarians.
Keywords: *Cost, yield, carrot, fertilizer, pesticide*

Introduction

Carrot production in Georgia is a relatively new industry. Commercial production was extremely sparse until the early 1990s with only a handful of acres, mostly grown for the processing market. The original areas of production centered on Macon and Colquitt Counties. Fresh market production in Georgia originated primarily in Pierce County. Production then spread to areas in Wayne, Brantley, Coffee and Jeff Davis Counties and is still active in most of these counties. Today interest in both fresh market and processing carrots extends through-out the lower two thirds of the state.

Carrot *(*Daucuscarota *var*. sativus*)* is a member of the Umbelliferae family. Other vegetable crops and herbs in this family include celery, parsnip, parsley, dill, caraway, anise, coriander and fennel. Domestic carrots may have evolved from a wild form similar to its relative known in North America as Queen Anne's Lace. The family name comes from the flower form, which is an umbel. Characteristic of most of the family's plants, an umbel has individual flower stalks originating from the same point on the stem.

Carrots probably originated in Asia around northwest India. Cultivation of carrots for medicinal purposes began 2000 to 3000 years ago. They were used for a myriad of medicinal purposes including stomach ulcers, abscesses, bladder, liver and kidney problems, to aid in childbirth and even as aphrodisiacs. Cultivation of roots for consumption dates back to 600 A.D. when purple root types were grown in the area currently known as Afghanistan.

Yellow types were eventually selected and produced in Syria and Iran in the ninth or tenth century. Carrots were introduced to China by the thirteenth century and cultivation spread from the Middle East to Italy, Spain and throughout Europe by the fourteenth century. Eventually, white and orange types were selected. Orange types, first grown in the Netherlands during the seventeenth century, were brought to North America

by early settlers. The root was popular with Native Americans and production currently exists worldwide.

One of the reasons production is so widespread is that carrots are the major single source of Vitamin A in the diets of many cultures. They are also a good source of other vitamins, minerals and fiber. Carrots are produced for a variety of uses. Fresh market production for retail sales is still an important market. Fresh packed articles include peeled baby carrots, carrot sticks, shredded carrots and salad mixes. Processing markets include baby food production, frozen and canned products. Carrots are popular as snack foods, for deli trays, in salads, cooked in casseroles, as main vegetable dishes as well as numerous other culinary creations.

Carrot varieties produced in the United States are biennial in nature, requiring two full seasons from germination to seed production. However, it is grown commercially as an annual for its large storage root produced during the first year. True annual forms of the crop also exist but are not produced in the United States. Young carrots are characterized by a tight rosette of finely serrated leaves and a slender tap root with fine fibrous side roots. As the tap root enlarges and reaches maturity, the conductive tissue is distinguished as a light-colored core (xylem) and the deeper orange cortex (phloem).

Literatures on Carrot Cultivation

This section brings the review of literature in the economics of carrot cultivation in India. The reviews would bring some insights to the field of agricultural research.

Radhakrishnan. D (2013) examined that carrots remain favourite of Ooty farmers. Rain or shine carrots are fine. With this view being shared by many members of the farming community in The Nilgiris and also those from the plains who take agricultural lands on lease, the area under carrots has been steadily increasing. They are cultivated in different parts of the Ooty, Coonoor and Kotagiri blocks like M.Palada, Kullisholai, Nanjanad, Thuneri, Ketti, Ithalar, Kookalthorai and Nedugula. Unlike earlier when rotation of crops was the practice among the farmers now most of them cultivate carrots throughout the year on account of the good return and demand. Each cultivation season lasts about 30 days. Stating that about 3,000 farmers, including traditional and new are now engaged in carrot cultivation, he said that individual holdings range from 25 cents to two acres. Adverting to the role of the department in helping the carrot growers, Mr. Mani said that seeds and technical inputs are made available to them. Pointing out that the seeds include the normal variety, hybrid and location specific, he said that a 50 per cent subsidy is extended. The cost per kg. of seeds depending on the variety ranges between Rs. 1, 500 and Rs. 15,000. With the demand increasing, the department now distributes about 3,500 kg. of seeds including 1500 kg. of hybrids. To a query on the impact of the prolonged dry weather this year on the cultivation of carrots, he said that it was not serious as most of the carrot cultivating areas had either received some rain or had irrigation facilities.

Pointing out that when the going is good the flow can touch even 500 tonnes a day, he said that now it was about 200 tonnes a day. Nilgiris carrots which are in demand in many states fetched till recently fancy prices like Rs. 40 a kg.

RaghuvirBadrinath (2013) has examined the quality of Ooty carrot. For those driving up the picturesque Nilgiri range to Ooty, eating crunchy and juicy 'Ooty Carrots' on the way is a must. Ooty and its neighbouring areas are ideal for growing carrots. This region accounts for supplies of about 100 tonne a day to various states and for export. Farmers from Ooty take their harvest to the Mettupalayammandi, pay the broker a fee and sell the produce at the prevailing rate. However, brokers discount the price for bad produce, sometimes as high as 30 per cent. Thus, many farmers are at the mercy of brokers. Lawrencedale Estates and Farms (LEAF) was formedLEAF works with about 1,000 farmers, mostly those with one to two acres. It shares farming techniques, assists farmers for better yields, increases the harvest per acre and provides the full value for their harvest, without brokerage free. Importantly, it doesn't discount bad produce.

VigneshwaraVarmudy (2014) examined the above increase in carrot cultivation. In India, carrot is grown across the country. Haryana is the leading producer, followed by Andhra Pradesh, Punjab, Bihar, Tamil Nadu, Karnataka and Assam. The total area under this crop in India during 2012-13 was 64.33 thousand hectares, and the production was 1147.08 thousand metric tonnes. India exports carrots and turnips to the UAE, UK, Maldives, Bangladesh and other countries. The total volume of exports during 2012-13 was 278.97 metric tonnes valued at 6.43 million. Even though carrot is an important nutritional vegetable, the efforts made to improve the production of this crop in India are insufficient. India once stood sixth in the world in the production of carrots, but has now dropped to 14th position; so there is a need to overcome prevailing problems like pests and diseases, marketing, etc. India's government should under-take a detailed survey of the present situation as well as future prospects.

Dezordi, LucielRauni et al (2015) analysed the Nutrient Recommendation Model for Carrot Crop. The literature on fertilization for carrot growing usually recommends nutrient application rates for yield expectations lower than the yields currently obtained. Moreover, the recommendation only considers the results of soil chemical analysis and does not include effects such as crop residues or variations in yield levels. The aim of this study was to propose a fertilizer recommendation system for carrot cultivation (FERTICALC Carrot) which includes consideration of the nutrient supply by crop residues, variation in intended yield, soil chemical properties, and the growing season (winter or summer). To obtain the data necessary for modeling nutritional requirements, 210 carrot production stands were sampled in the region of Alto Paranaíba, State of Minas Gerais, Brazil. The dry matter content of the roots, the coefficient of biological utilization of nutrients in the roots, and the nutrient harvest index for summer and winter crops were determined for these

samples. To model the nutrient supply by the soil, the literature was surveyed in regard to this theme. A modeling system was developed for recommendation of macronutrients and B. For cationic micronutrients, the system only reports crop nutrient export and extraction. The FERTICALC which was developed proved to be efficient for fertilizer recommendation for carrot cultivation. Advantages in relation to official fertilizer recommendation tables are continuous variation of nutrient application rates in accordance with soil properties and in accordance with data regarding the extraction efficiency of modern, higher yielding cultivars.

Venkataramanan et al (2015) examined the nutritional value and suitability of carrot whole top as green fodder. The carrot tops had high crude protein (144 g/kg), calcium (24.3 g/kg) and phosphorus (7.7 g/kg), comparable to sun hemp (Crotalaria junctea), fodder berseem and oil cakes, respectively. Milk from animals fed with carrot tops were free from residues of organochlorine, carbamate and organophosphorus pesticides. Carrot tops are perishable in nature and hence were preserved as feed blocks to extend shelf life. The nutritional value and keeping quality of the blocks were also studied. The studies revealed that carrot whole tops can be a promising alternate source of green fodder, especially in hilly regions where there is a shortage of green fodder during winter.

Organic Facts (2016) The health benefits of carrots include reduced cholesterol, prevention from heart attacks, warding off of certain cancers, improving vision, and reducing the signs of premature aging. Furthermore, carrots have the ability to increase the health of your skin, boost the immune system, improve digestion, increase cardiovascular health, detoxify the body, and boost oral health in a variety of ways. They also provide a well-rounded influx of vitamins and minerals. In a study meant to reveal the therapeutic value of carrots, researchers at the Wolfson Gastrointestinal Laboratory in Edinburgh, Scotland revealed that cholesterol level drops by an average of 11 percent if seven ounces of raw carrots per day are taken for three weeks. High cholesterol is a major factor for heart disease. Since regular consumption of carrots reduces cholesterol levels, it is a good idea to consume a healthy dose of carrots, in order to prevent heart-related problems. A group of Swedish scientists discovered that these root vegetables can reduce the chances of having a heart attack. A study conducted at the Mario Negri Institute of Pharmacological Research in Italy found that those who ate more carrots had 1/3 as high a risk of heart attack as compared with those who ate less carrots. Next time you start getting riled up about something and your blood begins to boil, eat a carrot! Carrots are rich sources of potassium, which is a vasodilator and can relax the tension in your blood vessels and arteries, thereby increasing blood flow and circulation, boosting organ function throughout the body, and reducing the stress on the cardiovascular system. High blood pressure is also directly linked to atherosclerosis, strokes, and heart attacks, so this is yet another heart-

healthy aspect of carrots. The coumarin found in carrots also has been linked to reducing hypertension and protecting your heart health.

The above studies gives various problems in carrot cultivation in India and all over the world. This review would help the researcher to bring more research and pave way for sustainable yield of carrot in India.

Conclusion

From the studies it could be found that the seedlings fail to appear or develop forked shape from soil problems because carrots are a root crop and must penetrate deeply into the soil, the type and texture of the soil influences their shape and vigor. Even as they germinate they need light, airy soil so that the sprouting seed can break through to the sunshine above as well as grow downward. Heavy, crusted, or overheated soil effectively prevents them from even sprouting. Rocks and clumps or clods of dirt will cause developing carrot roots to split and distort into a forked shape as they grow around these obstacles. To avoid these problems, take pains to prepare the seedbed for carrots well before sowing seed. Wait until the soil has dried out before digging it. Dig it up thoroughly, turning it over and breaking up lumps into small pieces. Cover the newly sown seeds with sand or fine soil that will not crust over when dry. Keep the soil moist. Provide shade for seeds planted in mid-summer so that the soil does not heat up. Garden fleece will do this job. Vigorous growth or heavy rains that wash away soil usually cause this problem, but covering the carrot shoulders, but not the crown where the foliage emerges, relieves it. As carrot foliage grows thicker, it will shade the shoulders too. Cut off any green tops of harvested carrots and eat the orange part. The green part tastes bitter, but it's not poisonous. Thus, it would be better if the farmers follow this technique for increasing the production of carrot in India.

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