SPICES BOARD

Ministry of Commerce & Industry
Government of India
Sugandha Bhavan
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Chairman : **V.J. Kurian I.A.S.**

Chief Editor : **Dr. P.S. Sreekantan Thampi**
Deputy Director (Publicity)

Editor : **S. Palanichamy**

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Tel : 0484-2333610-616, 2347965
Fax : 0484-2331429-2334429
E-mail : spicesboard@vsnl.com
Website : www.indianspices.com

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IN SEPTEMBER ISSUE

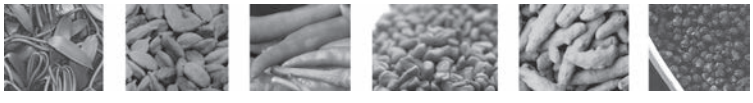
Hon'ble Andhra Pradesh Chief Minister, Dr. Y.S. Rajasekhara Reddy delivering his speech after laying the foundation stone for the Spice Park in Guntur in Andhra Pradesh. To his right is seen Hon'ble Union Minister of State for Commerce and Power, Shri Jairam Ramesh.

SPICES PARKS BECOME FUNCTIONAL SOON

The Spices Parks being set up by the Spices Board at Guntur in Andhra Pradesh and at Sivaganga in Tamil Nadu are scheduled to be fully functional before the next-year end. Dr. Y.S.Rajasekhara Reddy, Chief Minister of Andhra Pradesh laid the foundation stone for the Guntur Spices Park at Edlapadu on 21st August 2008. The foundation stone for the Sivaganga Spices Park was laid by Shri P.Chidambaram, Union Finance Minister at Kottagudi on 23rd August 2008.

The Guntur Spices Park, largest of all others planned across the country, is set up in an area of 124.78 acres of land in Mydavolu and Vankayalapadu villages in Guntur District, alienated to the Spices Board by the Government of Andhra Pradesh. The Sivaganga Spices Park is being set up in 74 acres of land in Kottagudi village in Sivaganga district, alienated to the Spices Board by the Tamil Nadu Government. Shri Jairam Ramesh, Union Minister of State for Commerce & Power was present at both the programmes.

The Spices Park is primarily intended to be regional-crop-specific. It integrates export-oriented production, processing and export promotion of quality spices and also seeks to empower the spice farmers with better price realization for their produce. The land in the Park



Hon'ble Union Finance Minister, Mr. P. Chidambaram with Hon'ble Union Minister of State for Commerce and Power, Shri Jairam Ramesh, Hon'ble Minister of Tamil Nadu, Mr K.R. . Periakaruppan with Chairman of the Spices Board, Mr VJ Kurian at the foundation stone laying function for the Spice Park in Sivaganga.

will be leased to the exporters who are registered with the Spices Board to set up value added processing and exporting units. The proximity with the establishment of units in the Spices Park enables the processors and exporters to forge a closer and lasting relationship with the nearby spice growers, go in for contract farming and continuously procure fresh raw materials.

Farmers themselves can avail of the common infrastructure facility for cleaning / processing and also set up their own processing units in the Park. The Spices Board will create common infrastructural facilities of cleaning, grading, processing, packing, steam sterilization, warehousing, banking, customs clearance, forward market terminal, pre-shipment inspection, etc., in the Spices Parks. All the units in the Park will be certified ISO / HACCP / GMP having international acceptance.

The Guntur Park would mainly focus on Chillies, Tomato chilli and Turmeric. Andhra Pradesh is the largest producer of chilli in the country with a share of 35 percent in area and over 45 percent in production. Guntur is the very heart of India's chilli industry contributing more than 35 percent to the area under chilli crop in India. During 2007-08, the chilli export from India reached a record level of 2.09 lakh tonnes valued at Rs. 1097.50 crore, which accounts for 40 percent of the total spices exported from the country and 23 percent in value terms. Andhra Pradesh also contributes 58 percent to the turmeric production in the country. The Board is considering installation of Radio frequency heating and drying techniques too in the Guntur Park, which would

benefit a lot of small and medium chilli farmers.

There has been overwhelming response to the Expression of Interest invited by the Spices Board from the entrepreneurs to set up their spice processing and value-addition units in the Guntur Park.

The Sivaganga Park is dedicated to coriander, tamarind, Mundu variety of chilli, Erode-Salem variety of turmeric and medicinal plants. Madras Curry Powder is a popular generic brand name in the international market. Tamil Nadu contributes to 27 percent of the total exports of spices through Chennai and Tuticorin ports. The State is the largest producer of clove and Tamarind as well in the country.

Besides 20 local spices exporters, three leading overseas manufacturers of spice products from Sri Lanka, Malaysia and South Africa have also expressed their willingness to set up their processing units in the Sivaganga Spices Park. The representatives of these companies participated in the foundation stone laying ceremony at Sivaganga and had detailed discussion with the Union Finance Minister about the possibility of establishing their units and the Foreign Direct Investment.

In addition to the Spices Parks in these two States, the Spices Board is also establishing the Spices Quality Evaluation Laboratories at Guntur and Chennai, which will be operational in less than one year. The Garlic and Green chilli-focused Spices Park at Chhindwara in Madhya Pradesh coming up in 9 acres of land, for which the foundation-stone was laid in August last year by Shri Kamal Nath, Union Commerce & Industries Minister will be commissioned next month. The production and exports of quality spices from the country are expected to receive a major boost with the establishment of a series of Spices Parks and Quality Laboratories.

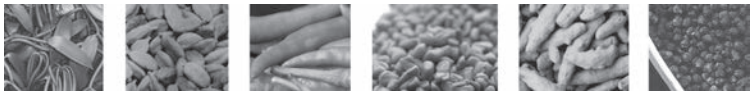
SPICE PARKS SIGNALING PROCESSING REVOLUTION

The Indian spice industry is embarking upon a major processing revolution to beef up the exports of value added spices to fetch higher unit value realization from exports. The chain of six spice parks which the Spices Board is going to set up six different states is the first firm step in direction.

The objective is to improve the processing capabilities and upgrade quality levels in almost all the range of products. Besides offering individual slots for serious processing houses, the Board is giving space for individual and groups of farmers to take to modern means of processing and value addition. The whole process brings in sharp rise in quality levels and will help the farmers to bargain for their quality products to secure rise in price realizations.

The increased pressure by major spice consuming countries in Europe and the US are demanding more of quality compliance by producing countries like India . The recent trends among the consumers to select safe quality food has imposed one more precondition that only those suppliers who can meet the aspirations of the consumers can stay in the processing and export field.

The Indian spice industry is in the threshold of meeting these emerging challenges. Though the Indian export of spices has crossed the US $ I billion mark in 2007-08, setting



a new record in business, the future is overcast with lots of challenges and uncertainties relating to definitions of quality levels. The Indian share in world spice market has gone up to 47 per cent in quantity and 40 per cent in value. It is also important to note that major competing countries like China has imposed ban on their exports of certain spices for want of required guarantees on quality parameters.

The dominance of bulk spices in the Indian export basket of spices is giving way to value added spices. The share of value added spice products in exports is on the increase signaling the fact that its demand is on the rise. Spice Oils and oleoresins, curry pastes and powders and mint products are the major value added items from spices. A total of 39,200 tonnes of these products were exported during 2007-08 bringing in foreign exchange revenue to the tune of Rs 1954.50 crores. This is substantially higher than the figures of 2006-07 when the exports of these products segments were 32000 tonnes valued at Rs 1698.67 crore. The trend is that the exports of value added spices are gaining ground year after year.

The imperative need of the industry is to upgrade the quality and processing levels. Many processing export houses including the Multinational houses in the country are now continuously upgrading their production lines meeting the expectations of international buyers. However for those of the individual exporters who cannot find the capital to invest in the new processing technologies the concept of Spice Parks is a bountiful opportunity.

Many international buying houses are also in the process of seeking entry in the Spice Parks in the country. The attraction for such a desire is that these parks will be more or specializing in the production and processing of locally specific spices and varieties. The Spices Parks will be using the state of the art technology based processing facilities in its six major Spice Parks in the country.

The Spices Park in Guntur in Andhra Pradesh will be focusing on chillies and turmeric. Guntur and the neighboring districts in AP grow the varieties that are sought after in the international market for its generic exclusiveness. This will help the investor in this Park to source their requirement on a competitive rate. Besides the Parks offer the chances of direct interface with growers and quite often backward linkages will be effectively considered.

The Spices Park in Chindwara in Madhya Pradesh will generate good opportunities for dehydration of garlic and extraction of green chillies. The Park in Jhalrapatan village in Jhalawar in Rajasthan and the Park in Brahmanvada village in Mehsana district of Rajasthan bring to focus the immense potentials in seed spices.

The globally famed Byadagi chilli famous for its red colour richness will get a better exposure when the Park in Byadagi in Karnataka becomes a reality. The Spice Park in Kerala, the home for cardamom, pepper, cloves, nutmeg, mace and cinnamon will open up vast openings in processing not only for processors but also for farmers.

The Board has already invited expression of interests from processors and exporters to set up facilities in the Park especially for chillies and turmeric. All the Units in the park will be certified ISO/HACCP/GMP having international acceptance.

The park will have facilities for warehousing. Cleaning, drying, grading, sorting and packaging, pulverizing, blending, facilities for extraction, sterilization, analytical and preshipment inspection facilities and

container opportunities. In addition the Board will also provide a world-class analytical laboratory to undertake analytical services and also to impart training on both pre and post harvest operations in spices to all sections of the trade.

Research and Development facilities are also envisaged for spices and spices products within the Park. The Research Station in the Park will undertake research on high yielding and disease resistant varieties which will benefit spice farmers.

Exports of Spices and spices products from India

Spices exports have reached a major milestone by crossing one billion US dollar mark in 2007-08. The exports have reached a new peak in volume as well. During the year 2007-08, a total of 4, 44,250 tonnes of spices and spices products valued at Rs 4435.50 crores (US $ 1101.80 million) was exported from the country as against 3, 73,750 tonnes valued at Rs 3575.75 crores (US $ 792.5 million) in the previous year.

India commands a formidable position in the World Spice Trade with over 45 percent share in Volume and over 40 percent in Value. World trade in spices is estimated to be around 800,000 tonnes valued at US $ 2000 million.

India can now boast as the monopoly supplier of spice oils and oleoresins the world over. In the case of curry powders, spice powders, spice mixtures and spices in consumer packs, India is in a formidable position. The consistent effort of the Board during the last one decade has improved the share of the value added products in the export basket to 60%. ☆

FENNEL
Spice of the Angels

Raj Pal Meena *, Sumer Singh and R. P. Meena*****
* Scientist, DWR, Regional Station, Katrain, KulluñValley
(Himachal Pradesh) -175129
** Scientist, National Research Centre on Seed Spices, Ajmer
*** Programme Coordinator, KVK, Rajasmand

India is the world's largest producer, consumer and exporter of the spices and among all spices fennel (*Foeniculum vulgare*) is one of the most important spice. Fennel generally known as *saunf* belonging to Apiaceae family. Fennel is a stout, aromatic, annual herb (biennial with potency of regeneration). The volatile oil is used for manufacturing cordials and enters into the composition of fennel water, which is commonly given to infants as medicine. The fennel fruits are used as stimulant in carminative and in cure of colic pains. Essential oil of fennel prevents development of chronic liver damage hence it is very useful for controlling disease of chest, spleen, kidney and aid to longevity. The seeds are used as a flavouring agent in many herbal medicines, and to help disperse flatulence. The

seeds, and roots, also help to open obstructions of the liver, spleen & gall bladder, and to ease painful swellings, in addition to helping with yellow jaundice. The essential oil is also used for scenting soaps and flavouring materials for cakes, liquor, sauces, pastries, confectionary, bread roll and meat dishes. In India fennel seeds are also used for mastication and chewing alone or with beetle leaves.

As a herb, fennel leaves are used in French and Italian cuisine's in sauces for fish and in mayonnaise. In Italy fennel is also used to season pork roasts and spicy sausages, especially the Florentine salami *finocchiona*. It is traditionally considered one of the best herbs for fish dishes. In Italy, there is also small-scale usage of fennel pollen as an expensive and rather extravagant spice also known as "Spice of the Angels".

Fennel pollen is also produced in California as a small-scale exotic crop.

In India fennel is mainly cultivated in Gujarat, Rajasthan, Uttar Pradesh, Karnataka, Andhra Pradesh, Punjab, Haryana and Madhya Pradesh. Gujarat ranks first in area and production contributing more than 90 per cent of total fennel production of the country. In India, fennel fruits are classified for trade purposes according to their place of origin. Some of the well known types are Bombay, Bihar, and UP fennels. Seeds from Lucknow are considered to be best and are priced higher than those from other areas.

Fennel requires cool and dry climate for its cultivation. Dry and moderately cool weather conditions during seed formation increase seed yield as well as quality of the produce. Except sandy soil, fennel can successfully be cultivated in all types of soils having sufficient amount of organic matter. Black cotton soil and loamy soil containing lime with proper drainage are better suited for its cultivation.

Traditionally the nutrient requirement of fennel is being met out by the application of chemical fertilizers. The experience of many researchers working in India as well as abroad shown that excessive and imbalance use of chemical fertilizers and pesticides for long time have resulted degradation and deterioration of soil's physical, chemical and biological properties as well as health of environment which is not conducive for sustainable crop production for a longer period. To overcome this problem increase in use of organic sources of nutrition is needed. Moreover the demand of seed spices all over the world

is increasing which is an important source of earning foreign exchange because whole world is looking towards the India for supply of quality seed spice free from contamination of toxic residues. From this point of view nutrient management of fennel by organic sources like farm yard manure, sheep manure, vermicompost, biofertilizers etc is important. Integration of low levels of chemical fertilizers as starter dose with organic sources of nutrients is the best strategy to realize the maximum yield of the fennel. The biofertilizer inoculations respond positively with all sources of nutrients. However, the application of sheep manure @ 10 tonnes per hectare with biofertilizer exhibited highest yield followed by the application of vermicompost @ four tonnes per hectare with biofertilizers. It was revealed in an experiment at National Research Centre on Seed Spices by *Meena et al*, 2007. Application of farm yard manure and vermicompost made significant improvement in physical, chemical and biological properties of the soil which in turn enhance availability and uptake of macro and micro nutrients resulting better yield of the crop. Healthy seedlings are the primary need to harvest the good yield. Therefore, in the nursery farm yard manure application is must @ 400 – 500 kg of FYM / 150 – 200 square meter nursery area. Besides nutrient management good cultural operations are equally important to harvest a good and healthy yield. From this point of view the field must be ploughed and kept open during summer months. This will help for controlling the pest, diseases and weeds as for the export of spices which is free from toxic residues natural suppression of disease and pest by cultural operations are very important. The cultural operations are also helpful in *insitu* water conservation.

The content of essential oils varies strongly (0.6 to 6 per cent); fruits in the center of an umbel are generally greater, greener and stronger in fragrance.

Time of harvest and climate are also important. Harvest the physiologically matured umbels and dry under shade. As the umbles do not mature at the same time so plucking of umbles is done when seeds are fully developed but still green. Longer exposure to sun changes the colour and luster of seeds, reducing their quality. Commercial samples vary considerably in quality, depending upon the variety or race to which they belong and the care bestowed in harvesting and storing the fruits.

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The Composition of Fennel Seed

Moisture 6.30 % Calcium 1.3 % Vitamin B2 0.36mg / 100g	Protein 9.5 % Phosphorus 0.48 % Niacin 6.0 mg / 100 g	Fat 10.0 % Iron 0.01 % Vitamin C 12.0 mg / 100g	Crude Fiber 18.5 % Sodium 0.09 % Vitamin A 1040 IU / 100g	Carbohydrate 42.3 % Potassium 1.7 % Calorific Value 370 Calories / 100g	Total Ash 13.4 % Vitamin B1 9.41 mg / 100g

Scientist –Farmer Interface on "Management of Cardamom whitefly"

Dr. S. Varadarasan
HOD (Entomology)

A few cardamom farmers encountered whitefly in the summer of 2008 and had a difficult time in managing the pest. ICRI could visit a few gardens and suggest ecofriendly remedial measures. In addition, ICRI has organized an interface with farmers, field officers and Scientists at ICRI Myladumpara on 17-07-2008, to empower the farmers the knowledge to tackle whitefly problems in cardamom plantations. About 62 participants attended the discussion and were shown the methodology to identify the live nymphs and adults of whitefly, and the natural enemies of the pest. It was also shown to the participants (a) how the nymphs (larvae) and adults (fly) cause yellowing of leaves by sucking the plant sap and (b) the infestation of natural enemies such as parasite (*Encarsia*) and entomopathogenic fungi (*Aschersonia* and *Verticillium*) on nymphs. It was emphasized that whitefly is only a minor pest and its occurrence as a major pest in a few plantations is due to the improper use of insecticides. With excess use of insecticide, all natural enemies are killed and hence whiteflies multiply uncontrolled. In ICRI farm, at Myladumpara where Integrated Pest Management (IPM) is practiced, whitefly was never been a problem. Majority of the participating farmers conceeded that whitefly is only an invited problem and the pest can easily be managed with Yellow Sticky Trap (YST).With slides and photos, the method of YST installation was explained to participants.

Whitefly adult trapped in YST

The Scientist of ICRI emphasized the following points:

1. Adopt IPM to avoid whitefly.
2. If whitefly becomes major pest, the first line of management is to avoid use of chemical insecticides to control whitefly.
3. Identify the live nymphs or adult of whitefly in the field.
4. Install Yellow Sticky Trap (YST) to control adult whitefly (Eco-friendly method of management).
5. Spray suspension of neem oil (300-500ml) + soap solution (300-500ml) on the lower surface of the leaves only if live nymphs are seen; otherwise YST is a safer method of whitefly management.

Scientists participating in the seminar on whitefly

Participants during the seminar on Whitefly

ECONOMIC ANALYSIS OF SAFFRON UNDER RAINFED CONDITIONS OF KASHMIR

Dr. S. A Shah
Department of Geography &
Regional Developement
University of Kashmir,
Srinagar
E.mail:shamimcrocus@gmail.com

The king of spices, golden condiment viz, saffron consists of the dried stigmas and tops of the styles from the flowers of a member of the **Iris** family. **Crocus Sativus**, known as *kong* to Kashmiri, Kesar in Hindi, Keshara in Sanskrit. Jafran in Bengali, Keshar in Gujrati, Kesare in Marathi, Kunkuma kerari in Karnataka, saffron in English, Azafran in Spanish, Azafaran in Arabic, Safran in German and French, Saffroon in Dutch, Shafran in Rus-sian, Safuran in Japanese, Zafferano in Italian, and Fan - Hung - Hua in Chinese. Saffron is the slender, dried reddish - brown, flattened stigma of cultivated form of Crocus Sativus.

Saffron is highly prized as one of the best natural food flavouring and colouring substance having general panacea properties. In Kashmir, it is the legendary crop of the well drained plateau of Pampore; where it is being grown since ancient times. The recorded account of saffron cultivation in Kashmir dates to 550 A.D., nearly four centuries earlier than its recorded cultivation in Spain around 961 A.D.

Commercial saffron, the dried brilliant orange red or deep red stigmas, is a natural colouring and flavouring material used nowadays chiefly as food additive in culinary, bakery and confectionary. It imparts a pleasing flavour and

ye1low colour to the dishes and delicacies. In India, it is highly esteemed in religious rites and worships, besides being one of the chief ingredients of many Ayurvedic and Unani medicines. Its chief medicinal properties are attributed to its having antispasmodic, antihysteric, stomachic, expectorant, stimulant and aphrodisiac properties.

Saffron thrives well in sub-temperate climate at an altitude ranging from 1500 to 2400 meters above sea level. Sunny days during flowering are favourable for good yield. In general, localities which receive 30 to 40 cms. Of rainfall and are covered with snow during winter, are suitable for commercial cultivation. Spring rains are favourable for promoting production of new corms while a second spell of rains at the end of summer or at the beginning of autumn encourages profuse flowering.

It requires a well drained loamy soil. A medium light soil with neutral to slightly alkaline reaction is suited for its cultivation. In water-logged soils, corms rot and thus proper drainage system is an important requirement for this crop. Saffron plant is a small perennial herb with globular corms which range 0.2 cm to 5 cms. in diameter. Propagation of the plant is through corms. The plant remains in deep dormancy from mid-June to August. The mother corms-reproduce annually- and give rise two to six new corm lets and remain attached to the mother corm till dormancy period starts. It pro- vides food to the new developing corms and in doing so wither, shrink and finally die. Land preparation starts in March-April. The field is ploughed four to five times to a depth of 30.35 cms.

Last ploughing is done in May. Fifteen to twenty tonnes of farm yard manure (FYM) per hectare are incorporated into the soil and then fields are leveled. Furrows are opened 8-10 cms. Deep and corms are planted in the furrows at 8-10 cms apart with row to row distance between 15-20 cms. The field is divided into (2x8 meters) strips with 20 cm. deep inter-drainage channels. This is efficient and less expensive method recommended by 'SKUAST'. It requires about 40 quintals of well developed corms to plant a hectare. Before planting of corms a prophylactic treatment with five per cent copper sulphate solution is given. Two hoeings are most essential, one in the month of June and another before flowering commences. Higher yields are obtained by applying 20 kgs. N, 80 kgs. P_2O_5 and 30 kgs. K_2O/ha. In equal split does, one at the time of planting or before final hoeing i.e., first week of September and second after flowering is over i.e., third week of November. The flowering season is confined to about three weeks from mid of October to first week of November. Alternate picking is preferred over four days interval picking. The picking of flowers is usually done in the early hours of morning.

From picked flowers, stigmas along with style are isolated immediately. About 1, 50,000 flowers are required to produce a kilogram of good quality dried saffron. The drying of fresh saffron is carried after the carpels are detached from the rest of flower, air-dried to moisture content of 8-10 per cent, and stored in moisture proof containers.

Table: 1

Year	Area (Hectare)	Production (00kg)	Yield (Kg/ Hectare)
1996	5707	155.06	2.64
1997	5361	171.94	3.24
1998	4161	130.24	3.13
1999	4042	77.60	1.92
2000	2831	35.67	1.268
2001	2758	3.03	0.109
2002	2758	3.03	0.109
2002	2880	65.23	2.265
2003	2742	51.54	1.88
2004	3063	48.17	1.572
2005	2989	88.52	2.961

Source: - Agricultural Finance Commission, J&K.
Economics of saffron

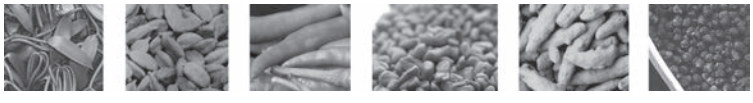

Table 2:

a. Summery of Economic Analysis of Saffron per hectare under Rain fed conditions of Kashmir (2000-01 to 2006-07)

Year	Expenditure	Cost of seed corms Rs./100kg	Saffron yield Kg/ha)	Market price Rs./kg	Gross Income (Rs./Kg)	Net Income Rs./ha.
1st year	2,18,000	5000	0.5	40,000	20,000	-198000,00
2nd year	20,000/-	-	1.0	42,000	42,000	22,000
3rd year	21,000	-	1.5	43,000	64,500	43,500
4th year	21500	-	2.1	43,500	91350	69850
5th year	32,500	-	2.5	90,000	2,25000	192,500
6th year	35,000	-	3.0	90,000	2,72,000	2,37,000
7th year	40,000	9,000	-	-	7,20,000	6,80.000

b. Detailed year-wise Expenditure/ Returns

1st year			**Amount (in Rs.)**
1.	Cost of 40,000kg. of seed corm at Rs. 45,000 /100kg.	……..	2,00,000/-
2.	Cleaning of seed corns before planting	…….	3,000/-
3.	Land preparation, layout and planting	…….	10,000/-
4.	Cost of manures and fertilizers and its application	……..	5,000/-
	Total		**2,18,000/-**
5.	Returns(cost of special grade of saffron at Rs. 40.00/gm for 500 grams	……..	20,000/-
2nd year			
1.	Cost of ……..hoeing , inter culture operation	…….	15,000/-
2.	Cost of manures and fertilizers and its application	…….	5,000/-
3.	**Total**		20,000/-
4.	Returns(cost of special grade of saffron at Rs. 42.00/gm for 1000 grams	…….	42,000
3rd year			**Amount (in Rs.)**
1.	Cost of inter-cultural operations (Labour)	…….	16,000/-
2.	Cost of manures and fertilizers and its applications	……..	5,000/-
3.	**Total**		21,000/-
4.	Returns(cost of special grade of saffron at Rs. 43.00/gm for 1500 grams	…….	64,500/-
4th year			
1.	Cost of inter-culture operation(Labour)	…….	16,500/-

2.	Cost of manures and fertilizers and its applications	……..	5000 / -
3.		**Total**	21,500 / -
4.	Returns(cost of special grade of saffron at Rs. 43.00 / gm for 2100 grams	…….	91,350 / -
5th	**year**		
1.	Cost of inter-culture operation(Labour)	…….	25,000 / -
2.	Cost of manures and fertilizers and its applications	……..	7500 / -
3.		**Total**	32,500 / -
4.	Returns(cost of special grade of saffron at Rs. 90.00 / gm for 2500 grams	…….	225,000 / -
6th	**year**		
1.	Cost of inter-culture operation(Labour)	…….	27,000 / -
2.	Cost of manures and fertilizers and its applications	……..	8,000 / -
3.		**Total**	35,000 / -
4.	Returns(cost of special grade of saffron at Rs. 90.00 / gm for 3000 grams	…….	272,000 / -
7th	**year**		
1.	Cost of uprooting of corms with help of local 'zoon'	…….	30,000 / -
2.	Returns(cost of 80,000kg of seed corns of varying size at Rs. 9,000 / 00kg)	…….	720,000 / -
1.	Overall expenditure (1st to 7th year)	…….	3,88,000 / -
2.	Overall gross income(1st to 7th year)	…….	14,34,850 / -
3.	Net income (6 years crop cycle)	…….	10,46,850 / -
4.	Average income per year	…….	1,49,550 / -

Saffron cultivation involves a huge initial investment. The economic analysis has been worked out at Chandhara-Pampore Kerawa from 2000-01 to 06-07 considering six year crop cycles under rain fed conditions of Kashmir valley by cost benefit analysis.

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BLACK PEPPER IN GUYANA

B.Sasikumar,
ITEC Expert(Spices Technology),
National Agricultural Research Institute,
Mon Repos,GeorgetownGuyana.
Email:sasikumarsooranadu@gmail.com

Guyana, one of the less developed nations in the Caribbean region, with about eight lakhs people ,is blessed with fertile land and plenty of water.

Though rice and sugarcane are the major crops of the country, many horticultural crops are also grown by the farmers. Among the horticulture crops, the important spices are **black pepper ,nutmeg, ginger and turmeric**. (Turmeric is known as 'dye' in Guyana). Spice cultivation is yet to gain momentum in the country, though few black pepper vines are maintained by some of the farmers, probably introduced from Barzil long ago.

For administrative purposes, the country is divided into 10 regions, comprising of hinterlands and coastal regions. Black pepper vines are there in the regions1,2,3,6,7 and 10.

Guyana is having many rivers. Essekubo is major river in the region 2. And there are about 350 islands in this river. Farmers live in the islands. Farm holdings vary from 5-10 acres and many of the farmers are People of Indian Origin. Black pepper is grown as a homestead vine along with citrus, coffee, carambola, avocado, West Indian cherry, mango, coconut, pineapple, tapioca, ginger, cucurbits, vegetables etc.

A typical homestead has most of these crops plus poultry including ducks. Black pepper is found trailed on coffee, carambola etc in the backyards.

The soils are clayey and drainage is poor. No fertilizer is applied to the crops in the backyard. Thick weed cover is a characteristic of Guyana's land.

Black pepper is propagated from runner shoots, directly. No nursery practices are followed by the farmers. Some farmers restrict the growth of the vine to three-four feet height ,others allow the vine to trail uninterrupted on the standards. No shade regulation is followed. Spikes are produced from the third year onwards.

Mr. Raymond Abdul Karim of Upper Pomeroon river, region 2, is typical farmer who grows black peeper in the backyard. He has ten vines trialed on coffee. His neighbour, Mr.Rayandot Lalulis(accessable by boats)too has black pepper on coffee.

They harvest the spikes at full maturity or at half maturity. In a year two harvests are possible,during June-July and January-February. Threshing is done by hands. Usually drying is done under sun for about 10 days. Blanching is known to some farmers .Mr.Lalulis told that after drying the pepper in the sun, he roasts them for 10-15 minutes and grind the berries Mr.Lalulis gets about 1.5 kg dry berries from a 12 years old vine.

Most of the farmers use the produce for household purposes as spice. Now there is no organized market for the produce, though the country imports about 20 tonnes of black pepper at present.

No much varietal variation is observed among the vines. The vines observed are characterized by long(12-14 cm)long spikes, with good setting, bold berries, big obovate leaves with acuminate tips and purple shoot tips. The vines resemble the popular Indian cultivar 'Karimunda' except for the spike features and leaf size. For leaf shape, spiking intensity, berry size, leaf base and shoot feature(slender),there is some similarity with 'Karimunda' .Bulk density and pungency are very good.

The vines are free from disease and pests .Foot rot or other diseases are not yet known.

PERFORMANCE OF CORIANDER GENOTYPES (*CORIANDRUM SATIVUM LINN.*) IN RAINFED VERTISOLS

C. Sarada and Giridhar Kalidasu
Acharya NG Ranga Agricultural University,
Regional Agricultural Research Station,
Lam, Guntur-522 034.

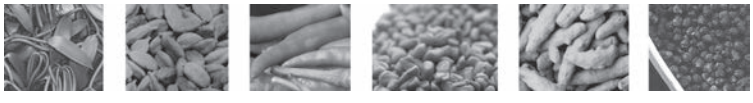
ABSTRACT

In Andhra Pradesh Coriander is grown nearly in 58,000 hectares in black soils under rainfed conditions. Andhra Pradesh occupies third place in area and production in India. A study was undertaken to evaluate the performance of promising coriander genotypes selected from locally available land races. Eleven genotypes were evaluated in Randomized Block Design with three replications for three years from 2002 to 2005. Significant differences were observed in all the yield attributing characters as well as yield among the genotypes evaluated. Among the genotypes evaluated, LCC-216 recorded maximum yield (863.2 kg / ha) followed by LCC-212 (836.1 kg / ha) which are on par with each other and significantly superior to check Sadhana (624.8 kg / ha). The increase in yield may be due to the higher plant growth indicated by higher plant height, more number of primary and secondary branches, and higher number of umbels per plant, umbellets per umbel and number of mericarps per umbel.

KEYWORDS: Coriander

INTRODUCTION

Coriander is traditionally grown in vertisols of Andhra Pradesh under residual soil moisture in rabi season. This crop is grown in fifty eight thousand hectares in Andhra Pradesh with an average productivity of 700 kg / ha (during 2002-03). The crop is grown in Kurnool, Kadapa, Anantapur, Prakasam, Medak, Adilabad, Nalgonda, Warangal and Guntur districts in large scale. Though the crop is widely grown in Andhra Pradesh, its cultivation is limited to vertisols of the aforementioned districts. The crop is sown in rabi with the subsequent to the on set of North East Monsoon in the second fortnight of October or in the first fortnight of November. As the soil moisture and dew fall is sufficient for plant growth for about eighty days to one hundred days, farmers grow early or medium duration coriander varieties only to avoid terminal moisture stress to the crop. The crop heavily suffers in case of any fluctuations in the weather during the crop growth period like heavy rains or prolonged dry spell or rapid depletion of soil moisture towards end of the crop growth. Need for evolving varieties which comes to maturity within 90 to 100 days with high yielding capacity is



vital for improving the productivity of the crop in Andhra Pradesh. In this context, a study was undertaken to evaluate the performance of promising coriander genotypes selected from locally available land races.

MATERIALS AND METHODS

The present study was conducted for three years during, 2002-2003, 2003-2004 and 2004-2005 at RARS, Lam, Guntur in vertisols with eleven promising coriander genotypes in RBD with three replications. The experimental soil was medium in available N (238 kg ha^{-1}), medium in available P_2O_5 (29 kg ha^{-1}) and high in exchangeable K_2O (971 kg ha^{1}). The recommended dose of fertilizers 30 kg N, 40 kg P_2O_5, K_2O applied as basal dose and necessary cultural operations were taken up periodically for the experimental field. The crop was sown in rabi season of the years under study. Data on growth parameters and yield attributes were studied during the crop growth period.

RESULTS AND DISCUSSION

The pooled analysis (Table 1 & 2) of the three years data indicated that the genotypes under evaluation varied significantly in all the characters under study. Similar results were reported by Yadav and Karaca et. al. (1999). Maximum plant height was recorded by LCC-216 (65.9 cm) and is significantly superior to check Sadhana (56.2 cm). Minimum plant height was recorded in LCC-151 (44.9 cm). LCC-216 recorded maximum number of primary branches (6.5) followed by LCC-170 (6.2), which were on par with each other and significantly superior to check Sadhana (5.1). Maximum number of secondary branches were recorded in LCC-216 (12.1) followed by LCC-212 (11.0) which were on par with each other and significantly superior to check Sadhana (8.0). Regarding days to 50 per cent flowering, LCC-170 recorded maximum number of days (49.3) where as least number of days was recorded by LCC-192 (42.1). The check Sadhana recorded 46.4 days for 50 per cent flowering. Maximum number of umbels per plant was recorded by LCC-216 (21.5) followed by LCC-212 (19.5) which were on par with each other and significantly superior to check Sadhana (15.3). Similarly, maximum number of umbellets per umbel was recorded by LCC-216 (7.4) followed by LCC-212 (7.0) which were on par with each other and significantly superior to check Sadhana (5.4). LCC-216 recorded maximum number of mericarps per umbel (25.4) and significantly superior to check Sadhana (19.7). Regarding the maturity of the genotypes, LCC-170 and LCC-172 recorded maximum days to maturity (86.1) while LCC-192 recorded minimum days to maturity (81.6).

Considering the yield of the genotypes under evaluation, LCC-216 recorded maximum yield (863.2 kg / ha) followed by LCC-212 (836.1 kg / ha) which are on par with each other and significantly superior to check Sadhana (624.8 kg / ha). LCC-143 recorded lowest yield (504.3 kg / ha) among the genotypes. Such variability in yield was reported from Andhra Pradesh earlier also (Rao et. al., 2000).

Vedamuthu et. al. (1989) reported that seed yield was positively influenced by number of umbels per plant and with plant height. Number of umbels was the main trait contributing to yield, while height influenced yield through other traits. Hence, the higher yield in case of LCC-216 and LCC-212 may be due to their higher plant growth in characters like plant height, number of primary branches, number of secondary branches,

number of umbels per plant and number of umbellets per umbel. Similar findings were reported by Shindi et. al. (1986) and Bhati et. al. (1989). These varieties come to maturity within 85 days indicating their capability to thrive and yield well in the rainfed vertisols under residual soil moisture regime.

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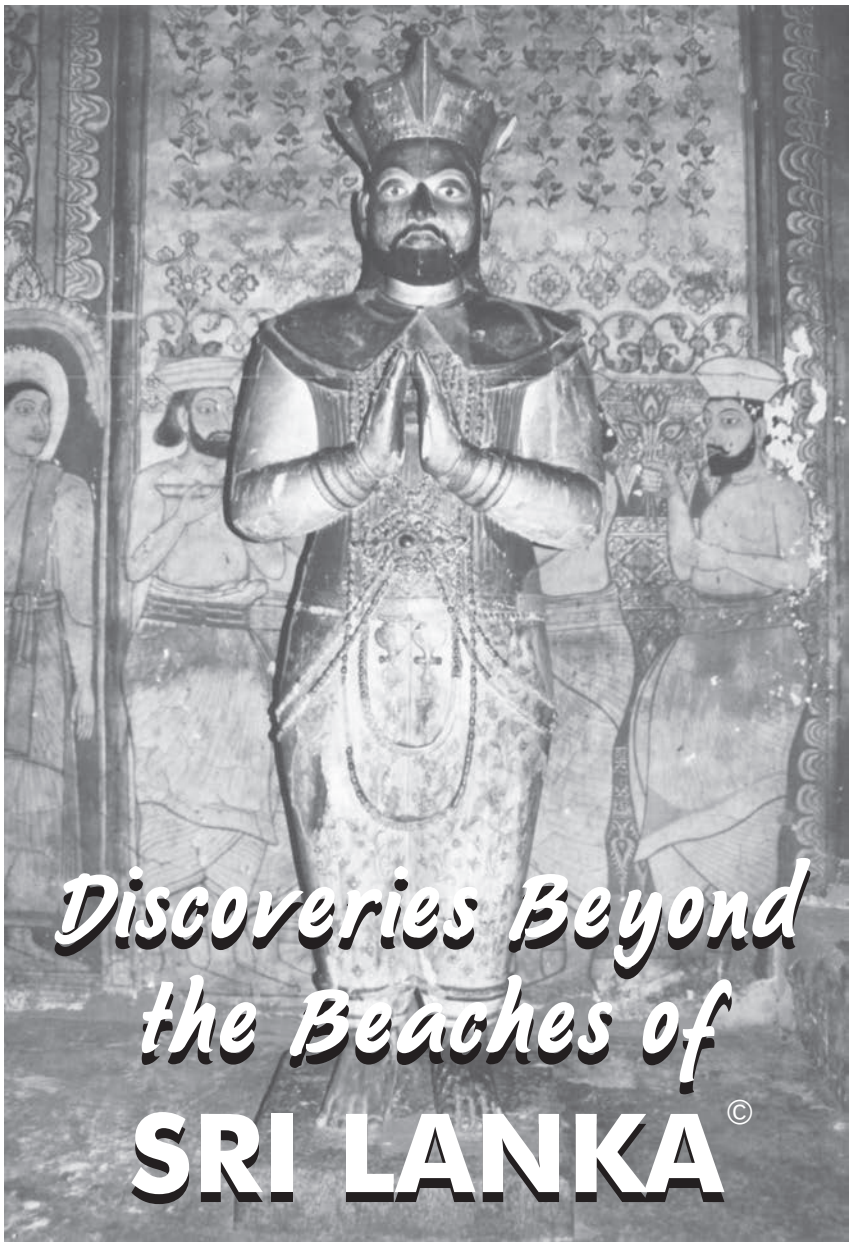


Discoveries Beyond the Beaches of SRI LANKA©

King Kirthi Sri Rajasinghe and to the right a muslim minister

Hugh & Colleen Gantzer

From the surf-sprayed Galle Seaface in Colombo, we sped 148 kms out and 2,300 years back into the past.

Dambulla was a gold pagoda, terraces bright with monks, school-children and visitors. Behind the Temple rose a great outcrop of rock with cave shrines carved into it. A white, galleried, façade protected the entrances to the caves. Cave No. I, the smallest of the caves, had the sculpted image of Buddha's transient body as he entered Parinibbana, a husk without its enlivening spirit.

Cave II is the most elaborately decorated. 53 images and brilliant mosaics cover the entire surface of the cave. The best preserved paintings, however, are in Cave III. Here there is an interesting statue of King Kirthi Sri Rajasinghe in his royal robes, attended by his Muslim Prime Minister.

In Kandyan iconography, sculptures are usually painted in bright colours as was the principal statue of the Buddha in Cave IV, carved out of the living rock.

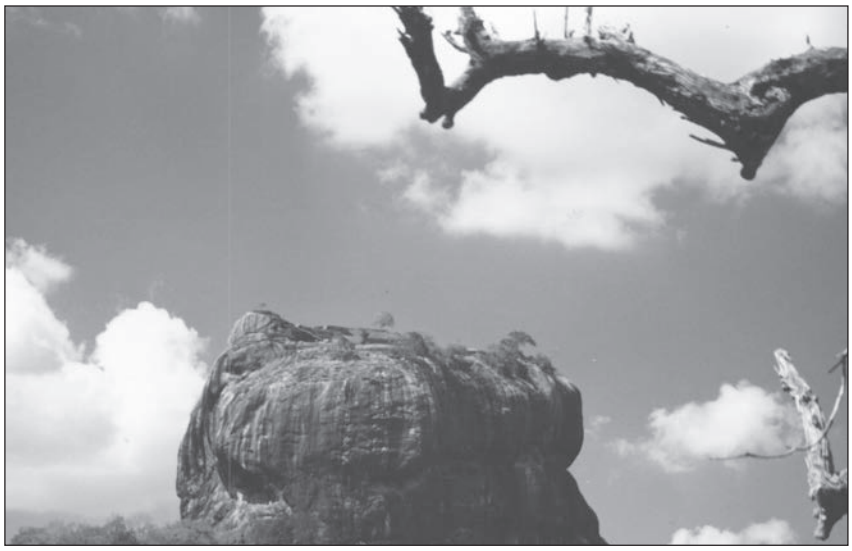
Then we entered the last cave: No. V. Here there is one of the most unusual statues of the Buddha in the Dambulla caves: a youth sitting on the coils of a cobra and shielded by its triple-headed hood.

The sun was a little gentler when we stepped out. In the far distance, rising beyond a stretch of fields and woodland, was another towering outcrop of rock.

That was our next goal but first we stopped over for lunch at one of the state owned Guest Houses. This one offered a substantial Sri Lankan buffet. Sri Lankan cuisine has been strongly influenced by the

varied foods of southern India. In fact, judging by some of the fiery dishes we have sampled all across that beautiful island, Andhra seems to have had a very assertive affect on Sri Lankan dishes. Given the fact that Sri Lanka attracts hordes of western tourists, there should be a high potential market for milder Indian spices in the creation of a new, fusion, Indo-Sri Lankan cuisine.

Such a cuisine might already have been created atop Sri Lanka's iconic Lion Rock, centuries ago.



Sigiriya, like a giant pebble

Sigiriya is visually arresting. It rises like a giant pebble, 200 meters above the wooded plain and this is what attracted the troubled Prince Kasyapa to it in the fourth century AD.

Prince Kasyapa was the eldest son of King Dhatusena I, a monarch as powerful and star crossed as Hamlet. Sadly, Kasyapa's mother was a commoner and so, when the king married an Indian princess and she gave birth to Moggallana, a son of double royal pedigree, he was made the heir to the throne. But the Indian queen's influence did not last very long. Kasyapa teamed up with his cousin Migara, the army commander, and murdered his own father, the king. The distraught Moggallana and his mother sought refuge in India. Kasyapa, however, was convinced that Moggallana would return with an army, kill him, and take back the kingdom. He, therefore, moved to Simha-giri, now truncated to Sigiriya, and turned it into his palace-fortress-stronghold. Legend has it that Moggallana did, return and defeat Kasyapa who had made the mistake of venturing out of his formidable capital. During this time, the queen's Indo-Sri Lankan cuisine must have been revived but, with the decline of the Indian connection, its overtly Indian elements could not have survived.

The facade of the Dambulla caves

But though the political

Sri Lankan monks look at the huge statue of Buddha as he achieves Nirvana

power of Sigiriya ended with the death of its founder, it is still a challenging prospect for any visitor. In spite of the UNESCO-engineered facilities, the climb up the rock is no piece of cake.

We were sweating as we trudged upwards, even though it was past four o'clock. We were relieved, however to find that the narrow passages cut into the rock, and the spiral staircase winding up, had protective fences around them. Then the famed damsels of Sigiriya appeared before us. Here, 100 meters above the base of the great rock, in two alcoves in the cliff-face, unknown artists had painted the half-torsos of lissom, voluptuous, women. Most of them were topless but wore jewellery and crowns and were bedecked with flowers. We trudged on. Finally, at the very top of the great rock, Kasyapa and his brilliant architects had laid out, with geometrical precision, his sky-high palace and its gardens centred on a rock-cut pool. After all these centuries, the buildings no longer stand but their foundations bear adequate testimony to the vision of this fifth-century king.

But why should Kasyapa's people make the strenuous effort to climb up to the top of the rock? Because they were drawn here to visit the world's largest picture gallery. Kasyapa probably reasoned that if he could entice them to climb this far, it would be worth their while to climb the other half and visit his resplendent palace. In other words the Sigiriya Maidens were an alluring tourist attraction!

The next morning, we moved on to the last point in our discovery of Sri Lanka's Cultural Triangle.

Polonnaruwa was the administrative capital, of King Parakarmabahu the Great, from 1153. He was a far-sighted man who linked three smaller lakes and built the great Parakramasamudra reservoir thereby converting an almost arid land into a verdant one. He, and his successors, then proceeded to plan and expand their capital. Regrettably, the great king's palace is now only an impressive mass of ruins with few distinguishing features .

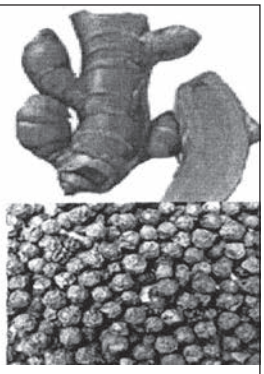
The sacred web of Buddhism, however, spans continents. Two Sri Lankan monks, in orange robes, escorted their Korean Brothers, in lay dress, around Polonnaruwa. They, and we, paused for a long time at one of the most outstanding sculptures in this ancient capital: that of a reclining Buddha when he reached the end of his life.

Polonnaruwa's end came in the first quarter of the 13th century and the jungle moved in.

Dambulla has been governed by humble monks from the very beginning. It never became a ruin. Sigiriya and Polonnaruwa were monarchies. We wonder if there is a deeper message for everyone in Sri Lanka's Cultural Triangle.

☆

GREENCOVER OVERSEAS



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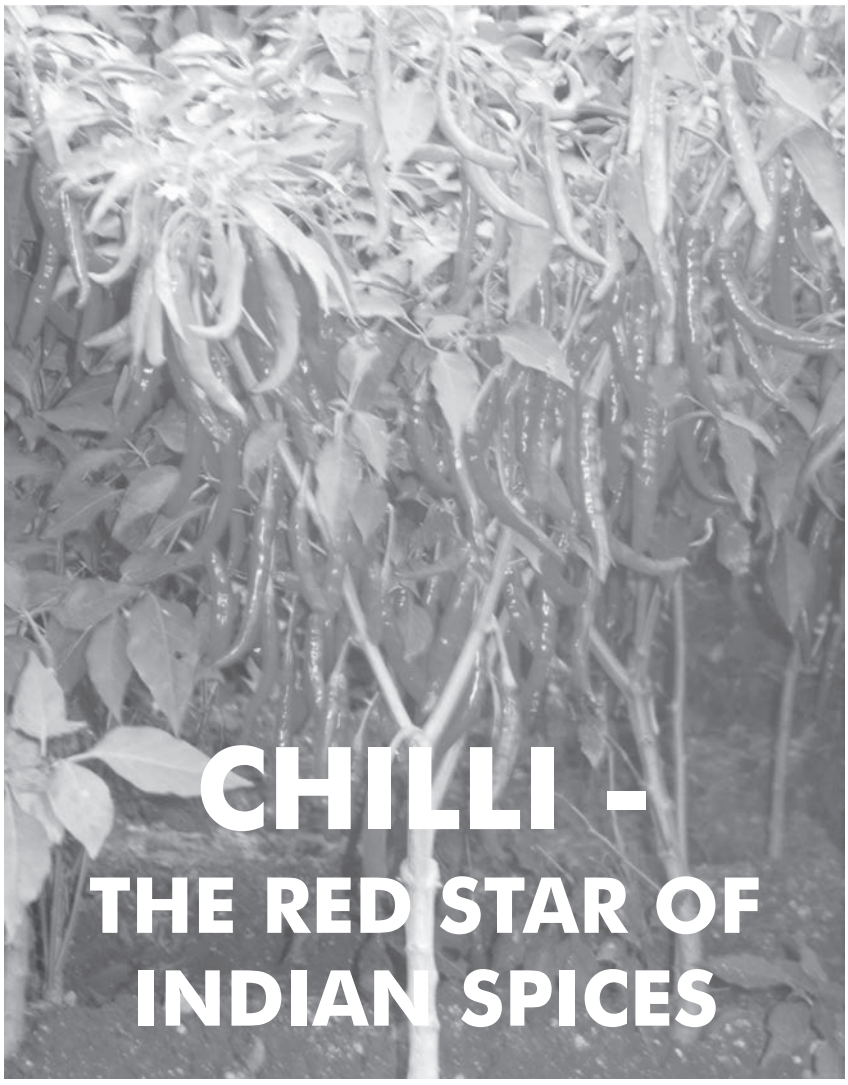

CHILLI - THE RED STAR OF INDIAN SPICES

Y. Saideswara Rao
Scientist D, ICRI
Rai P Joseph
Asst. Director (Stat),
Spices Board, Kochi-25

India is the largest producer and exporter of spices in the world. There are 52 items of spices coming under the purview of Spices Board, which are produced and exported from India. The estimated world trade in spices is 8,00,000 tonnes valued at US$ 2000 million out of which India has a significant share of 47 per cent in quantity and 40 per cent in value. During the year 2007-08, we have achieved spice exports 4,44,250 metric tonnes valued at Rs. 4435 Crores in which export of Chilli accounts for 40 per cent in quantity and 23 per cent in value terms. Chilli occupies number one position in exports of spices with 2,09,000 metric tonnes volume worth Rs . 1,097 crores. Another important export component of the Indian spice exports is value added products like oils and oleoresins with Rs.563 crores for which the major share of the raw material used is chilli. Hence chilli is an important spice for the export from India. The purpose of this article is to highlight the various statistics from the production cost to export earnings. (Table-1).

Income : An average of 20 quintals is expected from one acre which can generate an income of Rs.60,000/- if the rate is Rs.3000/- per quintal. If the production falls below 20 quintals or if the price is below Rs.3,000/- per quintal, the farmer will incure a loss. Farmers owning land can make a saving of Rs.10,000. There could still be a savings of Rs.10,000/- if he undertaken on his own labour for fertilizer and pesticide application, irrigation etc.,

These are based on moderate investment patterns. However farmers who spent more on indiscriminate use of pesticides and fertilizers record only very marginal gains. The investment goes up without any increase in return.Hence what is required is need based fertilizer and pesticide application.

Table 1 . Income and investiments for chilli cultivation (1 acre)

Sl. No	Particulars	Amount (Rs.)
1	Lease of land	10,000
2	Preparation of land (Plouging, etc 6 times)	3900
3	Weedicide application 2 rounds @ Rs.700/-	1400
4	Purchase of seedlings @ 0.45 x 10,000	4500
5	Transplanting 6 persons wages	600
6	Gap filling 3 times each time 5 persons	1500
7	Manual weeding 2 times – 20 persons	1600
8	Fertilisers 8 bags	4800
9	Labour for fertilizer application	400
10	Pesticides 15 rounds @ Rs.600/- per round including petrol etc	9000
11	Labour for pesticide application – 30 numbers	3000
12	Intercultivation 2 times	1250
13	Irrigation 5 rounds @ Rs.500/- including petrol etc,	2500
14	Labour wages for irrigation – 10 persons	1000
15	Harvesting Rs.700/- per quinta – average for 20 quintols	14000
	Total	**59450/-**
	Rounded off to Rs.60,000/- per one acre For one hectare : 1.50 lakhs (1 ha = 2.5 acres)	

From the Table 4, the following inferences are made

1. Out of all spices , Chilli occupies first position in Spice exports from India.
2. Forty seven percent of the world chilli exports are from India
3. Sixty percent share of of chilli exports from India is from Andhra Pradesh . The rest 40 per cent from Tamil Nadu, Karnataka etc.
4. In the production front also 66 per cent of the world production is from India
5. Andhra Pradesh produces 55 per cent of chilli of India.
6. The area of chilli cultivation in Andhra Pradesh is 26 per cent of the total area in India while the production stands at 55 per cent level. This is due to the very high productivity in Andhra Pradesh.
7. Guntur district in Andhra Pradesh stands first with 38 per cent production followed by Khammam, Warangal and Prakasam .
8. Production cost has come to Rs. 60,000/- per acre with a production of 20 quintals per acre. Hence the production cost of one Kg dry chilli is Rs. 30/- . A rate less than Rs. 30/- kg leads to loss to farmers.

Table 2 : Production details of chilli

S.No	Particulars	Seed boroadcasting	Transplanting	
			Conventional types	Hybrids
1	Distance between plants	75 X 37.5 cm	75X60 cm	75 X 60 cm
2	No. of plants per acre	14112	8820	8820
3	No. of Fruits / plant	225	300	400
4	Wt. of one ripe fruit (gr)	2.5 gr	2.5 gr	3.1 gr
5	Wt. of one dry fruit (gr)	0.7	0.8	0.9
	Yield per Acre (Quintals)			
6	Ripe fruits	79.30	66.19	109.36
7	Dry fruits	22.22	21.16	31.75

Rounded off to 20 and 30 quintals for conventional varieties and hybrids respectively

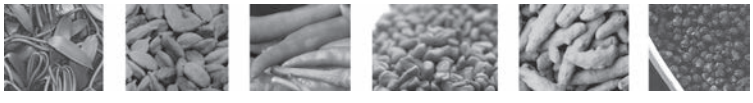

Table 3 :Chilli- Harvest wise yield

S.No	Harvest	Month	No. of Fruits / plant			Wt. of Ripe Fruits / acre (Quintols)			Wt. of dry Fruits / acre (Quintols)		
			Broad casting	Transplant-ing with conven-tional varieties	Trans-planting with hybrids	Broad casting	Transplant-ing with conven-tional varieties	Trans-planting with hybrids	Broad casting	Transplant-ing with conven-tional varieties	Trans-planting with hybrids
1	1st	Dec- Jan	30	35	50	10.6	7.71	13.67	2.96	2.47	3.97
2	2nd	Jan- Feb	70	100	125	24.6	22.05	34.17	6.91	7.06	9.92
3	3rd	Feb- Mar	100	120	175	35.28	26.46	47.85	9.88	8.46	13.89
4	4th	Mar- Apr	25	45	50	8.82	9.97	13.67	2.46	3.17	3.92
	Total		225	300	400	79.30	66.19	109.36	22.22	21.16	31.75

Table 4 : Area, production and export statistics of chilli (2007-08)

S.No		EXPORTS (MT)		
				% share & remarks
1	World chilli Imports (almost equal to exports)	4,45,500		
2	India n chilli exports	2,09,000		47 per cent of world exports
3	Andhra Pradesh chilli exports	1,25,400		60 per cent of India's share from A.P. (approximate), the rest 40% from TN, Karnataka etc.
		Area and Production		
		Area (Ha)	**Production (MT)**	
1	World	15,81,700	21,48,300	
2	India	8,08,027	13,24,470	India occupies 52 per cent share in area and 62 per cent share in production of the world.
3	Andhra Pradesh	2,14,000	7,66,000	In India, A.P. 's share is 26 per cent in area and 58 per cent in production
4	Guntur district	59,916	2,88,940	Guntur district occupies 27per cent share in area and 38 per cent in production of A.P.

9. Maximum harvest is in the third round of harvest which ranges from 27 to 48 quintals ripe fruits from one acre. The average farmer normally cultivate in one hectare. The drying yards or poly houses for drying of chilli should have the capacity to accomodate atleast 70 quintals i.e seven tonnes. ☆

PEST PROBLEM AND THEIR ECO-FRIENDLY MANAGEMENT TECHNIQUES IN CARDAMOM

(*ELETTARIA CARDAMOMUM* (L.) MATON)

(continuation from last issue)

Dr. D. Kumaresan
C-10, SHANTHI SADHAN, KOCHADAI,
MADURAI 625016, TAMILNADU

2.5. Insecticide management

2.5.1. Thrips

Attempt to control the thrips was made first during the early forties. Tobacco decoction spray was found out to be effective for thrips control by Cherian and Kailasam (1941). Later, Jones (1943) reported that spraying with 120 ml of nicotine sulphate and 120 ml of fish oil resin soap dissolved in 450 liters of water at weekly spraying effectively controlled the thrips. Subbiah (1949) recommended HCH@ 4 kg/ hectare for effective control of cardamom thrips. Use of nicotine sulphate and HCH were advocated for control of thrips. (Anonymous 1954; Jone, 1956 and Rajan 1965).

With the advent of more potent organophorous and carbamate group of insecticides, several field trials were conducted and an array of insecticides recommended to manage thrips damage in cardamom ecosystem Viz; quinalphos 0.025 per cent and 0.05 per cent, monocrotophos 0.03 per cent, fenthion 0.05 per cent, methyl parathion 0.05 per cent, chloripyriphos 0.05 per cent, methidathion 0.05 per cent, carbosulfan 0.05 per cent, (Gopakumar and Kumaresan 1984; Joseph rajkumar et.al, 2007; Kumaresan, 1981, 1982, 1983, 1983a and 1988; Kumaresan and

George 1979; Nambiar et. al., 1975; Pillai and Abraham 1978; Varadarasan and Kumaresan, 1983,1984; Wilson et.al., 1977 and 1978.later a number of synthetic pyrethroids were also evaluated for the control of thrips (Joseph 1983a and Varadarasan and Kumaresan 1984). However, synthetic pyrethroids application was found to increase thrips damage with regular application (Anonymous, 1983).

A schedule of spray for thrips management was fixed as seven rounds for high ranges of Kerala (Kumaresan, 1983, 1988) and five rounds for lower Pulneys, Tamilnadu (Varadarasan and Kumaresan, 1984 and 1988). The schedule is recommended after the pruning work (removal of dried plant parts) in cardamom plants (Kumaresan 1988) and presently, this system is adopted by the planters under rain fed areas. The key pests pose a major problem in irrigated areas and insecticide management is to be followed according to the fixed plot survey and the insecticide application during rainy period is to be avoided.

Profenofos 0.05 percent (Renuka et.al. 2002), Lambda cyhalothrin 15 ppm (Sureshkumar et. al., 2002) thiacloprid 0.005 percent {Kubendran and Kumaresan, 2006} and diaphenthiuron (Stanly, 2007) were recommended for the control of thrips.

Detailed studies on efficacy of neem formulations against cardamom thrips were conducted (Gopakumar and Singh, 1994; Gopakumar et. al., 1996) and the results indicated that neem oil and other commercial neem formulations were not effective in controlling thrips.

2.5.2. SPCB

Ayyar 1940 recommended prompt collection and destruction of attacked shoot and capsules and removal of attacked plant parts during off season for efficient management. David et.al. (1964), Sulochanana Bai et.al. (1968) and Saroja et.al.(1973) recommended various insecticides like fenthion, HCH,DDT. Parathion, malathion, methyldemeton, trichlorfan and carbaryl for controlling this on castor. Nambiar et.al. (1975) recommended dimethoate and phosphamidon 0.05 percent on cardamom in Kerala. Endosulfan, fenthion, phosalone, monocrotophos, quinalphos, carbaryl+ molasses and dimethoate at 0.1 percent were found effective (Kumaresan et.al., 1978; Joseph, 1981, and Kumaresan and Joseph, 1982). A strategy of collection and destruction of moths and infested tillers followed spraying monocrotophos 0.075 percent or fenthion 0.075 percent is recommended against SPCB (Varadarasan and Kumaresan, 1984; Anonymous, 1985), Krishnamurthy et.al., (1989) recommended the removal of affected tillers during September – October if the infestation is less than 10 percent and spraying quinalphos 0.03 per cent in cardamom growing tracts at Karnataka. Sprays have to be targeted on first or second in star stages of the larvae, which feed on tender panicles or immature capsules. This can be achieved by monitoring adult emergence in field and spraying either monocrotophos 0.075 per cent or fenthion 0.075 per cent with in 12 – 15 days after adult emergence (Varadarasan et.al., 1989). New insecticides Viz; profenofos 0.05 per cent (Renuka, 2001), lambda cyhalothrin 20 ppm (Rajabaskar et.al. 2003) diafenthiuron (Rajabaskar, 2003 and Stanely, 2007)thiodicarb 0.06 per cent {Kubendran and Kumaresan 2006}were found more effective against SPCB in cardamom.

2.5.3. Root grub

Earlier studies have shown that raking up the soil and subsequent application of granular insectidies (phorate @ 30 – 40 grams / plant or carbofuran @ 50 grams / plant); during May – June and September – October is an effective method (Gopakumar et.al., 1987). Varadarasan et.al. (1990) reported that application of phorate @ 20 – 40 grams / plant or chlorpyriphos 0.06 per cent effective against grubs. Later, chlorpyriphos at 0.04 per cent was found to give economical control of grubs (Varadarasan et.al., 1991).Early stages of grub can be managed by soil drenching of

imidacloprid@0.015 per cent [Josephrajkumar et.al.2007]

2.5.4. Whitefly

Spraying neem oil 0.5 per cent + emulsifier (non – ionic) 0.5 per cent to 0.75 per cent on under surface of leaves, (Gopakumar and Kumaresan, 1991)and Acephate 0.075 per cent, ethion 0.1 per cent and triazophous 0.05 per cent were found equally effective against the nymphs.{Gopakumar et.al.,, 1988a, 1988c; Kumaresan et.al.,, 1993; Selvakumaran and Kumaresan, 1993 and Josephrajkumar et.al.2007}

2.5.5. Nematode

Soil fumigation of nursery sites can minimize nematode populations. In plantation area, granular formulation s like phorate @ 2.5 -5.0 g a.i/ plant or carbofuran @ 5g a.i/ plant (twice a year) reduced root knot nematodes and increased yield {Ali 1987a; Eapen 1994).Neem cake @ one kg/plant is recommended for effective management.

3. Conclusion

Cardamom pest management practices should be a harmonious approach in cardamom eco- system. Now a days, farmers adopt cultural practices with insecticide management to reduce the crop loss due to pest. The components of pest management practices like trap crop practices, host plant resistance, pheromone traps; augmentation of natural enemies and bio control agents should be strengthened in field scale adoption. Active participation of farmers is to be encouraged in this research cum demonstration practices in their fields. Importance of pest surveillance system is to be encouraged to the farmers' community to have a fixed plot to monitor the pest status in cardamom eco system. It is essential to work out a suitable pest management practices according to various agro climatic condition of cardamom plantation and also based on pest surveillance status.

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Compilation by
K.A. JOSEKUTTY

MARJORAM

Botanical Name	:	*Majorana hortensis* Moench
Family Name	:	Lamiaceae / Labiatae
Sensory Quality	:	Aromatic and slightly bitter
Empirical properties	:	Calming, warming, soothing,relaxing and strengthening.
Part used	:	Leaves
Origin / Nativity	:	Asia minor / Mediterranean
Distribution range	:	Asia temperate, Western Asia-Cyprus and Turkey, Central and Eastern Europe, North and South America. (Widely cultivated in Mediterranean region – cultivated in fairly hot climate).
Major exporting country	:	Egypt

Marjoram is some what a cold sensitive, tender, bushy perennial herb or under shrub having small oval leaves with sweet pine and citrus flavours. The dried leaves or marjoram with or without flowering tops that constitutes the leafy spice of commerce. The herb is 30-60 cm high. Sweet marjoram is characterised by a strong spicy and pleasant odour. The flavour is fragrant, spicy, slightly sharp bitterish and camphoraceous. It is cultivated in Western Asia, South and North America, France, Germany, Hungary, Greece, Romania, Spain, Portugal, USA, England, the Mediterranean and North Africa. The colour of the dried herb is light green with a slight greyish tint.

Cultivation

Though perennial herb, marjoram is cultivated as annual

Soil and Climate

Marjoram grows in well-drained, fertile garden-loam soil and Ph between 6.5 and 7.5. It is some what cold sensitive and cultivated in fairly hot climate.

Propagation

It is propagated by seeds and cuttings and seed germination period is 8 to 14 days (seeds per gram is 3500 (approx.). Seeds are sown in October in plains and in hills from March to middle of June in India. Seeds are sown in pots and seedlings are transplanted in the field 20-25 cm apart in rows which are spaced 30 cm apart. Propagation is done by cuttings at higher elevations.

Fertilizer application

Results of three harvests of marjoram done during a year revealed that application of the highest dose of nitrogen at 32 kg/hectare gave significantly higher herbage yield (11.54 tonnes/ha) and oil yield (52.79 kg/ hectare). Application of phosphorus at 40 kg/ha recorded herb yield at 10.01 tonnes/hectare and at 120 kg/ hectare gave oil yield at 48.87 kg/hectare It is found almost at par with phosphorus at 80 kg/ hectare (Farooqui et al., 1994).

Pests and diseases

Marjoram is usually free from pests and diseases. However, whitefly, spider mites, thrips attack marjoram and there is minimal disease issues. To prevent plant diseases, provide good air circulation around crops. Water requirement on a regular schedule and do not over water marjoram. It prefers full sun.

Marjoram will grow indoors satisfactorily under standard fluorescent lamps and exceptionally well under high output fluorescent.

Harvesting

The crop is ready for harvesting in about 3 ½ months from the date of planting. The tops are cut when the plants are near flowering. The foilage is cut off about 5cm-8cm above the ground and second cutting after two months.

Post harvest handling.

After harvest, the leaves are dried, carefully cleaned and stored. Methods of drying depend on the size of the crop and climatic conditions. Cut plants are tied as bunches in small quantities and dried in open air or spread on wire trays in ventilated rooms and dried by regulated circulation of warm air. Sun drying may take two to four days for drying and in the case of ventilating, it take more than a week. Stems or stalks are separated from leaves by rubbing on hand sieves of one to two cm mesh. A solar greenhouse drying is also in practice in Egypt. Freeze drying is also in practice. Packaging in airtight manner at 23°C seems best for long life.

Processed products

Dried marjoram, frozen marjoram and marjoram oil & oleoresin.

Chemical composition of the essential marjoram

1 ***Mnoterpenes***: terpinolene, b-phellandrene, a-terpinene, g-terpinene limonene, sabinene, a-thujene, a-pinene, b-pinene, camphene, mycrene, ocimene

2 ***Mnoterpene alcohols***: linalool, geraniol, a-terpineol,terpinene-4-ol, *cis*-and *trans*-2-p-menthen-1-ol, cis-and trans-piperitol, borneol, p-cymene-8-ol

3 ***Monoterpene carbonyls:***carvone**,** a-thujone, camphor

4 ***Monoterpene esters***: neral acetate,geranyl acetate, linalyl acetate, and terpeny1-4-acetate.

5 ***Sesquiterpenes***: b-caryophyllene, a-humulene, a-copaene, farnesene, ledene, , g-elemene, b-bisabolene, bicyclogermacrene, alo-aromadendrane

6 ***Terpinoid ether/oxides***: 1,8-cineol, aryophyllene epoxide

7 ***Benzoid compounds***:p-cymene, eugenol, thymol, carvacrol, methyl chavicol, anethole.

Nutritional Composition of Marjoram per 100g

Composition	USDA Hand book 8-2[1]	ASTA[2]
Water(g)	7.64	6.5
Food energy(kcal)	271	365
Protein(g)	12.66	12.5
Fat(g)	7.04	6.8
Carbohydrates(g)	60.56	64.4
Ash(g)	12.10	9.7
Calcium(g)	1.990	2.5
Phosphorous(mg)	306	230
Sodium(mg)	77	110
Potassium(mg)	1522	1400
Iron(mg)	82.71	72.7
Thiamine(mg)	0.289	0.290
Riboflavin(mg)	0.316	0.320
Niacin(mg)	4.120	4.10
Ascorbic acid(mg)	51.43	51
Vitamin A activity (RE)	807	807

[a] Composition of foods, spices and herbs, USDA Agricultural Handbook 8-2 January, 1977[b] The nutritional composition of spices, ASTA Research Committee., February, 1977

Uses of Marjoram

Venus is said to have created marjoram, touching it with her fingers to give it the amazing fragrance it retains. Marjoram's powerful aroma helps to calm obsessive thinking and quiet feeling of isolation, loneliness and neediness. It also helps to instill the importance of self-nurturing and compassion. Marjoram's nature is to help restore our ability to give ourselves and others. It has found its uses in food, medicine, cosmetics, dyes and perfumes.

Uses in food

Marjoram is used in many foods where a well rounded herb note is desired. It is added to soups, salad dressings, sauces for stewed meats and stuffing's. However, its widest use is in seasoning sausages and salamis. Sometimes it is used together with other fresh herbs in 'bouquet garni'. It is also used as a substitute for oregano. Marjoram can be added to practically any dish in which one would use thyme. Marjoram has a delicate perfume which can be lost easily while cooking. Hence it is at its best when added shortly before the end of cooking or use it as a raw.

Marjoram leaves are used by the industrial manufacturers for flavouring liver and Polish sausages and cheese and also in soups, stews, dressings, salads, egg and poultry dressings. The leaves of the plant are used fresh or dried and are highly esteemed as a condiment for seasoning foods. Dried flowering tops are used for sachets and potpourri. The aromatic seeds are used in confectionary and French confitures.

Marjoram has pleasantly aromatic and distinctly mint-sweet flavour with slightly bitter undertones. This subtle aroma makes it an ideal addition to many herb mixtures as it helps give body and depth to a variety of dishes. It is used in wine like French 'hippocras'. It was also added to water used to rinse with fingers at the table during banquets. It is used more in the Western cooking than eastern cooking and finds more use in UK, Germany and Italy. The dried leaves and floral tops are superb for seasoning all meats, poultry, sea food and baked or grilled fish, egg and tomato dishes, soups such as chicken, mutton, turtle, green vegetables stews, fruit salads, in flavouring vinegar, in formulation of liqueurs and vermouths.

According to Chiej, sweet marjoram oil is used for flavouring of fats, oils, baked foods, coconut foods, meat products, processed vegetables, condiment relishes, soups, vinegars, snack foods and gravies.

Uses in Cosmetics and Perfumery

The oil of marjoram is employed in high grade flavour preparations and perfumes and in soap. In body and hair care it is used as bath oil, liquid soap body oil, body lotion, body mist, liniment, shampoo/ conditioner.

In aromatherapy it is used as diffuser, room mist and scent. Besides, in powdered form the herb forms part of certain sneezing powders.

Medicinal uses

Marjoram is popular as an alternative to standard Western allopathic medicine for a variety of problems including bruising, tonsillitis and a natural disinfectant. it is considered as carmiantive, expectorant and tonic. Leaves and seeds are astrigent. An infusion of the plant is used as stimulant, surorifie, emmenagogue and galactagogue. It is reported to be useful in Asthma, hysteria and paralysis.

Marjoram essential oil is considered to have warming, soothing and fortifying effects. It is an aid in menstural, digestive, nervous and respiratory complaints. It may also help obstructions of liver and spleen. Most commonly used in formulas of muscular and rheumatic pain, sprains, strains, bruises and stiff joints. It is recommended as a nerve tonic. It is used in Homeopathic

mother tincture. It acts upon the generation organs, particularly of the women. It is also used successfully for troubles arising from sexual irritation.

Chopra et al (1956) reported the use of marjoram oil in hot fomentations, for acute diarrhea and as an expectorant. According to Mabey (1988) marjoram contains tonic and astringent bitter principles, which rouse the appetite and hence it is helpful for invalids. Marjoram is a good general tonic, helping to relieve anxiety, headaches and insomania. the herb is also thought to reduce sexual desire. It is a natural healing for many complaints caused by tension. Guba Ron (2000) reported that essential oil of marjoram has menstural-regulating or hormone like effects.

Reported benefits.

Natural disinfectant, Antifungal, Antibacterial, Bruising, Flatulence, Stomach Bloating, Tonsillitis, Anxiety, painful mensturation.

Possible Action

Analgesic, Anaphordesiac, Antioxidant, Antispasmodic, Antiviral, Bactericidal, Carminative, Cephalic, Cordial, Diaplioretic, Digestive and Diuretic, Emmanagogue, Expectorant, Fungicidal, Hypogtensive, Laxative, Nervine, Sedative, Stomachic, Vasodialator.

Possible indications

Muscular and joint aches, pains, injuries, stiffness, nervous tension, headaches, and migraines, asthma and bronchitis.

Functional properties

The essential of marjoram possess biological activities like antimicrobial and antioxidant properties.

Antimicrobial properties

Yadava and Saini(1991) found that marjoram inhibits *A.fumigatus* and *A.niger* fungi. Tiziana and Dorman(1998) reported antifungal activity of marjoram oil against the common spoilage fungus. *Aspergillus niger* even at concentration of 1 micro ligtre / ml broth.

Huhtanen(1980) and Ueda et al.(1982) reported that marjoram control bacteria such as *E.coli, salmonella sp., S.aureus, B.cereus, campylobacter, S.tphimurium, S.marcescens, P.acruginosa, P.vulgaris and P.morganii.* Tiziana and Dorman(1998) noticed that marjoram oil was most active in inhibiting the growth of *Acinobacter calcoacetica, Beueckea natriegens* and *S.aureus.*

Antioxidant properties

Tiziana and Dorman (1998) obseved that in egg yolk asasy, the antioxidangt activity of marjoram was much higher than that of a-tocopherol and comparable with that of BHT at all conenctrations tested (100 to 1000 ppm). Saito et al (1976) have obtained a higher antioxidant activity of marjoram at 0.02% against lard than tocopherol. Biacs and Wissgott(1997) noticed that ground tomato seeds with rosemary and marjoram stabilized the carotenoid pigments by way of their antioxidizing powers. El-Alim et al (1999) found that spices such as marjoram is proved to be advantageous in regard to shelf life of the food as well as for human health.

Control of platelet aggregation

Okazaki et al (1998) found that allspice, basil, marjoram, tarragon and thyme strongly inhibitted the platelet aggregation induced by collagen. They isolated an active compound, arbutin, from sweet marjoram as an inhibitor of platelet aggregation.

Other theraeutic effects

Yamazaki (1995) found non-inhibitory action on HIV for 70 per cent ethanol extract of marjoram, at a concentration of 31µg / ml of water extract showed effects of inhibition of HIV-1 on Molt 4(MT-4) cells. Formation of giant cell was also found to be inhibited by concentration of marjoram extract at 125µg / ml. He suggested that mechanism of their anti-HIV activity is due mainly to their inhibitory action on cell-to-cell absorption.

Anderson et al (2000) evaluated the effect of massage with marjoram essential oil on children with atopic eczema and found that aromatherapy massage is a good treatment for the control of atopic eczema.

☆

CALENDAR OF OPERATIONS FOR IMPORTANT SPICES - OCTOBER 2008

Timely planning and execution of farm operations based on agroclimatic conditions of the area is important for successful farming for higher productivity and sustainability. To facilitate this a calendar of operations in respect of important spice crops for October is given below.

Name of the crop/ Type of operation	Details of the operations
CARDAMOM I Agronomic measures 	Nursery ➢ Provide adequate drainage. ➢ Thin out seedlings if overcrowded in beds ➢ Remove and discard disease affected seedlings, if any. ➢ If seedling rot is noticed, soil drenching with 0.2 per cent copper oxychloride or 0.2 per cent mancozeb or trichoderma or pseudomonas or bacillus sp. is recommended. ➢ If symptoms of leaf rot is noticed spray 0.3 per cent mancozeb (Indofil M 45) and for incidence of leaf spots 0.25 per cent Difoltalan (Foltaf or Captafol) or 0.2 per cent Bavistin may be sprayed after noticing early symptoms. MAIN FIELD ➢ Depending upon weather conditions gap filling can be continued. ➢ Planting of shade tree saplings in open patches may be continued. ➢ Drain out, if water stagnates around plant base. ➢ In the irrigated field apply second dose of fertilizer according to soil test result and recommendations. General recommendation is 41.5:41.5:83 kg NPK / ha. This can be supplied by way of 90 kg urea, 200 kg Mussoriphos and 138 kg Muriate of Potash (if not done during the previous month). ➢ General recommendation for fertilization in rainfed area is; 37.5:37.5:75 kg NPK / hectare as final round application. This can be supplied by 81 kg of urea, 187 kg Mussoriphos and 125 kg Muriate of potash (if not done during the previous month).

- For Zinc deficiency Zinc sulphate can be applied as foliar spray @ 250 grams/100 liters of water by covering both lower and upper surface of the leaves.
- If boron deficiency is observed apply borax @ 3.75 kg along with NPK fertilizers.

II Pest management

- To check incidence of root grubs, beetles may be trapped by nets.
- Towards Integrated Pest Management, dry leaves may be pruned and spraying of Monocrotophos 200 ml. or Phenthoate 150 ml. per 100 liters of water may be taken up during the month in rainfed as well as irrigated areas, if not carried out during the previous month.
- Spray should coincide with shoot borer moth emergence.

III Disease management

- Adequate drainage facility to be provided wherever necessary to avoid disease outbreak during North East monsoon season.
- Keep constant vigil for any katte virus affected plants. Uproot and destroy katte plants, if found.

There are chances of outbreak of fungal diseases during the North East monsoon period. For controlling such incidence the following measures may be taken up if not done during the previous month.

- For controlling fungal diseases like azhukal (capsule rot) and rhizome rot (clump rot) by Integrated Disease Management, phytosanitary measures, bio-control measures & fungicidal application are to be taken up.
- Spray one per cent Bordeaux Mixture or Akomin (Potassium Phosphonate 0.4 per cent) with soil drenching of Copper Oxy Chloride (COC) @ 0.2 per cent.

or

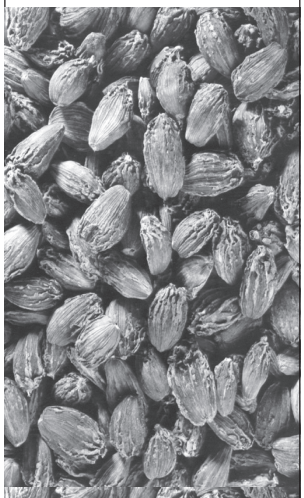
COC (0.2 per cent) drenching plus one per cent Bordeaux Mixture spray. 15 days later apply trichoderma alone or with Pseudomonas fluorescens at plant base. Repeat bio-agent application and foliar spray with Akomin 0.4 per cent.

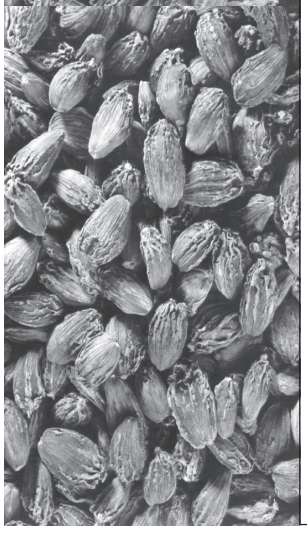
- If bio-control measure is followed, basal application of trichoderma harzianum alone or with Pseudomonas fluorescens may be carried out.

IV. Harvest and Post harvest operations.

- Harvesting can be continued with a gap of 25 to 30 days depending upon the weather conditions and maturity of capsules. Ensure always, right maturity for better out-turn.
- Wash harvested capsules thoroughly before drying in curing chamber.
- Timely removal of water vapour from curing chamber and maintaining proper temperature during curing will result in better green colour of the produce.
- Clean and store the cured cardamom at 10 per cent moisture level in black polythene lined gunny bags and inside wooden boxes.

LARGE CARDAMOM



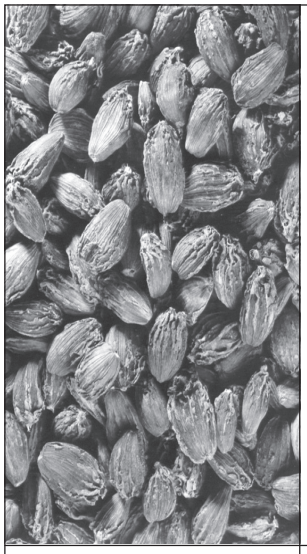


Nursery

- One round weeding may be attended in sucker nursery. After weeding, the nursery beds may be mulched properly with dried leaves to prevent weed growth and as soil moisture conservation measure.
- If any symptoms of disease/pest infestation are noticed, it may be controlled immediately.
- Depending on the rainfall condition, irrigation may be provided.

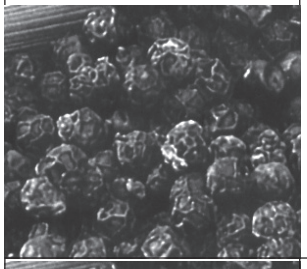
MAIN FIELD

- Repairing of modified Bhatti if not completed may be done depending upon the necessity and firewood may be collected and kept ready.
- Harvesting may be done when the crop is fully mature. Maturity can be assessed when the capsule of the top most spike turn dark brown and when the capsule come out easily while pulling.
- The mother clump after harvesting can be collected and destroyed by burning isolated place to minimize the infection of pest and diseases.
- The harvested spikes may be heaped overnight and capsules may be separated for curing.
- The cured capsules may be rubbed on wire mesh for cleaning and removal of calyx (tail).
- After removal of tails from the capsules, the dried cardamom should be kept in polythene lined jute bags and stored on wooden platform to avoid absorption of moisture.



- After processing, the moisture percentage in the dried capsule should not be more than 10 per cent for better shelf life.
- Chirke and Foorkey infected plants may be destroyed by uprooting / burial at regular intervals.
- Regular inspections may be carried out to observe caterpillar / shoot borer incidence, if any may be hand picked and destroyed mechanically.
- As bio-control measure, Trichoderma or Pseudomonas or Bacillus species may be applied in the soil.
- If sufficient moisture is not available in the soil, the cardamom plants may be irrigated.

PEPPER
I Agronomic measurers

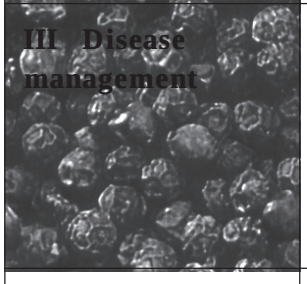


- Pepper vines with desirable characters may be marked for collection of runner shoots for multiplication.
- Trailing and tying of vines around the standards may be attended to.
- If excess weed growth noticed, resort to slash weeding in the interspaces and clean weeding at the base of the standard, without damaging root portion of the vines and mulch the base.
- Organic manures if not given earlier can be added to the base of the plants.

II Pest management

- In more shaded plantations there is likelihood of pollubeetle attack, which can be controlled by proper shade regulation.
- If pollubeetle attack is severe spray quinalphos 0.05 per cent (200 ml / 100 liters of water).

III Disease management



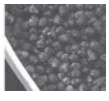
- Against incidence of foot-rot disease, spray one per cent bordeaux mixture. In severe situations, drench 0.2 per cent COC (200 grams / 100 liter water) at the plant base @ five liters per vine apart from bordeaux mixture spraying.
- Vines affected by little leaf disease or phyllody may be uprooted and destroyed.

VANILLA
I Agronomic measurers

- Vanilla planting with stem cuttings / tissue culture plantlets / rooted cuttings can be continued on already planted standards.
- Continue trailing of vines on support trees wherever necessary.





- Decomposed organic matter, rotten cowdung, compost, vermicompost, neem / ground nut cakes etc. can be applied and plant base mulched with organic debris.
- By the end of the month, nip off the growing end of vanilla vine by about 10-15 cm. length to induce flowering.

II. Pest and disease management

- Soil application of trichoderma @ 0.5 kg. / plant at the root zone and spraying of pseudomonas (0.2 per cent) on the foliage are recommended to arrest spread of fungal diseases.
- Vanilla vines showing any viral symptoms are to be removed immediately and destroyed.

III. Harvesting and Processing

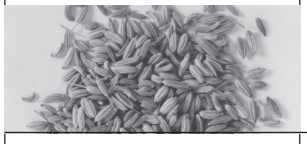
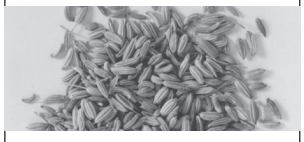
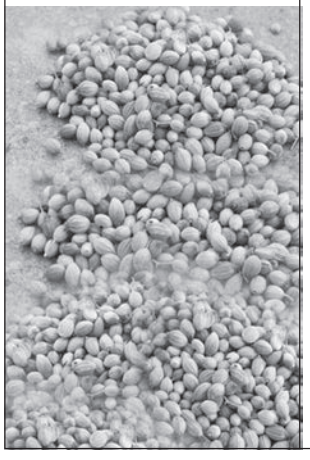
- Harvest the vanilla beans as soon as pale yellowing observed at the distal end of the beans.
- Cure the harvested beans following Bourbon method or sell the green beans immediately after harvest.

GINGER

- Weeding, earthing up the beds and mulching may be done depending on requirement.
- Water stagnation should be avoided by providing sufficient drainage.
- If soft rot disease is noticed dig out the affected plants and drench beds with cheshunt compound or one per cent Bordeaux mixture.
- If shoot borer incidence found spray Monocrotophos 0.05 per cent (140 ml / 100 liters of water).

TURMERIC

- Weeding, earthing up beds and mulching may be done depending on requirement.
- To avoid water stagnation, proper drainage may be ensured.
- Rhizome rot if noticed can be controlled by drenching 0.3 per cent dithane M 45 or 0.3 per cent cheshunt compound.
- If incidence of leaf spot noticed, spray either with one per cent bordeaux mixture or 0.2 per cent dithane M45 (200 g / 100 liters of water).
- Spray Monocrotophos 0.05 per cent (140 ml / 100 liters of water) to control the incidence of shoot borer.

CHILLI  	➢ Apply first dose of fertilizer in transplanted field (Nitrogen and Potash @ 50 : 20 kg / ha). ➢ Erect pheromone traps for monitoring pod borers 6" above the crop level @ four to five numbers per acre. ➢ Erect bird perches to control pod borers @ 10 numbers per acre. ➢ Spray monocrotophos 1.6 ml. or acephate one gram or phosolone three ml. per liter of water to control thrips. ➢ Open trenches between the rows with the help of plough to support the plants and for irrigation. ➢ Weeding may be done if required.
FENNEL **(Kharif transplanted)** 	➢ Earthing up may be done to prevent the plants from lodging. ➢ Intercultural operations / weeding may be done based on need. ➢ Crop should be irrigated at an interval of 15-20 days. ➢ Drenching by one per cent bordeaux mixture or spray with 0.2 per cent solution of any copper fungicides may be done to control collar rot.
FENNEL **(Rabi transplanted)** 	➢ Weeding may be done in nursery during 1st week. ➢ Seedlings may be transplanted to the main field during 2nd fortnight. ➢ 20 metric tonnes of farm yard manure per hectare may be mixed in the soil at the time of land preparation and 45 kg. nitrogen and 45 kg. phosphorous may be applied as basal dose before transplanting. ➢ Seedlings may be irrigated just after transplanting and repeated after 15-20 days interval.
CORIANDER 	➢ Land may be prepared for sowing by two to three ploughing followed by planking. ➢ 15-20 metric tonnes of farm yard manure per hectare may be mixed into the soil at the time of land preparation. 20 kg nitrogen, 30 kg. phosphorus and 20 kg potash per ha. may be applied as basal dose. ➢ Second fortnight of October to first fortnight of November is suitable for sowing and seed rate is 15-20 kg / hectare. ➢ Sowing may be done by broadcasting or drilling in rows opened at 30 cm apart. ➢ To hasten germination, seeds may be soaked in water for six-eight hours.

MONTHLY AVERAGE PRICES OF SPICES FOR AUGUST 2008

SPICE	CENTRE	GRADE	PRICERS / KG
Black Pepper	Kochi	Ungarbled	137.54
		Garbled	143.46
Cardamom small (Auction)	Vandanmettu	e-auction	592.07
	Bodinayakanur	e-auction	585.07
	Saklaspur		473.21
	Sirsi		443.88
	Maharashtra		611.19
Cardamom (L)	Siliguri	Badadana	148.21
		Chotadana	136.67
Chillies	Virudhnagar		47.50
Ginger (Dry)	Kochi	Best	98.75
		Medium	93.75
Turmeric	Kochi	Alleppey Finger	47.26
	Bombay	Rajpuri Finger	71.63
	Bombay	Duggirala	43.56
Coriander		Indori	90.50
		Kanpuri	97.13
Cumin	Bombay	4%	117.66
Fennel	Bombay	-	55.31
Fennugreek	Bombay	-	35.94
Mustard	Chennai	-	33.93
Garlic	Bombay	-	13.44
Celery	Bombay	-	60.50
Clove	Cochin	-	280.00
Nutmeg(with shell)	Cochin	-	131.15
Nutmeg(without shell)			234.42
Mace	Cochin	-	417.69
Cinnamon	Delhi	-	74.75
Cassia	Chennai	-	76.71
Vanilla*			1030.00

SPICES SOURCES

Average FOB export price - July 2008

Prices are collected from secondary sources like Agricultural Produce Market committees, Kirana Merchants Association, India Pepper and Spice Trade Association, Licensed Cardamom Auctioneers etc.

AVERAGE INTERNATIONAL SPOT PRICES FOR AUGUST 2008

SPICE	MARKET	GRADE	(USD/KG)	(RS/KG)
Black Pepper	U.S.A	MG-1	3.79	162.74
White Pepper	U.S.A	Muntok	5.69	244.33
Cardamom(Small)	Saudi Arabia	India Asta Extra Bold	17.31	743.29
Chillies	U.S.A	India S4	2.43	104.34
		Chinese Small	3.70	158.88
Ginger(Dry)	U.S.A	Chinese Sliced	1.92	82.44
Turmeric	U.S.A	AFT 5..50 Curcumin	1.87	80.30
Coriander	U.S.A	Canadian	1.87	80.30
Cumin	U.S.A	Indian	3.35	143.85
Fennel		Egyptian fancy	1.74	74.72
Fennugreek	U.S.A	Ind / Turkey	1.15	49.38
Clove	U.S.A	Mad / Zan / Com	5.86	251.63

AVERAGE IMPORT PRICE OF VANILLA IN TO USA

GRADE/ORIGIN	MARKET	JUNE' 08 US $/KG
Madagascar	USA	22.32
Indonesia	USA	14.33
India	USA	15.79
Uganda	USA	18.83

Exchange Rate 1 US $ = Rs. 42.94

SOURCE: 1.A.A. SAYIA & CO.INC.HOBOKEN