DECEMBER 2001

ISS Newsletter

NEWSLETTER OF THE INDIAN SOCIETY FOR SPICES

No 3 (2)

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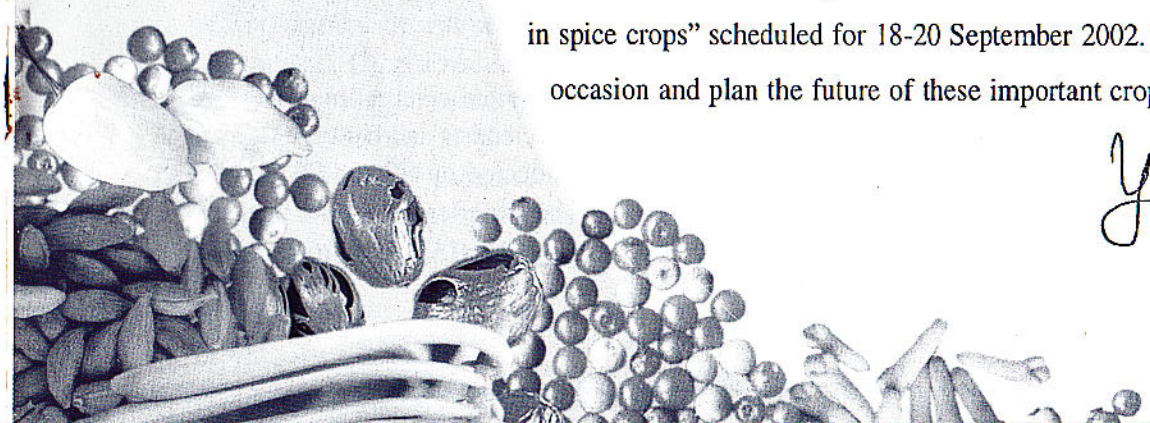
FROM THE PRESIDENT'S DESK

The first year of my tenure as President of ISS started during the Centennial Conference on Medicinal and Aromatic Plants held during 20-23 September 2000 where in it became a meeting point both for the spices farmers and researchers besides several others connected with spices industry. This was followed by Silver Jubilee Celebrations of IISR for which ISS was a sponsoring agency. The interface between scientists, exporters and farmers was a focal point of celebration that helped enormously to understand the needs of the exporters and farmers and accordingly helped to refocus the research priorities. Discussions held during interface with exporters brought two important issues in the case of chillies and paprikas, the first being aflatoxins and the second being pesticide residues which have become major bottle necks in export of this commodity. Price fluctuations of ginger, turmeric and pepper are affecting the investment mood of the farmers. Particularly neglect of inputs to perennial crops like pepper because of the slump in prices will have a long-term impact on the productivity of the crop. In order to overcome the rude shock of price fluctuations, the only way is to reduce the cost of production and increase the productivity through innovative methods, which are the needs of the hour. We have to address some of these issues during the National seminar on "Productivity challenges in spice crops" scheduled for 18-20 September 2002. Let us all meet on this occasion and plan the future of these important crops and commodities.

(Y.R. Sarma)



SILVER JUBILEE CELEBRATED

After an eventful period of 25 years of service to spices farmers, Indian Institute of Spices Research, Calicut celebrated Silver Jubilee on 8-9 October 2001. Padma Vibhushan Prof.M.S. Swaminathan, Chairman, MSSRF, Chennai, inaugurated the celebrations with the traditional lighting of lamp. In his inaugural address, Prof. M.S.Swaminathan pointed out that the 10th five-year plan would concentrate on enhancing farm productivity, quality, employment and income and would provide a better management system in the agricultural sector. He opined that IISR should be elevated to the status of a Deemed University. Dr.Y.R.Sarma, Director, Indian Institute of Spices Research, welcomed the gathering. Dr.G.Kalloo, DDG (Hort.), ICAR, in his keynote address expressed high optimism for bright future for horticultural crops especially spices. Crop loss due to diseases and pests are major production constraints. He called for practical and efficient IPM strategies to overcome this threat. Prof. K.V. Peter, Vice Chancellor, Kerala Agricultural University, presided over the function. He expressed that the Indian Spice Industry at present is passing through a critical phase and that the present set back to Indian Spices is only temporary. Hence Indian Spice farmers need not worry about the present price slump. Dr.R.N.Pal, ADG (PC), Indian Council of Agricultural Research and Dr.P.N.Ravindran, Project Co-ordinator, All India Co-ordinated Research Project on Spices spoke on the occasion.

On the occasion of Silver Jubilee Celebrations, Prof. M.S.Swaminathan dedicated the Laboratory and Administrative Building to the nation and also inaugurated exhibition. Besides, the Silver Jubilee Hall and the new controlled environment facility under PHYTONET were inaugurated by Dr.G.Kalloo, DDG (Hort.) and Dr.R.N.Pal ADG (PC) respectively. This was followed by launching of IISR web site (www.iisr.org). Later a CD (compact disc) was also released on **SPICE GENE**.

Eight publications were also released to mark the Silver Jubilee Celebrations. These publications include:

1. Saga of Spice Research
2. Silver Jubilee Souvenir
3. Spice Varieties
4. IISR-Blending tradition and technology
5. Indian Spices
6. Extension pamphlets on black pepper, cardamom, ginger, turmeric, cinnamon, clove, nutmeg, and vanilla.
7. Kerala Karshakan
8. Spices News

Special mementos were presented to past Directors and Project Co-ordinators of IISR and also to the IISR retired staff. Dr. K.V.Ahamed Bavappa former Director, CPCRI Kasaragod and FAO Expert, Mr.C.J..Jose, IAS, Chairman Spices Board, Dr.P.Rethinam former ADG (Hort.) and present Chairman of Coconut Development Board, past Directors Dr.M.K.Nair, Dr.A.Ramadasan and Dr.K.V.Peter, past Project Co-ordinators Dr.S.Edison and Dr.A.K.Sadanandan spoke on the occasion. They recollected past memories about the Institute and shared their experiences. The various problems in establishing this Institute viz. financial, physical, infrastructural, administrative, managerial etc. were highlighted. The speakers applauded the Institute for the significant contributions made and thus achieving the present status. Dr.E.V.V.Bhaskara Rao, Director, National Research Centre for Cashew, Puthur, Dr.V.Rajagopal, Director, CPCRI, Kasaragod, Dr.K.Sivaraman, Director, Directorate of Arecanut and Spices Development, Calicut, Dr.K.P.Prabhakaran Nair, former ICAR Visiting scientist and fellow Van Humboldt and Dr.S.N.Potty, Director, Indian Cardamom Research Institute, Myladumpara, felicitated IISR on the occasion.

As part of the Silver Jubilee celebrations interface between exporters and scientists and between farmers and scientists was conducted on 8th and 9th October 2001 respectively. The exporters-scientists interface was chaired by Mr. C.J. Jose, IAS, Chairman, Spices Board, Kochi. Eminent persons from various fields of spice processing and industry delivered lectures highlighting the 'bottle necks' facing spice industry and suggested remedies to overcome them. Dr. K.V.Ahamed Bavappa chaired the farmers-scientist interface on 9th October 2001. The lectures in this session centered on organic farming, impact of WTO agreement on Agriculture, spice cultivation and productivity. Award winning farmers narrated their experiences in cultivation and marketing of spices. There were suggestions for enhancing the income of farmers through value added products, improving the marketing channels both at national and international level and for adoption of promising technologies. The farmers from Andhra Pradesh (AP) pointed out the potential for spice crop cultivation in AP and pleaded for the establishment of IISR Station in AP.

NEW DIRECTOR FOR ICAR RESEARCH COMPLEX, GOA

Dr.V.S.Korikanthimath, former Head of the Division of Crop Production and Post Harvest Technology, Indian Institute of Spices Research, Calicut, took over as Director ICAR Research Complex, Goa on 25th January 2002. Dr.Korikanthimath took his academic degrees namely, M.Sc (Ag) in Agronomy from Tamil Nadu Agricultural University, Coimbatore (1975) and Ph.D in Agronomy from University of Agricultural Sciences, Dharwad (1995). He joined the Agriculture Research Service (ARS) in 1976 under the Indian Council of Agricultural Research (ICAR) as scientist S_1 at Cardamom Research Centre, Appangala, Madikeri.

Dr.Korikanthimath was selected as the Head of the Division of Crop Production and Post Harvest Technology, and joined the Indian Institute of Spices Research, Calicut, on 13th March, 2001. He has published over 285 papers in reputed professional journals/ books/ chapters/ proceedings of symposia. Besides being the Vice President of the Indian Society for Spices, Calicut, he is a life member of over a dozen professional societies dealing with Crop Production and Post Harvest Technology.

Dr.Korikanthimath won the prestigious **HARI OM ASHRAM TRUST AWARD**, of ICAR during 1996 along with other scientists for his contributions on development of HPT on cardamom and implementation of the same in farmers fields. He also won the prestigious **JAWAHAR LAL NEHRU AWARD,** during 1998 for his Ph.D research thesis on 'Agronomic investigations on cardamom' (*Elettaria cardamomum* Maton).

Dr.Korikanthimath took charge as the Director, ICAR Research Complex for Goa, on 25th January 2002.

Indian Society for Spices wishes him all the best in his new assignment.

MEDICINAL PLANTS AROUND US

Common rue

Common rue (*Ruta graviolens*) known as ' Arootha ' or ' Sathappa ' in Malayalam, Sathap (Hindi); 'Guchapatra' 'Peetha pushpa' 'Sathapadika' etc. (Sanskrit) is a common medicinal plant found throughout India either as a garden plant or as forest plant. More than the medicinal properties the plant is credited with religious auspiciousness as well as tantric and magical rites. It is believed that the rue protects the households from evil spirits. Arootha is referred to in Bible (Luko 11: 42) as a medicinal and poisonous herb. Muslims (Arabs) believe that this plant is blessed by Prophet Mohammed.

The plant grows to a height of 60 to 90 cm. Leaves are narrow, divided, flat, aromatic and bitter in taste. Flowers are greenish yellow, small, flat, pungent and bitter in taste.

Arootha is used in treatment of nervous ailments including hysteria, epilepsy, and convulsions in children and even in insanity. It is believed that herbs can stimulate mind /brain. Rue is used in all women's ailments including faulty menstruation, uterine congestion etc. The herb is useful in all ailments of arteries and veins as well as for weakness and palpitation of heart. It is also used for fevers, colic worm etc. Small sprigs are infused in hot water sweetened with honey and given to infants with stomach upsets. A paste of leaves, if applied externally, works as antidote against poisonous insects / snakes bite.

Arootha is usually taken in the form of a standard brew - a small teaspoon full of the herb to a tall glass of water; take two tablespoons twice daily. Infusion of rue flowers is useful in the ailments of eyes including cataract treatment. Pregnant women are advised not to use Arootha as it will lead to uterine bleeding.
Rue contains a principle called 'rutin' a glycoside besides essential oil. Essential oil is greenish yellow in colour turning to brown upon storing. The essential oil contains methyl-n-nonyl ketone, methyl-n- heptyl ketone, l-á pinene, l -limonene, cineole etc.

B. Sasikumar
II SR, Calicut

IISR VISWASHREE A VERY HIGH YIELDING NUTMEG VARIETY

Nutmeg, indigenous to Moluccas islands (Indonesia) produces two separate spices, the nut and the mace. They are widely used in pharmacy and industries. It was introduced into India during the 18th Century by Britishers. In India, nutmeg is grown in about 4800 ha, mostly in Kerala, Tamil Nadu, Karnataka, Goa, Maharashtra, Northeast India and Andaman Islands, with an annual production of over 1420 tonnes. Major problem being faced by the farmers is that the seedlings segregate into males and females at approximately 50%.

A very high yielding clone (A9/4) of nutmeg was selected from the conservatory. This clone was collected from Mannoor (Kozhikode District) from a mother tree yielding above 10,000 fruits per year. The selection is dwarf, with bushy habit and flowers in groups of 2-3, almost in every leaf axil, yielding from the 5th year of planting. It yields on an average 800 fruits/tree per year during the first four years of bearing. The spacing employed is 5X5 m accommodating 360 plants/ha.
The salient features of this variety are given below:

1. Average yield :480 kg mace/ha at 8th year, with 3122 kg dry fruits/ha.
2. Potential yield : 4800 kg mace/ha & 31220 kg dry nuts/ha.

QUALITY CHARACTERS

1. Nut oil	:	7.14%
2. Mace oil	:	7.13%
3. Nut recovery	:	70%
4. Mace recovery	:	35%
5. Oleoresin in nut	:	2.48%
6. Oleoresin in mace	:	13.8%
7. Butter in nut	:	30.9%
8. Myristicin in nut oil	:	12.48%
9. Myristicin in mace oil	:	20.03%
10. Elemicin in nut oil	:	13.65%
11. Elemicin in mace oil	:	20.75%

PLANT CHARACTERS

1. Height of the tree at 9 years	:	3-5 m
2. Width of the canopy	:	3-3.5m
3. Trunk girth at 9 years	:	45 cm
4. Leaf length/breadth	:	18/5 cm
5. Time taken for flowering	:	3-4 years
6. Yield per tree, 8th year	:	1000 fruits, 1.33 kg mace & 9 kg dry nuts
7. Colour of mace	:	Dark red
8. Colour of seed	:	Shining black
9. Size of seed	:	Bold

The shape and size of this cone makes it suitable to be raised as an inter crop in areca nut, coconut, jack, cashew, mango and guava. Based on clinical trials conducted on mice and rats elsewhere, it was observed that myristicin appears to have a terrific potential for being an excellent chemo preventive agent.

The nutmeg variety IISR Viswashree (A9/4) has a very high myristicin content, indicating the tremendous potential of this particular variety in cancer treatment.

B. Krishnamoorthy
IISR, Calicut

SHOOT BORER OF GINGER AND TURMERIC

Ginger and turmeric are infested by over 50 species of insects in India among which the shoot borer (*Conogethes punctiferalis*) is the most serious pest causing severe crop loss. The shoot borer is widely distributed occurring in most of the ginger and turmeric areas in India. In endemic areas over 50% of the pseudostems are infested by the pest by the time the crop reaches maturity. The pest infestation is generally more serious on ginger than on turmeric. The shoot borer is highly polyphagous and has been observed in over 20 plant species including many economically important ones.

The larvae of the shoot borer bore into pseudostems and feed on the growing shoot resulting in yellowing and drying of infested shoots. The presence of a borehole in the pseudostem through which frass is extruded and the withered central shoot is a characteristic symptom of pest infestation. Studies on yield loss caused by the pest on ginger indicated that when more than 50% of the pseudostems in a clump are affected, there is a significant reduction in yield of rhizomes.

The adults are medium sized moths with a wingspan of 18-21 mm; the wings are orange-yellow with minute black spots. The eggs are laid on the topmost unopened leaf and they hatch in 3-5 days. The newly hatched larva feeds on the unopened leaf making small holes in them and later they migrate down to the pseudostem and bore into them. There are five larval instars and they last for 25-40 days. Fully-grown larvae are light brown with sparse hairs and measure 15-25 mm in length. The prepupal and pupal periods last for 3-4 and 9-10 days, respectively. The larval and pupal periods may be prolonged in cooler regions especially during the winter season. The pest is observed in the field at all stages of the crop when the pseudostems are green and in Kerala the pest population is higher during October-November.

Spraying of malathion 0.1% or monocrotophos 0.075% or Dipel 0.3% (a *Bacillus thuringiensis* product) at 21-day intervals during July-October is effective in controlling the pest infestation on both ginger and turmeric. It is important to start the spraying operations when the first symptom of pest attack is seen on the unopened leaf in the form of small holes. Alternatively, on ginger, pruning and destruction of freshly infested shoots (at fortnightly intervals) during July-August and spraying of insecticide (malathion 0.1%) (at 21-day intervals) during September-October is also effective in controlling the pest infestation. This integrated schedule would be more effective in regions where ginger is grown in compact areas and the schedule has to be adopted in the entire area. By adopting this strategy two insecticide sprays can be avoided, thus causing less harm to the ecosystem.

A number of natural enemies have been recorded on the larvae of shoot borer among which entomophagous nematodes and hymenopterous parasitoids are important. The former is more common during the monsoon season and the latter during the post monsoon season. Studies are being undertaken at Indian Institute of Spices Research, Calicut, to develop integrated management schedules against the shoot borer utilizing potential biocontrol agents, plant products and selective application of safer insecticides.

S. Devasahayam and K. M. Abdulla Koya
I ISR, Calicut

VERMI COMPOST

Vermi composting means use of earthworms for compost preparation, as they feed on wastes and produce vermi cast with immobilized micro flora and enriched nutrients, vitamins, enzymes, antibiotics and hormones. *In situ* management of earthworms is also beneficial. Studies conducted at IISR showed that growing earthworms in bush black pepper pots improved the soil physico chemical properties and yield of pepper. It has been estimated that from about 10 tonnes of feeding material earthworms can produce 3 tonnes of compost. Different types of soils have different species of earthworms and hence choosing local or native species is ideal. Local species like *Lampito mauritii*, *Octochaetona serrata*, *Perionyx excavatus* are found to be good. Indigenous species like *Eudrilus eugeniae* and *Eisenia foetida* are also good. CPCRI, Kasaragod has identified efficient local species of verms to compost coconut leaves and fronds.

Method of preparation

Make a pit of 1m width with 75cm depth of convenient length using bricks. Fill with pebbles at the bottom to about 7.5cm thickness. Make holes at the bottom of this layer to drain excess water. Fill loose soil to form another layer of about 15 cm thickness. Spread handful lumps of fresh cattle dung over sand and introduce verms at a rate of 50 per square meter. This layer forms the active ground for earthworms – vermi bed. The vermi bed has to be kept moist without flooding. The pit is then layered with moist, partially rotten leaf wastes to another 5 cm thickness. After decomposition again put FYM and leaf wastes above decomposed layer. Repeat the process depending upon the decomposition until the pit is filled. When the pit is full, stop watering for three to four days, which causes migration of earthworms to deeper vermi bed. The compost can then be taken out from top and can be applied to crops after air-drying under shade. Studies showed that 1 Kg vermi compost supplies approximately 20g N, 8 g P, 12 g K, 33 g Ca, 11 g Mg, 8.6 g S, 6.1g Fe, 0.2g Mn, 44mg Zn and 36mg copper.

Experiments conducted at IISR showed that application of vermi compost to black pepper and cardamom increased water holding capacity, nutrient availability and microbial population especially that of phosphate solubilizing bacteria of soil. It also increased the yield significantly over application of chemical fertilizers alone in bush pepper, black pepper and cardamom.

V. Srinivasan and S. Hamza
I ISR, Calicut

DWARF IS SHARP

Since time immemorial spices have become an indispensable ingredient in culinary art. Chilli is no exception. It is an elegant umbrella spice cum vegetable that finds a unique place in our day-to-day dishes. It is a semi erect or compact herb of about one meter height. Several high yielding hot chilli varieties have been developed by conventional breeding method and released for the commercial cultivation all over the country. A tall robust high yielding mutant variety MDU-1 (Madurai-1) was developed through induced mutagenesis and released in 1997 by the Tamil Nadu Agricultural University, Coimbatore for the commercial cultivation within the state. It is a tall, robust high yielding variety suited for black soil types.

Induction of mutation is a proven supplement to conventional breeding. It helps in improving the variety without altering its phenotype. For the first time, a **"dwarf"** mutant chilli variety was developed through gamma irradiation (35kR) of chilli seeds of variety K-2. This particular mutant shows small stature with short internodes. It occupies very less area (37cm as against 109cm in K-2) and the height of the plant is highly reduced. Inheritance studies reveal that a monogenic recessive gene controls this **'dwarf'** character. Dwarfness is not only an important characteristic feature for lodging resistance, but also a very useful character in breeding for the improvement of new varieties. Though **'dwarf'** mutant fruits are smaller in size than the control K-2, the number of fruits are more and the capsaicin content of this **'dwarf'** mutant (2.6% in whole fruits) is as high as 'Kanthari' chillies (2.4% in whole fruits). The yield of induced dwarf mutant (18q/ha) is almost on par with the control (21q/ha). The reduced height mutants serve as a source of alternative dwarfing genes in crop improvement

K.P.M. Dhamayanthi
IISR, Calicut

PERFUMES AND FRAGRANCES

A fragrance is simply a "sweet scent' whereas a perfume is a sweet smelling liquid for personal use. Perfumes are prepared from essential oils or aromatic chemicals. Fragrances are used for environmental application, fragrance ambiance and aromatherapy. Perfumes meant for any age group and sex are available in the market.

Perfumes are commercially available in various alcoholic concentrations. 'Extrait parfum' is the highest concentration perfume, which contains 15-30% perfume oil in high-grade alcohol, mostly 90%. 'Eau de parfum' is the highest grade of 'eau' consisting of 15-20% perfume oil in 80-90% grade alcohol. 'Eau de toilette' contains 5-10% perfume oil in about 80% grade alcohol. Aftershave, a men's line perfume, also contains 5-10% perfume oil. 'Eau de colognes' are toilet waters, which contain 3-5% perfume oil in 70% grade alcohol. Splash colognes are perfume waters, containing only 1-3% perfume oil in highly diluted alcohol.

Odour aspects of perfumes

Odour	Characteristic
Aldehydic	Fatty aldehydes –octanal,decanal, dodecanal etc.
Ambery	Amberoxide, ambrinol
Animalic	Indole, skatole, civettone
Aromatic	Vanillin, coumarin, heliotropin
	Citrusy Bergamot, lemon, lime, mandarin, orange, petitgrain, neroli
Floral	Carnation, freesia, jasmine, lily, orris, rose, tube rose, violet,ylang-ylang etc.
Fruity	Apricot, cherry, peach
Herbaceous	Herb oils, basil, thyme, mint etc.
Musky	Natural and synthetic musk compounds, biomusks
Spice	Spice oils, anise, cardamom, clove, nutmeg, pepper
Watery	Watery compounds (unsaturated aldehydes), water melon
Woody	Cedar wood, patchouli, sandal wood, vetiver oils and compounds

Perfumes are primarily created by perfumers of International fragrance houses including Creations Aromatiques, Dragoco, Drom, Firmenich, Givandan, Haarmann & Reimer, Quest, Robertet, Synarome, Takasago and many others. A good perfumer is one whose products sell frequently.

Perfumers are composers, and as such, they are artists. A good perfume is a piece of art. As in musical composition, fragrance evolution requires composers, performers and tuners. The performers are the commercial and retail people who have to sell the perfume to clients (perfume houses) and customers (in shops). The tuners are the technical people involved in research, development and quality control. A perfumer may also be a performer, discussing the perfume quality with clients and a tuner taking note when a raw material is inferior. However, the perfumer's main task is to

compose the perfume. In its uniqueness, each perfume evokes fantasy, imagination and illusion. As a creation of art, it imparts a good feeling and makes one happy. A good perfume is a harmony of odour themes and accords.

Although the most important feature of a perfume is its smell, its container also plays a significant role in successful commercialisation. Containers are mostly made of glass. The designers of perfume containers are like perfumers, artists. There are collectors of perfume flacons all around the world. There are museums for perfume bottles, international societies and books about perfume miniflacons.

Odour is the most important feature of fragrance. Some of the major perfumes in the international market were classified with general odour notes, green, floral, aldehydic, chypre, oriental, tobacco, leathery and fougere. Feminine as well as masculine fragrances were classified under these notes. Four hundred and fifty feminine fragrances were classified into the following odour notes.

- floral : green, fruity, fresh, floral, aldehydic and sweet types
- oriental : ambery and spicy types
- chypre and : fruity, animalic, woody fresh green types

About four hundred masculine fragrances are classified into the following notes.

- fougere : fresh, woody and ambery types
- oriental : ambery and spicy notes
- chypre : with woody, leathery, fresh and citrusy notes

As per the technical committee of French Society of Perfumes, feminine and masculine perfumes are divided into the following families and sub-families.

* Citrus : general citrus, floral chypre citrus, spiced citrus and woody citrus.

* Floral : single flower, lavender single flower floral bouquet, floral green, floral aldehydic, floral woody, floral fruity woody.

* Fougere : general fougere, soft amber fougere, floral amber, spiced fougere, aromatic fougere.

* Chypre : floral chypre, floral aldehydic chypre, fruity chypre, aromatic chypre

* Woody : general woody, woody citrusy coniferous, woody aromatic, woody spicy , woody spicy leather, woody amber

* Amber : floral woody amber, floral spicy amber citrus amber, floral semi amber

Feminine perfumes belong to floral-fresh floral, floral-aldehydic, floral fruity, floral-oriental, oriental and chypre odour types. Masculine perfumes belong to natural, woody-leathery, spicy, oriental, chypre and fougere aromatic.

The chypre family group of perfumes combines a fresh cicrusy note with floral elements and a woody-balsamic mossy accord. Oriental perfumes have an exotic character of the East and unify spicy notes with woody balsamic nuances. The fougere perfumes are characterized by fresh, herbaceous notes combined with moss and fern-like odour types.

There are three general types of odour descriptors for classification of perfumes.

- General sophisticated : chypre, fougere, oriental
- Derived from specified materials : aldehydic, ambery animalic,aromatic itrusy, floral, fruity, herbaceous, leathery, mossy, musky, spicy, watery, woody.
- Non-specified : classical, dry, fresh, rich, sweet soft warm, green.

Fragrances in general consist of more than 50% defined materials (natural and synthetic) and less than 50% natural isolates. Upto 5000 fragrances and perfumes are currently commercially available in the world. These products are commercialised by approximately 900 brands and sales companies. Every year 200 new fragrances reach the market. Two important features of a fragrance are the olfactive quality and the packaging. Perfumers and container designers are the creative artists. They are ultimately responsible for the economic success of perfume products.

T. John Zachariah
IISR, Calicut
Source: Perfumer & Flavorist

The ISS Family Know Your Family Members

(Continued from the previous issue)

Life Members

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SUGANDHA BHARATHI AWARD 2002

The Indian Society for Spices, Calicut, has been honouring outstanding scientists in the field of spices research with a "Sugandha Bharathi Award" once in 4 years for their lifetime contribution to the cause of spices in the country. The award has been instituted by the Division of Crop Improvement and Biotechnology, Indian Institute of Spices Research, Calicut and it consists of a Gold medal and a citation. It is awarded during the annual general body meeting of the Society. Nominations for the award is invited for the year 2002.

Selection Procedure

1. Nominations can be made by an eminent person, who is closely associated with the nominee or familiar with the nominee's contribution by giving a brief bio-data and salient contributions (not more than one page) made by the nominee.
2. A search committee constituted by the Society would scrutinize the nominations and shortlist five nominees.
3. The search committee would invite details of their contribution from the short-listed nominees, which would be evaluated for the award.

The last date for receipt of nomination form is **30 June 2002**. The nomination should be addressed to 'The Secretary, Indian Society for Spices, Indian Institute of Spices Research, Marikunnu (P.O), Calicut – 673 012, Kerala' so as to reach him on or before the closing date.

SUGANDHA BHARATHI AWARD 2002
Nomination Form

Name of the Proposer : _____

Designation : _____

Address : _____

_____

Name of the Nominee : _____

Designation : _____

Address : _____

_____

Field of specialization of the nominee : _____

_____

Salient contributions of the nominee : _____

(Restricted to one page) _____

_____

_____

Awards, recognitions

received by the nominee : _____

Signature

Date :

Place :

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