



IAUA



NEWS

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CONTENTS

Spot News

Promising Technology

NDRI, Karnal

New VCs

Dr S.S.Kadam: VC, MAU, Parbhani

Dr Parmatma Singh: VC, RAU, Bikaner

Prof C. Ramasamy: VC, TNAU, Coimbatore

Deemed Universities

CIFE, Mumbai

NDRI, Karnal

Universities

A Profile: AAU, Jorhat

DBSKKV, Dapoli

DYSPUHF, Nauni

KAU, Thrissur

MPUAT, Udaipur

MAU, Parbhani

NAU, Navsari

SKUAST, Jammu

UAS, Dharwad

Awards and Recognition

NDRI, Karnal

AAU, Jorhat

JAU, Junagadh

KAU, Thrissur

PAU, Ludhiana

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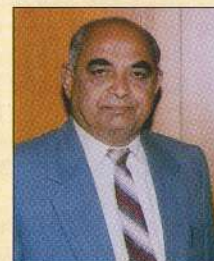
Shri R.S. Gupta

Ex-Editor (English), ICAR

SPOT NEWS

Dr S.S. Magar takes over as President, IAUA

Dr S.S. Magar was born on 1 June 1942. He obtained B.Sc. (Agric. Sci.) in 1965, M.Sc. (Agric. Engng) from University of Pune and Ph.D. (Soil Science) in 1977 from IIT, Kharagpur. He joined MPKV, Rahuri as Soil Scientist. He was appointed Professor and Head, Interfaculty Department of Irrigation and Water Management (1990); Associate Dean and Principal, Agricultural College (1994); and Director of Instruction and Dean, Faculty of Agriculture (1996) at Rahuri. He was appointed Vice-Chancellor of DBSKKV, Dapoli on 17 February 2000, and re-appointed for 3 years on 25 February 2003. Dr Magar has guided 24 M.Sc. and 3 Ph.D. students. He has authored 6 books and published 4 proceedings, 5 bulletins, and 50 scientific and 55 technical papers besides 257 research articles. Presently he is a Member of Standing Committee of AIU, New Delhi and ICAR Society, New Delhi. He is Honorary Colonel Commandant, NCC and recipient of Vasant Rao Naik Horticulture Development Award, 2003 and Shikhan Ratna Award, 2004. He visited Australia, the USA, Israel and Mexico on various assignments.



Dr S.S. Magar

New Executive Committee, IAUA, 2006

Dr S.S. Magar, VC, DBSKKV, Dapoli (President); **Dr M.P. Yadav**, Dir., IVRI, Izatnagar (Vice-President);

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Dr C.R. Hazra, VC, IGKV, Raipur (Member Eastern Region); **DDG (Edn)**, ICAR (Invitee-ICAR representative)

PROMISING TECHNOLOGY

National Dairy Research Institute, Karnal

Mechanized rasogolla-manufacturing plant

The existing equipment for cheese manufacturing in dairy plants can be adapted for chhena production. A continuous chhena-ball forming system has been developed. First chhena is prepared and from the kneaded chhena the chhena-balls are made mechanically. Then the chhena balls are cooked in sugar syrup for obtaining spongy rasogolla, which are later placed in sugary syrup. For this purpose a continuous cooker has been developed, where optimum cooking conditions such as concentration of sugar syrup and heat flux are maintained at optimum level to obtain the desirable quality of spongy rasogolla.

Continuous chhena ball-forming system

The chhena-ball forming system is an integrated device, consisting of a kneading unit and a ball-making unit. The same unit can produce chhena balls of different sizes from 15 to 25 mm diameter. It does not involve any contact of human hand during the process. The system is easy to operate, saves labour and gives smooth, hygienic balls required for preparation of high-quality rasogolla. The developed prototype has a capacity to prepare 3,000 rasogolla balls from 18 kg chhena/hr. It can be scaled up to any desired capacity as per the production plan. It can save up to 80% on labour cost.

Continuous rasogolla cooker

It consists of a steam-jacketed cooker with a product-conveying system. The equipment is filled with sugar syrup and kept at boiling temperature chhena balls, to develop typical spongy texture of rasogolla. The chhena balls are fed at the inlet of the cooker and the cooked rasogollas are discharged at the outlet. The capacity of the prototype rasogolla cooker is 3,000 rasogollas/hr. It produces consistent quality of spongy rasogollas in hygienic conditions. This also can save up to 80% of labour cost and can be scaled up to a desirable production capacity.



Rasogolla-making machine

(R.L. Chaudhary, K. Narasaiah and S.K. Makker)

Technology for preparing chelated zinc

For preparation of chelated zinc by enzymatic hydrolysis of soy protein, hydrolysis was done in a single-stage or double-stage process, using different enzymes to achieve maximum degree of hydrolysis. By adding 5 to 20% inorganic zinc (0.1 M ZnSO₄) to the hydrolysates, chelated zinc was prepared. It was observed that the recovery (%) of zinc declined with increase in the level of zinc used for chelation, and the absolute content of zinc in the chelate increased with the increase in amount of inorganic zinc from 5 to 20%. The final product was dried, using a spray-dryer and was used for *in-vitro* and *in-vivo* studies.

(H. Aliarabi and A. Chhabra)



Final product after spray drying

NEW VCs

Dr S.S. Kadam joins as VC of MAU, Parbhani

Dr S.S. Kadam has joined as VC of MAU, Parbhani on 12 April 2005. Born on 2 June 1947, Dr Kadam obtained B.Sc. (Agriculture) from Maharashtra Agricultural University in 1969, and M.Sc. and Ph.D. in Biochemistry from IARI, New Delhi in 1971 and 1975 respectively. He worked as Post-Doctoral Fellow at Berlin (Germany) in 1977-78, Visiting Scientist in Mexico in 1982 and Visiting Professor in the Department of Agricultural Biochemistry and Nutrition, University of New Castle (England) in 1985-86. He visited the USA in 1989 in connection with a PL-480 research grant.



Dr S.S. Kadam

Dr Kadam worked in different capacities as Biochemist and Associate Professor of Biochemistry in College of Agricultural Technology, MAU, Parbhani (1975-81); Professor of Food Science and Technology at Mahatma Phule Agricultural University, Rahuri (1981-84); Professor and Head, Department of Biochemistry (1984-87); Head of the Department of Food Science and Technology (1989-98); Associate Dean (1998-02) and Dean, Faculty of Agriculture, and Director of Instructions with the additional charge of Director of Research, MPAU, Rahuri. He was Acting Vice-Chancellor of MPAU, Rahuri (December 2004-February 2005). He guided 43 M.Sc. and Ph.D. students in Biochemistry and in Food Science and Technology.

Dr Kadam received a Certificate of Appreciation from the U.S. Department of Agriculture in 1992 for his excellent research on processing of groundnut. He published 126 research papers and reviews along with 17 books in English and Marathi. He bagged Dr W.B. Rahudkar Prize in 1992 for the best Marathi book on agriculture. In 1997 he was honoured with the prestigious Vihaya Shree

Award of India-International Friendship Society, New Delhi, for his contribution in the field of education and Dr J.C. Anand Medal for his outstanding contribution in post-harvest technology of fruits and vegetables by Horticultural Society of India. He was a member of Selection Committee for Young Scientist Jawaharlal Nehru Award of ICAR for 2002. He was associated with several committees of ICAR including RACs and QRTs for NRC on Citrus, Grapes, Onion and Garlic; AICRP on Potato and NAAS Committees on Food Processing and Agricultural Education. He was elected Fellow of National Academy of Agriculture in 2002 and Member, Executive Council of the Academy for 2003-06. He was the Organizing Secretary of Agricultural Science Congress, Pune in 2005. He travelled extensively abroad to the U.K., Germany, Mexico and the USA.

Dr Parmatma Singh continues as VC at RAU, Bikaner

Dr Singh took over as Vice-Chancellor, RAU, Bikaner, on 10 February 2003 for 3 years. As Vice-Chancellor he initiated many innovative steps to put the university on sound footing in the field of education, research and extension. He continues as Vice-Chancellor after completion of his first term on 9 February 2006.



Dr Parmatma Singh

Prof. C. Ramasamy gets second term as VC at TNAU, Coimbatore

He was appointed Vice-Chancellor, TNAU, Coimbatore on 4 November 2002 and reappointed on 30 December 2005 for the second term of 3 years.



Prof. C. Ramasamy

Focus on Universities - Achievements and Events

DEEMED UNIVERSITY

CENTRAL INSTITUTE OF FISHERIES EDUCATION, MUMBAI

Technology developed

Cage Aquaculture: To enhance Indian major carp stocks, a demonstration on aqua culture was undertaken at Govindsagar reservoir. Under this rohu and catla fry (25-30 mm) were reared up to 100 mm fingerlings. A total of 30,583 fingerlings were stocked in the reservoir.

Carp culture: A demonstration programme was undertaken in Tripura and Mizoram. Demonstration results indicated a fish yield of 2,300 to 3,800 kg/ha/7 months period from benchmark level of 1.5 to 2.0 tonnes/ha/yr.

Integrated farming system: Carp-cum-poultry and carp-cum-pig integrated farming demonstrations are in progress respectively of 0.25 and 0.95 ha each in four ponds in Mizoram state.

Giant freshwater prawn hatchery: The technique of water-quality management was refined using probiotics, by phasing out traditional chlorination method. This helped in elimination of antibiotics. This was demonstrated to private entrepreneurs in training programme on Management of giant freshwater prawn

hatchery and grow-out systems.

Prospective technology

A breeding programme on giant freshwater prawn, *Macrobrachium rosenbergii*, was undertaken in backyard hatchery at the CIFE, Mumbai. In this natural broodstock were collected from Maharashtra, which produced 2.75 lakhs seed. The seeds were supplied to Madhya Pradesh, Andhra Pradesh and Goa. The seed will be grown to broodstock and will be supplied to private hatcheries in Andhra Pradesh for improvement.

NATIONAL DAIRY RESEARCH INSTITUTE, KARNAL

Development of process for herbal ghee

Ghee is a fat-rich dairy product, widely used in India since time immemorial. It has been an integral part of our culture. It is mainly used as food and flavouring ingredient. But ghee contains cholesterol, which is one of the suspected culprits in arteriosclerosis. Hence health-



Arjun ghee (Herbal)

conscious people are scared of taking ghee. To alleviate this fear, the present study was undertaken to develop a process for functional ghee, i.e. Arjuna ghee, with functionalities like resistance to heart diseases and property to regulate blood pressure. The product-development work was carried out in phases, i.e. screening of raw materials to be used, process optimization, sensory and physico-chemical characterization of the product and estimation of phytosterol level (which is one of the key constituents of Arjuna that competes with cholesterol in the body in their absorption). The level of herb and other ingredients was optimized using Central Composite Rotatable Design (CCRD) of Response Surface Methodology using Design Expert software. Based on sensory responses generated for different levels of ingredients, the final

product formulation was developed. The developed ghee has been found sensorily similar to market ghee. It had overall acceptability score of 85.1 compared with 90.84 of the control. It complied with all the conditions laid down by PFA and AgMark (BR reading 42, moisture 0.13%, FFA 0.362%, RM value 28.2). The Arjuna ghee was found highly stable (8 days at 80°C) compared with the control ghee (2 days at 80°C), because its extract contains several antioxidants like polyphenols and terpenoids in addition to phytosterol, which are beneficial in cardio-vascular diseases (CVD) and blood pressure. Thus Arjuna ghee can be consumed instead of normal ghee to reduce the risk of CVD and to boost up our immune system.

(Rajanikant and G.R. Patil)

UNIVERSITIES

A Profile

ASSAM AGRICULTURAL UNIVERSITY, JORHAT

Establishment

Assam Agricultural University is the first institution of its kind in the whole north-eastern region of India. It was established on 1 April 1969 under The Assam Agricultural University Act, 1968 (Assam Act XXIV of 1968). The erstwhile Assam Agricultural College at Jorhat and Assam Veterinary College at Khanapara, Guwahati were merged with this university.

Objectives

- Making provision for imparting education to people in agriculture and allied branches of learning,
- Furthering advancement of learning and pursuance of research in agriculture and allied sciences, and
- Undertaking extension of such sciences especially to rural people of the state.



Assam Agricultural University

Faculty of Agriculture

Agricultural Biotechnology**	Entomology**
Agric. Economics & Farm Management**	Extension Education**
Agricultural Statistics*	Horticulture**
Agricultural Engineering	Nematology**
Agricultural Meteorology	Plant Breeding & Genetics**
Agronomy**	Plant Pathology**
Animal Husbandry & Dairying	Soil Science**
Biochemistry & Agricultural Chemistry**	Sericulture*
Crop Physiology*	Tea Husbandry & Technology*

Faculty of Home Science

Child Development & Family Relations*	Food & Nutrition**
Clothing & Textiles*	Family Resource Management*
Extension Education*	

*Offers B.Sc./B.V.Sc., M.Sc./M.V.Sc. degree programmes; * offers Ph.D. degree programme;

* offers degree in Master of Business Administration (Agriculture-Business); * offers only M.Sc. degree programme

Constituent colleges and degree programme

College of Agriculture, Jorhat (1948)

Programme / Duration / Intake: B.Sc. (Agric.): 4 years, 140 seats; M.Sc. (Agric.): 2 years, 10 seats in each Dep.*; MBA (Agric.): 2 years, 10 seats; (Business): 2 years, 4 seats; M.Sc. (Sericulture); Ph.D.: 3 years, 4 seats in each Dep.**

College of Home Science, Jorhat (1973)

Programme / Duration / Intake: B.Sc. (H.Sci.): 4 years, 40 seats; M.Sc. (H.Sci.): 2 years, 5 seats in each Dep.*; Ph.D.: 3 years, 4 seats in each Dep.**

College of Veterinary Science, Khanapara, Guwahati (1948)

Programme / Duration / Intake: B.V.Sc.: 5 years, 100 seats; M.V.Sc.: 2 years, 10 seats in each Dep.*; Ph.D.: 3 years, 4 seats in each Dep.**

Biswanath College of Agriculture, Biswanath, Chariali (1988)

Programme / Duration / Intake: B.Sc. (Agric.): 4 years, 30 seats.

Lakhimpur College of Veterinary Science, Lakhimpur (1988)

Programme / Duration / Intake: B.V.Sc.: 5 years, 20 seats.

College of Fisheries Science, Roha, Nagaon (1988)

Programme / Duration / Intake: B.F.Sc.: 4 years, 20 seats.

* PG departments; ** Departments offering Ph.D. courses

Faculty of Veterinary Science

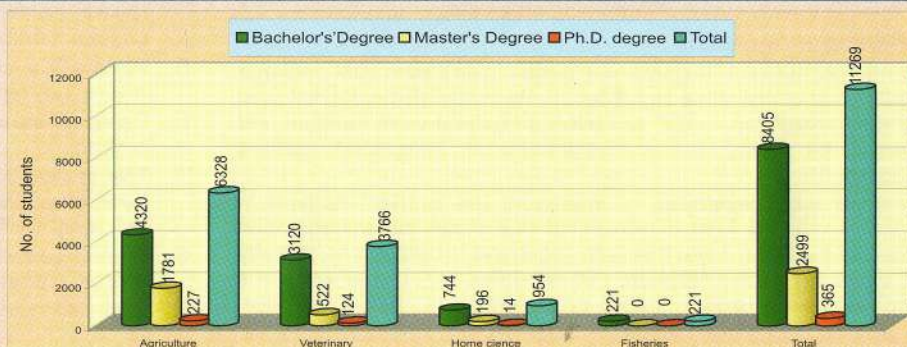
Animal Genetics & Breeding**	Vet. Science Medicine, Public Health and Hygiene**
Animal Nutrition**	Veterinary Microbiology**
Animal Production & Management**	Veterinary Parasitology**
Extension Education*	Veterinary Pathology**
Poultry Science**	Veterinary Pharmacology & Toxicology*
Veterinary Anatomy & Histology**	Veterinary Physiology**
Veterinary Gynaecology and Obstetrics & A.I.*	Veterinary Surgery & Radiology**

Faculty of Fisheries

Aquaculture	Fish Extension Education
Fish Biology	Fish Technology & Engineering
Fish Economics & Management	Hydrograph

Post-graduate studies

The Directorate of Post-graduate Studies has 15 departments in Faculty of Agriculture, 14 in Faculty of Veterinary Science and 5 in Faculty of Home Science. The admission to the PG degree programme is based on merit determined by the performance in entrance test and previous academic records of students, except for those sponsored by the ICAR. Till December 2004, the university produced 2,864 post-graduates, out of which 2008 in Agriculture, 646 in Veterinary science and 210 in Home Science (Fig.1).



Research

The Directorate of Research (Agric.) and Directorate of Research (Vet Sci.) headquarters at Jorhat and Khanapara respectively.

Table 4. Research stations

Research station	Agro-climatic zone	Thrust area
Regional Agricultural Research Station		
RARS, Titabar	Upper Brahmaputra Valley Zone	Rice
RARS, Shillongani	Central Brahmaputra Valley Zone	Pulses, oilseeds, jute and wheat
RARS, Gossaigaon	Lower Brahmaputra Valley Zone	Field crops
RARS, Lakhimpur	North Bank Plains Zone	Deep-water rice, diaraland
RARS, Diphu	Hills Zone	Hill agriculture, rice and vegetables
RARS, Karimganj	Barak Valley Zone	Rice, vegetables
Commodity Research Station		
Horticultural Research Station, Kahikuchi		Fruits and vegetables
Sugarcane Research Station, Buralikson		Sugarcane
Citrus Research Station, Tinsukia		Citrus crops
Coconut Research Station, Kharua		Coconut
Livestock Research Station, Mandira		Livestock
Goat Research Station, Burnihat		Goat

Research Output or Technology

Research in Crop Science

Varieties: Developed 40 rice varieties suited to diverse rice-growing situations and farmers' needs. Among these, rice varieties Ranjit, Bahadur, Kushal, Luit, Bishnuprasad, Jyotiprasad, Satya, Basundhara, Keteki etc. are the prominent. The prominent varieties in other crops are: TS 36, TS 38 and TS 48 rapeseed; AAUDT 9304-14-4 sesame; AAU 34, AAU 36 and Pratap greengram; COBLN 9101, COBLN 9102, COBLN 9103, COBLN 9104, COBLN 9105 in sugarcane; JC 1, JC 2, JC 3, JC 4, JC 5, JC 6, JC 7, JC 8 and JC 9 brinjal; AAU J1, AAU J2 and AAU J31 ridge gourd; AAUC 1, AAUC 2, AAUC 3 and AAUC 4 cucumber; Bilahi 1 and Bilahi 2 tomato; Bireek 1 and Bireek 2 chilli; and Kamrupa coconut.



Bishnuprasad a promising boro variety



Bahadur, a promising sali rice variety

Cultural management

Cultural practices have been formulated for all the major field and horticultural crops of Assam and recommended to the farmers, e.g. technology for mixed cropping of direct-seeded upland *ahu* and deep-water rice; staggered planting of *sali* rice; technology for late-planted *sali* rice in the flood-prone situation; technology for rice planting in hilly slopes, identification of cropping sequences for different farming situations, recommendations of irrigation schedules for major crops; integrated nutrient management for both cropping systems and individual crops; recommendations of improved practices alternative to jhum for higher production as well as to maintain the fertility status of jhumming areas etc.

Nutrient management

Among successful INM packages, biofertilizer-based INM package for *sali* rice is of immense significance. Recently efficient isolates of *N*₂-fixing *Azospirillum* and P-solubilizing bacteria were isolated and screened for using as a component of integrated nutrient management.

A method was developed of improving the nutrient content in compost produced from a mixture of rice straw, other vegetation biomass of the farm, water hyacinth, leguminous tree leaves, marshy peat, cowdung, rock phosphate and rice-husk ash. Use of consortia of cellulose-degrading micro-organisms as decomposition

accelerator could produce good-quality compost within 60-90 days.

Plant protection

- In most of the crops, varieties with resistance to the major pests and diseases was identified or developed, e.g. SG 1 greengram against *Cercospora*; JRO 524 and Sel 2 jute against rot; RK 8605 mustard against alternaria blight; Moran ginger against soft rot; Suryamukhi chilli against fruit rot; JC 1 and JC 2 brinjal, and AAUM 1 and AAUM 2 chilli against bacterial wilt; and AAUJ 1 and AAUJ 2 and AAUJ 3 ridge gourd against downy mildew.
- An IPM package for *sali* rice against the major insect pests has been widely tested.
- Control of leaf-folder of rice by application of *Bacillus thuringiensis* has been achieved
- Biocontrol of sheath blight of rice through seed treatment with *Trichoderma harzianum* and control of rice hispa with fungus *Beauveria bassiana* have been achieved.
- Pseudomonas fluorescens*-based bio-formulation Biofor-pf has been developed for efficient control of bacterial wilt of tomato and brinjal.
- Successful control of water hyacinth by field release of exotic weevil *Neochetina eichhorniae* and *N. bruchi*.
- Growth of nursery tea plants has been found affected by the status of the mother plant, the type of seed, storage period of seed and moisture regime of soil. Gamma-rays, callus culture and growth-regulators have proved potential tools for improving the quality of young tea. Pegging has been established to be a good method in young-tea management with better yield. Requirements of mulching, shade and optimum tea population per unit area in respect of yield, nutrient and moisture uptake as well as shoot and root grown have been established.



Biological control of bacterial wilt of tomato with Biofor-pf

Apiculture

Indian honeybee (*Apis mellifera*) is introduced successfully in the state and suitable management practices for its multiplication and commercial bee-keeping are evolved. Control measure for nosema disease has been developed.

Agricultural engineering

Manual bucket pump, fruit-harvesting device, reversible mouldboard plough, mouldboard plough, low-cost power tiller and wetland paddy weeder (of different sizes) have been developed.



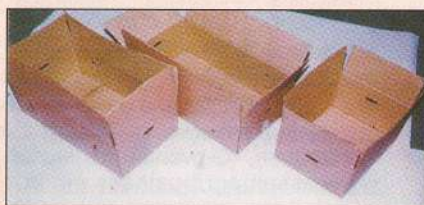
High-density banana planting with three suckers in a pit

Horticulture

- Development of remedial measures for pulp hardness in Malbhog banana.
- Citrus-rejuvenation procedure has been developed.
- Recommendations for year-round vegetable and flower cultivation under low-cost polyhouse.
- Standardization of paddy-based vegetable cropping sequence (paddy-frenchbean-cucumber for upland situation and paddy-chilli for medium lowland situation).
- Twenty-four cultivars of different tuber crops have been tested and recommended for Assam.
- Rapid-multiplication protocol standardized for *Anthurium* and orchids.
- The technique of off-season flowering of chrysanthemum has been standardized by manipulating photoperiod with the use of indigenously developed low-cost dark chamber.
- Weaning food-preparation technique from banana cv. Bhimkal has been patented.
- Natural food colourants developed from some locally available plant

sources like mulberry, melastoma, *jamun*, banana, annatto etc.

10. Developed an evaporative cooling structure (portable cool pot) for storage of horticultural produce, especially for rural areas.
11. Designed transportation box (CFB) for long-distance transportation of oranges, tomato and pineapple.
12. Method of shelf-life increase in pineapple has been formulated.
13. On-farm storage method of seed potato (thatched house with the infrastructure raised above the ground) has been standardized and recommended.



CFB box for transporting pineapple

Biotechnology

1. Micro-propagation technology has been perfected for Khasi mandarin, Assam lemon, orchids, banana, turmeric, ginger, *kadamb* and bamboo.
2. DNA fingerprints of many indigenous rice varieties have been established using RAPD markers.
3. *Agrobacterium*-mediated transformation protocols have been standardized in rice, chickpea, blackgram and citrus, and transgenic chickpea with resistance against storage pests has been obtained.

Research in home science

1. Improved women-friendly tools have been developed for reduction of drudgery in sun-drying of rice and plucking of tea leaves.
2. A cottage scale process for making *hurum*, a traditional waxy rice product of Assam, was developed in flaked rice mill, which helps in its commercialization.
3. A comprehensive intervention package for children has been developed.
4. A multimedia kit on storage of paddy has been developed.
5. Four natural dyes from bark of *arjun* (*Terminalia arjuna*), *tepor tenga* (*Garcinia xanthochymus*), *Bahat* (*Artocarpus lakoocha*) and flower of *titaphul* (*Phlogacanthus thyrsoiflorus*) have been identified for dyeing of cotton and silk yarn.
6. Nutritional composition of commonly used Assamese diet has been assessed to prepare a software for nutrition guide.



Transgenic chickpea harbouring 35S

Research in veterinary science

1. Two improved breeds of pig have been developed by crossing Hampshire(H) pigs with indigenous sows (I). The crossbreeds inherit 50% and 75 % of traits from exotic breeds.
2. By crossing local breeds of goats with Beetal, two goat breeds have been developed with 50% and 75 % blood from Beetal. These breeds are found to be suitable under the agro-climatic condition of Assam and are better in respect of growth and feed conversion than local goats.
3. Type characterization and breed descriptors for indigenous germplasm of swamp buffalo (*Bubalus carabanesis*), Miri fowls and Nageswari duck of Assam have been completed.
4. Chemical composition and nutritive value of different unconventional forages, agro-industrial or forest by-products, and waste from sericulture industry have been evaluated, and the level of incorporation of these materials in the feeds for various ruminant and non-ruminant species has been standardized. Procedure for improvement of poor-quality roughage by



Pig breed with 75% genes from Hampshire

ammonia treatment of straw has been developed and released for farmers' use.

5. Multiple Ovulation and Embryo Transfer (MOET) technology for production of multiple embryos from elite female under agro-climatic conditions of Assam has been standardized. Embryo transfer technology (ETT) protocols for goat and cattle have been developed and released. Total 35 kids and 3 calves have been produced through ETT. Scientists of this university successfully demonstrated kidding following transfer of post-thawed vitrified embryos to foster mother.
6. A new, low-cost technique was developed for embryo-freezing using specially designed appliances (60 cm long thermometers, straw-holder and special tube).
7. A novel technique of training boars for semen collection over dummy was developed, using an audiotape of gilt sound.
8. A modified method of collection of semen from smaller breeds of goat and goat semen-freezing technique using thermocol box and a modified freezing rack have been developed.
9. Technologies with hormonal and mineral intervention have been developed to overcome the problems of delayed puberty, post-partum anoestrus and repeat breeding with additional problem of longer intercalving period in dairy cows. Zone-specific mineral mixtures have been formulated to improve productive and the reproductive performances of various species of livestock.
10. A simple technique of craniotomy has been developed with modified H-shaped skin incision for the surgical removal of coenurus cyst in goat.
11. A local strain of Duck Plague Virus (DPV) has been isolated as vaccine candidate and handed over to IVBP, Government of Assam for mass production.
12. Salmonella toxoid vaccine against poultry *Salmonellosis* and KSCN extract vaccine of *Pasteurella multocida* have been developed.
13. *Musca pattoni*, which carries the larval stages of *Stephanofilaria assamensis*, was reported for the first time in the country. A number of metacercaria of zoonotic importance have been recorded for the first time in fish commonly available in Assam.

Research in fisheries science

1. Semi-intensive composite carp-culture technology has been developed, with a yield potential of 4,000 kg/ha/year.
2. Post-flood culture of carps with yield potential of 1,500 kg/ha/6 months has been developed.
3. Two low-cost carp-hatchery models (capacity 2 million spawn/operation), one for rural entrepreneurs and other for resource-poor farmers were developed.
4. Technologies for integrated pig-fish farming, fish-duck farming, fish-poultry farming, fish-pig-poultry farming, rice-fish farming, horti-fish farming and fish-cattle farming with a range of 3,500-6,000 kg fish ha/year were developed and recommended for farmers.
5. Prophylactic measures against Epizootic Ulcerative Syndrome (EUS) were developed and demonstrated.
6. A package of therapeutic measures for prevention and treatment of mostly observed common diseases of farmed fish was developed.
7. Technologies for induced breeding of magur (*Clarias batrachus*), cheniupathi (*Puntius sarana*), indigenous ornamental fishes, freshwater prawn and *singi* (*Heteroptneuptes fossilis*) were developed.
8. Six feed formulae for carps were developed.
9. Twenty-three plants having piscicidal properties have been identified.
10. A technology package of high-density rearing of carps with intensive feeding and aeration was developed. The university has developed a low-cost model of pond aerator for small ponds that are not suitable for adoption of semi-intensive technology.

Extension education

The Directorate of Extension Education, Jorhat offers four broad services, viz. training and skill development, advisory services, demonstration, information and publications. It has 14 Krishi Vigyan Kendras (KVKs) located in 14 districts of the state. These are involved in evaluation and validation of new training curriculum and methodologies. Some more KVKs have also been approved by the

ICAR for the State of Assam to strengthen the extension activities of the university, which will start functioning very shortly. Farm Women Training Centre (FWTC) and Extension Education Institute (EEI) at Jorhat impart training on



Agricultural Technology Information Centre (ATIC)

management aspects to research and extension personnels of North-East India. The EEI has active collaboration with MANAG, Hyderabad. Recently, the university established an Agricultural Technology Information Centre (ATIC) at Jorhat campus for single-window delivery system of input and information to the farmers. The ATIC has video conferencing facility also. It has digitalized the ATIC. The improved recommended technologies and posted on its website, university also participated in ASHA (a hope for farm prosperity), a web portal with URL www.assamagribusiness.nic.in launched by the Assam Small Farmers' Agribusiness Consortium, Guwahati for providing ICT-based agribusiness services.

Library

The university has a central library at Jorhat, with units in all the constituent colleges and stations. The central library at Jorhat has 96,149 books and back volumes, whereas the library at the College of Veterinary Science, Khanapara has 25,224 books and 35,042 back volumes. In addition, the central library provides reprographic facilities and inter-library loan service, has CD-ROM database like AGRIS, CAB Abstracts, Current Contents and Focus on Veterinary Medicine. In addition, the Cybercafé facility for browsing information on Internet is also available. The Colleges of Agriculture, Home Science and University headquarters are networked through LAN and the facilities of Internet on on-line journals are available up to department level.

Student welfare

The student-welfare activities of the university are co-ordinated by a Directorate of Students' Welfare, co-curricular activities, extra-curricular activities, extension and social service through National Service Scheme (NSS), hostel management, student housing, and the students' training and placement.

New initiatives

1. Introduced common academic regulations developed by the ICAR w.e.f. the Academic Session 2003-04 in Post-graduate programme of the university.
2. Curricula and syllabi developed by the ICAR for the Masters' degree programmes in Home Science and Agriculture have been introduced.
3. Master of Business Administration (MBA in Agri-business) has been introduced in the Dep. of Agricultural Economics.
4. Two post-graduate diploma courses on Early Childhood Care and Education, and Interior Enrichment are in the process of implementation in the College of Home Science.
5. Cyber cafe for the students has been introduced to give them access to the internet.
6. The website of the university www.aau.ac.in has been designed and hosted in the university server and is being updated at regular intervals.
7. Available bibliographic databases in CD-ROM format are now made available online to the users.
8. Suitable software to computerize payroll has been developed and is now being tested.
9. A computer network under Agricultural Research Information Service (ARIS) with financial support from the ICAR has been established at Jorhat campus. Presently it connects all the departments in the College of Agriculture and Home Science, directorates and the administrative building at Jorhat campus through LAN for providing e-mail and internet facilities. In the second phase, research and extension stations of the university are planned to be interconnected through modem for providing e-mail and internet facilities.
10. An Intellectual Property Rights (IPR) Cell has been set up in the university as per the suggestions of the ICAR.

11. The entire research-management system of the university has been restructured.
12. Constant efforts are on to address the emerging needs like organic farming; INM, IPM, complete mechanized cultivation, mass production of bio-fertilizer and bio-agents, and quality seed production of various crops.
13. Agricultural Technology Information Centre (ATIC), equipped with most modern facilities like video conferencing has been established.
14. The university is a partner for the ASHA (a hope for farm prosperity) initiative of Assam Small Farmers' Agribusiness Consortium, Guwahati to launch a web portal with URL www.assamagribusiness.nic.in.

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ASSAM AGRICULTURAL UNIVERSITY, JORHAT

Field release of *Puccinia spegazzinii*

The limited field release and establishment of *Puccinia spegazzinii*, a classical biological control agent of *Mikania micrantha* is done under the tea ecosystem of Assam university. Thus India has become the eighth country in the world to release any plant pathogen internationally for the CBC of an invasive weed in continental Asia. This is also the first time that a fungal pathogen is being used as a CBC for *M. micrantha* in India.

In a project work funded by DFID, UK, an international workshop on the project (ICAR-CABI-AAU collaboration) was held on 28 November 2005 at AAU, Jorhat. Dr Carol Ellison, Plant Pathologist, CABI, UK; Dr S.T. Murphy, Ecologist and Policy Adviser, CABI, UK; and Dr R.J. Rabindra, Director, Project Directorate of Biological Control, Bangalore, were present at the workshop attended by 35 scientists from different institutes.

DR BALASAHEB SAWANT KONKAN KRISHI VIDYAPEETH, DAPOLI

Appointment of Dr S.S. Magar, as Member, AIU Standing Committee

Dr S.S. Magar, VC, DBSKKV, Dapoli was appointed Member of the Standing Committee, Association of Indian Universities by Prof. Vachaspati Upadhyaya, President, AIU and VC, Shri Bahadur Shastri Rashtriya Sanskrit Vidyapeeth, New Delhi.

DR Y.S. PARMAR UNIVERSITY OF HORTICULTURE AND FORESTRY, NAUNI

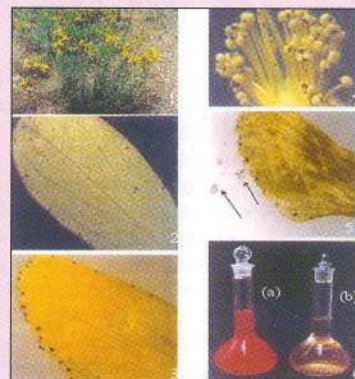
Two patents granted

Recently two patents have been granted to the university. One is for inventing a cheaper method for estimation of volatile residues like chloroform in foodstuffs. The method was developed by Dr Amit Nath, Dr S.K. Pati and Dr J.K. Dubey of the Department of Entomology and Apiculture. The patent is in force in 88 designated countries, in addition to grant of a European patent in two countries, QAPI patent in 16 countries, ARIPO patent in 13 countries and Eurasian patent in nine countries.

Another patent was granted to the university on the use of an extract of *Asparagus adscendens* for elimination of plant viruses. This is an Indian patent and the extract is useful for elimination of plant viruses from *in vitro*-infected cultures. Being a bio-friendly approach, the technology has wide applications. The inventors of this technology are Dr S.V. Bhardwaj, Dep. of Biotechnology, Dr Anil Handa, Dep. of Mycology and Plant Pathology, and Dr Manisha Mangal, presently working with SKUAST, Jammu (J&K).

Hypericin in glands of *Hypericum perforatum*

Hypericum perforatum, commonly known as St John's Wort, is an important antidepressant medicinal plant. Its antidepressant activity attributed to the active content hypericin. The plants are characterized by the presence of dark coloured secretory glands on petals, leaf margins and anthers. During our investigation in this species, these dark-coloured glands when punctured



Hypericin glands

secreted a red-coloured fluid. On chemical investigation this red-coloured fluid was identified hypericin.

KERALA AGRICULTURAL UNIVERSITY, THRISSUR

Dr T.R. Gopalakrishnan, Fellow of ISVS

Dr T.R. Gopalakrishnan, Associate Professor and Head, Department of Olericulture, was nominated Fellow of Indian Society of Vegetable Science, Varanasi.



Dr T.R. Gopalakrishnan

MAHARANA PRATAP UNIVERSITY OF AGRICULTURE AND TECHNOLOGY, UDAIPUR

New recommendations in package of practices

The summary of recommendations passed under package of practices during *rabi* 2005-06 are given below.

Wheat: Raj 4037 variety for normal sowing under adequate irrigation situation (zones IV a and IV b) HI 8627 for early to normal sowing under restricted irrigation and low-fertility status conditions (zone IV a). Application of ferrous sulphate @ 25 kg/ha in iron-deficient soils (zone V).

Chickpea: Varieties Pratap Channa 1 and GNG (Zone IV b). Kabuli chickpea variety KAK 2 (Zone IV b). Application of 45 kg potassium and 25 kg ferrous sulphate at the time of sowing (zone V).

Rajmash: Complete package of rajmash (sowing date, spacing, weed management, irrigation management and fertility management).

Fennel: Application of irrigation at IW: CP ratio of 1, i.e. 6 irrigations, first two irrigations at 15-20 days interval and the rest four irrigations at 20-25 days intervals (zone V). Application of nitrogen @ 90 kg/ha (zone V).

Sugarcane: Application of hexazinon (46.8%)+diuron (13.2%) mixture 1.2 kg/ha at pre-emergence followed by one hoeing at 90 days stage of the crop for efficient weed control (zone IV a). Application of *Azotobacter* and PSB @ 1 kg each/ha along with 20 tonnes crop residue of sugarcane with 100 % recommended dose of fertilized for ratoon of sugarcane (zone IV a).

Mustard: Variety Laxmi (zone IV b). Seed treatment with imidachloprid 7 g/kg seed for control of sawfly and painted bug (zone IV a).

Garlic: Application of methyl demeton 25 EC @ 1 ml or imidachloprid 17.8 SL @ 0.2 ml or dimethoate @ 1 ml/litre for control of thrips; if required the spray should be repeated after 15 days (zone V).

Isabgol: Application of three irrigations (at primary stage of tillering, complete tillering and at 75% flowering stages) and two sprays of brassinosteroid 0.4 ppm (initial stage of flowering and 20 days after first spray) (zone IVa). To control downy mildew disease, sowing in third week of November (zone IVa).

Safed musli: Sowing of safed musli on ridges of 7 inches height at a distance of 30x15 cm (zone IV a).

Opium: To control downy mildew, sowing in the last week of October. Application of sulphur dust @ 40 kg/ha and potassium @ 40 kg/ha after field preparation. Seed treatment with apron 35 SD @ 8 g/kg seed and spray of metaloxyl MZ (0.2%) @ 35, 55 and 75 days after sowing (zone IV a).

Other recommendations: Technology for use of bonemeal for phosphorus in different crops (zone IV a). Use of phosphate-rich organic manure for supply of phosphorus in different crops (zone IV a).

MARATHWADA AGRICULTURAL UNIVERSITY, PARBHANI

Prof. Sunita Kale receives best-poster presentation award NRMELSI

The paper entitled Utilization of flame of forest flowers as source of eco-friendly natural dye, presented by Prof. Sunita Kale, Senior Scientist, Clothing and Textiles, AICRP on Home Science, MAU, Parbhani was adjudged the best poster presented under the theme National Resource Management. The conference was organized by Central Soil and Water Conservation Research and Training Institute, Udhagamandalam (Ooty) and Indian Association of Soil and Water Conservationists, Dehra Dun during 24-25 November 2005 at Tamizhagam,



Prof. Sunita Kale receiving award

Udhagamandalam. Dr V.N. Sharda, Director, CSWCRTI, Dehra Dun, presented her the award.

Empowerment of rural girls for self-care and family life

The Department of Child Development, College of Home Science, MAU, Parbhani launched an innovative research scheme on empowering the rural girls for self-care and family life in collaboration with Department of Women and Child Welfare, Zilla Parishad, Hingoli 700 villages of Hingoli district. For this purpose 40 trainers or research teachers were given intensive residential training at MAU campus during 5-15 November 2005.



Members at training programme

NAVSARI AGRICULTURAL UNIVERSITY, NAVSARI

First convention

Dr (Mrs) Manju Sharma, former Secretary to the Government of India, Department of Biotechnology, and at present President and Executive Director, Indian Institute of Advanced Research, Gandhinagar in her convocation address laid emphasis on the potential of agricultural biotechnology to help our future needs of food and fibre, for sustainable development and environment improvement through abatement of pollution.



First convention

Shri Bhupinder Singhji Chudasama, Agriculture Minister, Government of Gujarat stressed on increase in production and doubling the farmers' income along with reduction in input cost. He felicitated the university scientists for developing the soil-health card for the farmers of Gujarat, which has helped achieve sustainable production.

Hon'ble Shri Nawal Krishore Sharma, Governor of Gujarat and Chancellor, appreciated the work done by NAU chiefly Charcha Sabhas and Vichar Gosthies with farmers in villages of south Gujarat.

The VC, Dr R.P.S. Ahlwat mentioned the pioneering work being done in various disciplines. He also highlighted the new initiatives of post-harvest technology, biotechnology, information technology, biological control and aquaculture. The dignitaries released some books, viz. *Water Management Technology: Compilation, Impact of Krushi Mahotasava 2005* (Gujarati), *Horticulture Crops* (Gujarati) and *Annual College Magazine*.

SHER-E-KASHMIR UNIVERSITY OF AGRICULTURAL SCIENCES AND TECHNOLOGY, JAMMU

Recent trends and innovations in animal reproduction

The XXI Annual Convention of the Indian Society for Study of Animal Reproduction and National symposium on Recent trends and innovations in animal reproduction was organized by the Division of Animal Reproduction, Gynaecology and Obstetrics, Faculty of Veterinary Sciences and Animal Husbandry, during 23-25 November 2005. H.E. Lt. Gen. (Retd) S.K. Sinha, PVSM, Governor, Jammu and Kashmir State was the Chief Guest, and Prof. Nagendra Sharma, VC, SKUAST-J presided over the function. He stressed upon the need to conserve germplasm and exploit natural resources for enhancing the reproductive efficiency and improving the livestock productivity by application of animal reproductive biotechniques, which are emerging as new compulsion to meet the ever-increasing demand of protein or food for the increasing population. In the symposium 273 delegates from all over India participated. In total 25 lead papers, 140 oral presentations and 145 poster presentations were made during 10 scientific sessions. In each technical session, one young scientist was given the Best Presentation award. A session on Dr S.N. Luktuke Extempore



Lt. Gen. S.K. Sinha, inaugurating the symposium and convention

Presentation by the young scientists was also conducted. To enhance the conception rate in dairy animals, it was resolved that only proven and outstanding bulls should be introduced for A.I. and vigorous screening should be done at early age. Moreover, only skilled inseminators should be allowed to go in for A.I. It was also resolved that work on equine reproduction should be encouraged.

Mineral imbalances in livestock and their impact on animal health and production

The Faculty of Veterinary Sciences and Animal Husbandry organized symposium and workshop on Mineral Imbalances in Livestock and their impact on Animal Health and production in Jammu & Kashmir State during 8-9 December 2005. It was co-sponsored by Jammu & Kashmir Council for Science and Technology. Dr Nagendra Sharma, VC, inaugurated it and Dr Mohammad Deen, Secretary Department of Animal Sheep Husbandry, Government of J&K, presided. Dr Sharma emphasized the importance of minerals and their impact on animal health and production. He informed that a large number of livestock in India are reared on the feed and fodder that does not meet the requirement of many minerals. Approximately 35-40 % cattle and buffaloes are deficient in calcium and phosphorus. Another major problem in J&K state is of fluorine toxicity in men and animals in the districts of Doda and Kathua. Faculty members, veterinary doctors and officers from the Department of Animal Husbandry and Sheep Husbandry, Jammu participated in the symposium and workshop. Expert lectures were delivered by Dr Donald Oberleas, Professor Emeritus, Texas Technical University, the USA as well as by various other eminent scientists from national institutes and universities working on mineral metabolism of animals.

UNIVERSITY OF AGRICULTURAL SCIENCES, DHARWAD

Krishi Mela and National Agricultural Machinery Exhibition

The UAS, Dharwad organized Krishi Mela 2005, from 29 September to 2 October 2005. Along with this, National Agricultural Machinery Exhibition (NAME, 2005) was also organized in association with the Department of Agriculture, Government of Karnataka. This annual mela attracted more than 3 lakh farmers, scientists, extension personnel and officers of various development departments and NGOs, representatives of various input-dealing agencies of organizations etc. from various parts of the country. An Animal Show was also arranged on crossbred cows, pure breeds of buffaloes, dog etc.

AWARDS AND RECOGNITION

NATIONAL DAIRY RESEARCH INSTITUTE, KARNAL

Dr Ruplal Choudhary, Senior Scientist, Dr K. Narsaiah, Scientist (Senior Scale), Shri S.K. Makker, Senior Scientist (Selection Grade), Dairy Engineering Division and Dr B.B. Verma, Principal Scientist, Dairy Technology Division were conferred first prize for their poster paper titled Evaporation rate of sugar syrup in a continuous rasogolla cooker, presented at the 3rd National Convention of Dairy Engineers on Engineering Intervention: Quality Milk Processing, at NDRI, Karnal on 19 November 2005.

ASSAM AGRICULTURAL UNIVERSITY, JORHAT

METOS award to Mrs Katakay

Mrs Madhusmita Katakay, Research Associate, Agrometeorological Advisory Services, Regional Agricultural Research Station, AAU, Diphu was conferred the prestigious METOS Award 2005 for best presentation of AAS report at the 14th Annual review workshop of AAS, NCMWEE, Department of Science and Technology, held during 30 November to 2 December 2005 at AAU, Jorhat.



Mrs Madhusmita Katakay

JUNAGADH AGRICULTURAL UNIVERSITY, JUNAGADH

Gold medal in PG

A Gold medal was awarded for overall performance at post-graduate level

each to Shri Prajapati Girish Kumar in the Faculty of Agricultural Engineering and to Shri Patel Chirag A in the Faculty of Agriculture for the year 2004-05.

KERALA AGRICULTURAL UNIVERSITY, THRISSUR

HIS gold medal

Dr P.K. Rajeevan, Associate Professor and Head, Department of Pomology and Floriculture, College of Horticulture, KAU has been awarded Gold Medal for his contribution and leadership in Floriculture in 2005.



Dr P.K. Rajeevan

PUNJAB AGRICULTURAL UNIVERSITY, LUDHIANA

Award to Dr Baldev Singh Dhillon

Dr B.S. Dhillon, Director of Research, PAU was bestowed with Dr Joginder Singh Memorial Award for outstanding research in Maize Genetics and Breeding for the biennium 1997-98 at the 4th International Food Legumes Research Conference held during 18-22 October 2005 at New Delhi.



Dr Baldev Singh Dhillon

Honour to Dr S.S. Guraya

Dr Sardul Singh Guraya, former Dean, College of Basic Sciences and Humanities, PAU, was honoured with Doordarshan Panj Pani Award, 2005 by Prasar Bharati (Broadcasting Corporation of India) for his excellent services in the field of Science and Technology.

Best Research Paper Award

Dr Gulshan Mahajan, Assistant Agronomist and Dr K.G. Singh, Research Engineer, Department of Soil and Water Engineering, have bagged the Best Paper Award at the International Conference on Plasticulture and Precision Farming, 2005. The conference was organized under the auspices of Ministry of Agriculture, Government of India during 17-21 November 2005.

The paper entitled Response of greenhouse tomato to drip irrigation and fertigation highlighted that the greenhouse tomato crop is profitable and gives additional net return of Rs 68,800/ ha over open-field tomato crop. In the greenhouse environment, tomato yield could further be increased up to 93.2 tonnes/ha when the water and nitrogen are applied through drip irrigation compared with 58.4 tonnes/ha under surface irrigation method. The new method also saved water up to 48 %. The greenhouse tomato crop matured earlier than the open-field crop and gave 22-25 more pickings in addition to improvement in quality in terms of uniform size, total soluble sugar and ascorbic acid content.

Honours for PAU Alumni

Shri Megh Raj Goyal, alumni of College of Agricultural Engineering (1971 batch) was honoured with the title Father of Irrigation Engineering in Puerto Rico, by The Puerto Rico Chapter of American Society of Agricultural Engineers, at its Annual Meeting held recently at University of Puerto Rico. Dr Megh Raj Goyal is working as a Professor of General, Agricultural and Bio-medical Engineering at University of Puerto Rico, Colegio. He has published more than 180 papers in professional journals; two bibliographies on drip irrigation; a text-book *Management of Drip Irrigation* (Spanish) and four books on Biomechanics engineering of human body.

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