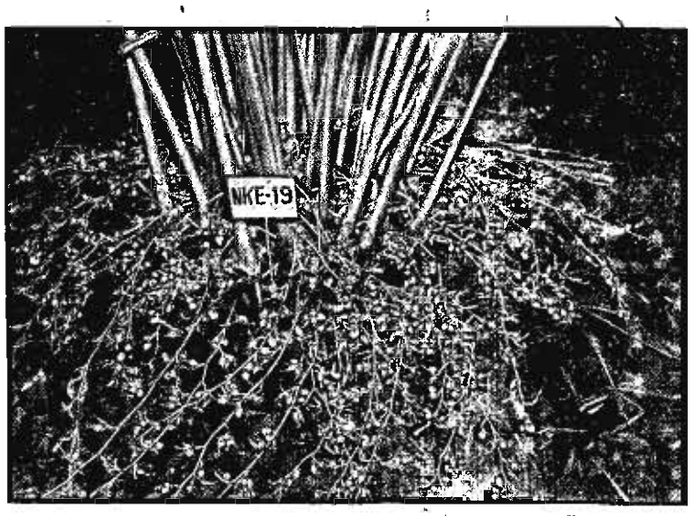
Volume 9 (1) January-June 1998

TURNING A NEW LEAF IN CARDAMOM BREEDING - 'KATTE' RESISTANT VARIETIES CUTTING IN

Getting a 'Katte' resistant variety of cardamom may be a small step in the history of crop improvement but definitely a giant leap in the annals of cardamom breeding. Cardamom mosaic disease or 'Katte' is a century old viral disease prevalent in all cardamom growing areas of South India with incidence ranging from 0.01 to 99.0%. The disease is also becoming a major problem in Guatemala too. Mosaic affected plants progressively decline and the plantations become uneconomical within 3-5 years of infection in the absence of disease management measures. Yield loss due to 'Katte' infection is estimated to be 10-98% in the different years of productivity. Infection at the seedling stage or juvenile stage results in total



'Katte' resistant cardamom line

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loss. 'Katte' disease is caused by a poty virus which is transmitted through the aphid vector *Pentalonia nigronervosa.*

Management of the disease is rather difficult. A resistant variety will be the safe, cheap and economical solution to this deadly menace. Hence, a threefold approach involving germplasm screening, inducing variability through mutation and somaclones as well os locating the naturally resistant plants (disease escapes) was initiated at the Cardamom Research Centre, Indian Institute of Spices Research, at Appangala, Karnataka.

Out of the three approaches, locating disease escapes have only yielded dividends as 19 natural 'Katte' disease escapes could be located. These 19 accessions remained free from infection even after six years of testing in sick plots. The field resistance of these accessions was further confirmed in three hot spot areas under field conditons.

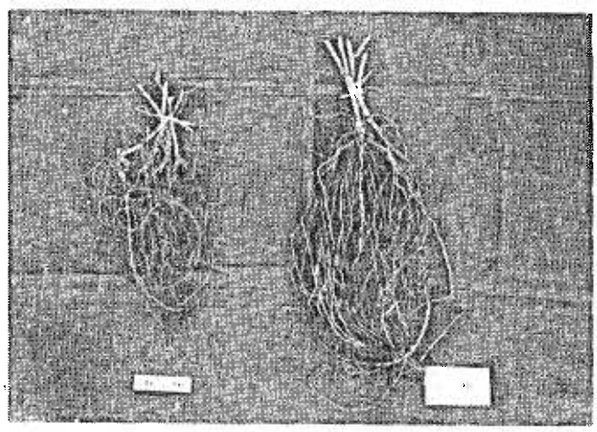
Comparative yield evaluation of disease escapes with local checks over a period of 3 years resulted in short listing six disease resistant lines superior to the checks. These lines yielded 535-643 kg ha^{-1} dry capsules as against 409 kg ha^{-1} of the local check under irrigated conditions.

A 'Katte' resistant variety not only cuts down the dumping of pesticides but is also a sustainable approach to maintain the high productivity of plantations.

RESEARCH HIGHLIGHTS

Biofertilizer boosts black pepper growth

In black pepper, combined soil inoculation of *Azospirillum, Phosphobacteria* and Vesicular Arbuscular Mycorrhizae (VAM) increased the biomass and dry matter production as well as mutrients uptake.



Effect of biofertilizer on root growth of black pepper

Biocontrol of scale insects in black pepper

Evaluation of coccinellid predator for the control of scale insects (*Lepidosaphes piperis*) infesting black pepper indicated that releases of 125 eggs of *Chilocorus nigrita* $vine^{-1}$ (5 release at 7-10 days intervals) reduced population of scale insects by 44.5%.

Insecticidal toxicity to biocontrol agents

Evaluation of toxicity of plant and organic products and conventional insecticides to the coccinellid predator *Chilocorus nigrita* indicated that the neem oil (0.3%), Neem gold (0.3%) and fish oil rosin (3%) are safer to the predator. Monocrotophos (0.1%) and dimethoate (0.1%) were toxic upto seven and one day after treatment, respectively.

Coconut water promotes *Trichoderma* growth

In shake culture using matured coconut water both *Trichoderma harzianum* and *Gliocladium virens* have shown good growth.

Verticillium chlamydosporium suppresses *Phytophthora capsici*

Cell free culture filtrates of *Verticillium*

chlamydosporium showed varying degrees of inhibition on growth, sporulation and zoospore germination of *Phytophthora capsici.*

Location effect on ginger quality

Ginger accessions cultivated in different geographical locations of India showed variability with regard to pungency and flavour profile. Gingerol, the major pungent principle in oleoresin was high in accessions collected from Orissa. Accessions collected from Kerala had high oil, oleoresin and flavour constituents.

Hybrid vigour in cardamom

Hybrid cardamom seedlings expressed more vigour than selfed and open pollinated seedlings in the juvenile phase.

Elite clove progeny

Clove progeny line, B-95, was found the best with regard to yield and morphological traits in the evaluation trial at IISR farm, Peruvannamuzhi and IISR Cardamom Research Centre, Appangala.

Root ontogeny in cassia

Studies on root ontogeny in cassia revealed that root primordia orginates from the main developing vascular tissues. Several layers external to cambium take part in the formation of root primordia. Its inner cells are added by the concurrent divisions and elongation of rays and fusiform cells of cambium. The root primordial initials further penetrate the endodermis and cortex, pierce the epidermis and come out as adventious roots. Root apex is dome shaped, xylem and phloem develop internal to it. Vasculature of roots are attached directly to stem vascular bundle; well developed vasculature is observed in adventious roots.

Micropropagation of curry leaf

Micropropagation protocol for curry leaf is standardised and tissue cultured plants are hardened and planted.

Mealy bug infestation in pepper root system

Mealy bug infestation on black pepper root is on the increase in Pulpally area of Wynad and other pepper growing regions as well. Mealy bugs are often found on encrustation formed by a fungal mat. Studies are afoot to mange the pest.

GERMPLASM ENRICHMENT

One wild pepper accession collected from Arunachal Pradesh has highly fragrant spikes.

In tree spices, *Myristica beddomeii, Knema* sp., *Cinnamomum riparium, C. perrottetii, C macrocarpum* and *C. wightii* are collected from the Western Ghat. A *Cinnamomum* sp. having lemon grass oil flavour was collected from Munnar; *C. litzia* and *C. malabatrum* were also collected from Munnar region.

Ten rooted cuttings each of Madagascar vanilla and a Coimbatore collection were obtained from Indo American Hybrid Seeds, Bangalore. *Vanilla vatsala* ? (from Agustiyarmuzhi) was collected from a secondary source (Hailey Buria Estate, Upputhura, Kottayam district) and added to the genebank. One elite tree of *Garcinia cambogia* was located at Chavaramuzhi, Kozhikode district and scions were collected and grafted on to *G. cambogia* stock. *Garcinia cowa* was collected from Taliparamba, Cannanore.

PUBLICATIONS

Research Articles

Krishnamoorthy, B., Sasikumar, B., Rema, J., Johnson K. George and Peter, K. V. 1997.

Genetic resources of tree spices and their conservation in India. Plant Genetic Resources News Letter, 111:1-5.

Peter, K. V. and Ravindran, P. N. 1998. Genetics and breeding of black pepper. Proc. 2nd International Crop Science Congress. NAAS, New Delhi. pp. 667-675.

Sajina, A., Mini, P. M., John, C. Z., Nirmal Babu, K., Ravindran, P. N. and Peter, K. V. 1998. Micropropagation of large cardamom (*Ammomum subulatum* Roxb.). *J. Spices and Aromatic Crops,* 6: 145-148.

Shamina, A., John Zachariah, T., Sasikumar, B. and Johnson K. George. 1997. Biochemical variability in selected ginger (*Zingiber officinale* Rosc.) germplasm accessions. *J. Spices and Aromatic Crops,* 6: 119-127.

Popular Articles

Edison, S. and Johny, A. K. 1998. Technologies developed for increasing cardamom production. *Spice India,* 11(1) 14-16.

Krishnamoorthy, B. 1998. Sex conversion in nutmeg. *Spice India* (Hindi), 11 (1) : 11-13.

Krishnamoorthy, B. 1998. A super selection in nutmeg. *Spice India* (Hindi), 11 (3): 9-11.

Krishnamoorthy, B. 1998. Sarvasugandhi. *Karshakasree* (Mal.), 3 (11): 50.

Krishnamoorthy, B. 1998. Black pepper. *Spice India,* 11 (1) : 8-10.

Krishnamoorthy, B. 1998. Asafoetida. *Spice India,* 11 (2) : 5-6.

Krishnamoorthy, B. 1998. Conservation and improvement of clove germplasm. *ICAR News,* 4 (1) : 6-7.

Krishnamoorthy, B. 1998. Conservation and improvement of cinnamon germplasm. IPGRI News Letter for Asia, the Pacific and Oceania. 24:16.

Sasikumar, B. 1998. Kasturi turmeric. Malayala Manorama, 18 May, 1998.

Sasikumar, B. 1998. Pollination in black pepper. Malayala Manorama, 25 May, 1998.

Sasikumar, B. 1998. Long pepper species. Malayala Manorama, 1st June, 1998.

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Sasikumar, B. and Saji, K. V. 1998. A tribal medicine for piles. Malayala Manorama, 22 June, 1998.

Sasikumar B. 1998. Varada - a new ginger variety. *Spice India* (Mal, 11(3): 10.

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Sasikumar, B. 1998. Vaccine yielding fruits and vegetables. *Yojana* (Mal.), 26(8): 31-32.

Sasikumar, B. 1998. Death bell for turmeric patent. *Yojana* (Mal), 26(9):1.

Sasikumar, B. 1998. Nut and mace spice - Nutmeg. *Indian Spice,* 34(3) : 23.

Chapters in books

Sarma, Y. R. and Anandaraj, M. 1998. Biological suppression of diseases of plantation crops and spices. *In: Biological supression of plant diseases, phytoparasitic nematodes and weeds.* (Eds.) Singh, S. P. and Hussaini, S. S. Project Directorate of Biological Control, Bangalore. pp. 21-47.

Sarma, Y. R. and Anandaraj, M. 1998. Major diseases of black pepper and cardamom and their management. In: *Pathological problems of economic crop plants and their management.* (Ed.) Paul Khurana, S. M. Scientific Publishers, Jodhpur. pp. 281-293.

TECHNICAL PUBLICATIONS

Research Highlights, IISR. 1997-98. IISR, Kozhikode. (Eds.) John Zachariah, T. and Santhosh J. Eapen.

Annual Report - All India Coordinated Research Project on Spices 1996-97. (Eds.) Sadanandan, A. K., Johny. Kallupurackal and C. Vasugi, IISR, Kozhikode. 119pp.

NEW SPICES VARIETIES

The XIV National Group Meeting (Workshop) of AICRP on Spices held at University of Agricultural Sciences, Bangalore, Karnataka discussed and recommended the release of three varieties of spices viz., ICRI-4 (TDK-4) (cardamom), Amba (CAM-3) (mango ginger) and Gujarat Fennel - 2 (fennel).

Cardamom

The variety ICRI-4 (TDK-4), developed by Indian Cardamom Research Institute Regional Station, Thadiyankudisai (Spices Board), a typical prostrate Malabar type, is a clonal selection from the germplasm collected from Vadageraparai area of Lower Pulneys hills of Tamil Nadu. It is an early maturing type. Plants are of medium size, capsules are globose to oblong, green and bold with an yield of 455 kg ha^{-1} under rainfed and 648 kg ha^{-1} under irrigation and capable of giving a potential yield up to 960 kg ha^{-1}. Dry recovery is 22.7%. The capsules contain 6.4% essential oil. The variety is adapted to the cardamom growing tracts of Lower Pulneys Hills, in the Kodaikanal taluk and is recommended for low rainfall areas. It is relatively tolerant to *Azhukal* disease, rhizome rot and capsule rot.

Mango ginger

Amba (CAM-3) developed through clonal selection by the High Altitude Research Station, Orissa University of Agriculture and Technology, Pottangi is the first mango ginger variety released in India. It has an average yield of 28t ha^{-1}; dry recovery is 18.7%, contains 0.8% essential oil and 6.4% oleoresin. It is tolerant to shoot borer and scale insects.

Fennel

The new fennel variety viz., Gujarat Fennel-2 (JF-29) was developed through selection based on individual plant progeny performance from local germplasm collection at the Main Spices Research Station (Gujarat Agricultural University) at Jagudan. Seeds of this variety are medium bold and oblong with good smell and taste and contains 2.4% volatile oil. The yield is 19.4q. ha^{-1}.

XII STAFF RESEARCH COUNCIL MEETING

The Twelth Staff Research Council Meeting was held during 22-24 April, 1998 at Kozhikode. Dr. K. V Peter, Director was the General Chairman and Dr. P. N. Ravindran, Dr. A. K. Sadanandan, Dr. Y. R. Sarma and Dr. K. P. Prabhakaran Nair functioned as Co-chairmen for various sessions. There were four technical sessions in which the progress made in 47 research projects were discussed. The SRC recommended closing of 4 projects and approved three new research projects. The plenary session was chaired by Dr. K. V. A. Bavappa, Chairman, Quinquennial Review Team.

QUINQUENNIAL REVIEW TEAM

The third Quinquennial Review Team (QRT) on Spices constituted by ICAR has completed the review of the research achievements of IISR

and the 20 AICRPS centres. The team visited IISR and its Regional Centre, AICRPS centres, Spices Board and All India Spices Exporters Forum and had discussions with the Scientists, representatives and growers. The team comprised of Dr. K. V. Ahammed Bavappa, Chairman; Dr. R. P. Sharma, Director, NRC for Plant Biotechnology, New Delhi; Dr. S. Chaudhury, Retd. Director of Research, BCKV, Kalyani, West Bengal; Dr. R. K. Sharma, Sr. Breeder, SKN College of Agriculture, Jobner, Dr. Rajendra Gupta, Retd. Project Co-ordinator (Medicinal Plants) and Dr. A. K. Sadanandan, Project Co-ordinator, (Spices) (Member Secretary).

TRAINING ATTENDED

Ms. K. Padmini

61st Foundation Course for Agricultural Research Management, NAARM, Hyderabad. 3 October, 1997 to 30 January, 1998.

Dr. (Mrs.) Femeena Hassan

Training on Mud crab falling. CMFRI, Cochin. 19-24 January, 1998.

Mr. Sunil, V. C.

Computer awareness with Hindi word processor. ER & DC. Noida. 23-27 March, 1998.

NEW PROJECTS SANCTIONED/EXTENDED

"Biological control of plant parasitic nematodes of spice crops". ICAR adhoc scheme with effect from 1.4.1998.

ICAR ad-hoc scheme on **"Characterization, early detection and management of *Kokke kandu* disease in cardamom"** has been extended for one more year.

GROUP MEETING ON PEPPER BREEDING

Dr. A. K. Sadanandan, Project Coordinator(Spices) and Dr. B. Sasikumar, Scientist (Sr. Scale), IISR attended the group meeting on pepper breeding convened by PC(Spices) at CPCRI, Kasaragod on 18 March, 1998. The meeting was chaired by Dr. K. V. A. Bavappa.

Dr. B. Sasikumar presented the pepper breeding work at IISR, Kozhikode.

PHYTOPHTHORA WORKERS MEET

A group meeting of *Phytophthora* workers of horticultural crops was held at IARI, New Delhi during the International Symposium on Integrated Plant Disease Management for Sustainable Agriculture. The meeting was organized by Dr. Y. R. Sarma, Coordinator of the Network project on *Phytophthora* diseases of horticultural crops.

TRANSFER OF TECHNOLOGY

Consultancy service

Dr. A. K. Sadanandan, Dr. K. V. Ramana, Dr. M. Anandaraj and Dr. B. Sasikumar visited the Travancore Rubbers & Tea Co., Ambanad Estate, Thenmalai, Quilon and gave advice on managing pepper plantation.

Dr. A. K. Sadanandan and Dr. B. Sasikumar visited Hailey Buria Estate, Upputhura, Kottayam on 5-6 June, 1998 and gave suggestions on scientific cultivation of black pepper.

Dr. Y. R. Sarma, Prof. (Dr.) K. P. Prabhakaran Nair and Dr. M. Anandaraj visited Coffee Land Estate, Saklespur, Karnataka 9-21 January, 1998.

Training imparted

Dr. (Ms.) Mrinalini N. Mallay from NRC for Onion and Garlic, Pune was trained on **"Vesicular Arbuscular Mycorrhizae"** at IISR, Kozhikode.

Ms. A. V. Vijayalakshmi and Ms. R. Chitra, Research Associates, Banana Research Station (KAU), Kannara were trained on **"Biological control of nematodes"** at IISR, Kozhikode.

Eighteen farmers from Ratnagiri (Maharashtra) participated in the one day training on Spices Production at Cardamom Research Centre, Appangala.

Radio Talks

P. A. Mathew

Preparation of white pepper. AIR, Kozhikode, 5 January, 1998.

Dr. Y. R. Sarma

Biocontrol of *Phytophthora* foot rot in black pepper. AIR, Kozhikode, 16 January, 1998.

Dr. (Mrs) Femeena Hassan

Cultivation of fresh water prawns. AIR, Kozhikode, 7 March, 1998.

Dr. Rajendra Hegde

Organic farm planning, AIR, Madikeri, 9 March, 1998.

Santhosh J. Eapen

Nematodes and spices. AIR, Kozhikode, 14 March, 1998.

P. S. Manoj

Improved method of processing turmeric. AIR, Kozhikode, 22 March, 1998.

Dr. S. Ravi

Interview on rabbit rearing and its economic aspects. AIR, Kozhikode, 28 March, 1998.

Dr. T. John Zachariah

Medicinal value of common spices AIR, Kozhikode, 30 March, 1998.

P. A. Mathew

Interview on grafting of pepper. AIR, Kozhikode, 6 May, 1998.

Dr. S. J. Anke Gowda

Pepper propagation and planting. AIR, Madikeri, 13 May, 1998.

Dr. S. S. Veena

Mode of spread of foot rot of pepper and its control, AIR, Kozhikode, 27 May, 1998.

IJC MEETING

Eighth meeting of the Third Institute Joint Staff Council was held at IISR Farm, Peruvannamuzhi on 19th February, 1998.

RAC AND IMC MEETING

The Research Advisory Council meeting was held during 10-11 June, 1998 and the Institute Management Committee met on 12 June 1998.

HINDI CELL

The quarterly meeting of the Hindi Cell was held on 25 June, 1998 and discussed about the implementation of Hindi.

The quarterly meeting of the official language implementation committee was held on 27th March, 1998.

PERSONALIA

Appointments

Name	Designation	Posted at	Date of Joining
Mr. Shaji Prabha	Research Associate	Kozhikode	23.1.98
Ms. T. E. Sheeja	Scientist (Biotech)	"	
Mr. A. Sudhakaran	Artist-cum-Photographer	"	6.3.98
Ms. Minoo Divakaran	Research Associate	"	1.4.98
Dr. A. B. Remashree	"	"	1.4.98

Name	Designation	Posted at	Date of Joining
Mr. K. Praveen	Sr. Research Fellow	"	1.4.98
Ms. P Girija	"	"	1.4.98
Mr. M. A. Arabi Mohammed Saleh	Research Associate	"	3.4.98
Mr. Benny Daniel	"	"	6.4.98
Mr. Domenic Joseph	Research Associate	"	15.4.98
Ms. M R Rubina	Sr. Research Fellow	"	20.4.98
Ms. A M Sajna	Sr. Research Fellow	"	4.5.98
Mr. Parasuram Chandravansh	Research Associate	Appangala	13.5.98
Ms. P. Vijaya	Sr. Research Fellow	Kozhikode	15.5.98
Mr. Stephan Jebakumar	Research Associate	"	22.5.98
Mr. K A Saju	"	"	26.5.98
Mr. M Anil	"	"	29.5.98

Transfer

Dr. M. S. Madan, Scientist Sr. Scale (Agril. Econ.) joined IISR, Kozhikode on 13.4.98 upon transfer from IIHR, Bangalore

Resignation

Ms. Mini Kallil, SRF, ICAR adhoc scheme, IISR, Kozhikode w.e.f. 8.6.98

AWARDS/HONOURS

Dr. Femeena Hassan, Technical Officer, (Fish), KVK, Peruvannamuzhi has bagged the Young Scientist Award of X[th] Kerala Science Congress, 1998.

Dr. Y. R. Sarma nominated as a member of the expert group on biofertilizer of DBT. Govt. of India New Delhi.

Dr. Y. R. Sarma, Member, Management committee of PDBC, Bangalore.

Dr. Y. R. Sarma, Biocontrol Task Force Panel Member, Dept. of Biotechnology, New Delhi.

Mr. B. Krishnamoorthy, Member, Official Language Implementation Committee.

Weddings

Mr. M. A. Arabi Mohammed Saleh, Research Associate with Ms. Juvairiya on 20 May 1998.

Ms. N. Beena, Research Associate with Mr. Ramachandran on 20 May, 1998.

Mr. T. S. Sadasivan, Pump Operator with Ms. Bindu on 17 May, 1998.

Mr. T. C. Prasad, Driver, KVK with Ms. Mercy on 26 January, 1998.

Ms. C. Vasugi, Scientist (Hort.) With Mr. C. Perumal on 2 March, 1998.

Congratulations and Best wishes to the married couples

Editor: **Dr.B. Sasikumar**, Members: **Dr. Johny Kallupurackal, P.A. Sherief**, IISR, Kozhikode.
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