Proceedings of Sixth Annual Review Meeting of Niche Area of Excellence

The VI annual review meeting was organized under the chairmanship of Dr. S. Ayyappan Secretary, DARE & DG, ICAR on 21st June, 2012 at 9:00 AM in the DG's committee room, Krishi Bhawan.

In addition to the PIs and Co-PIs of the various NAE centres, the following ICAR officials and resource persons participated in the meeting:

1. Dr. P. L. Gautam, Chairperson, PPVFRA, New Delhi
2. Dr. Arvind Kumar, DDG (Edn.)
3. Dr. M. M. Pandey, DDG (Engg.)
4. Dr. Meenakumari, DDG (Fy.)
5. Dr. K.M.L. Pathak, DDG (AS)
6. Dr A. P. Singh, VC, DUVASU, Mathura
7. Dr. R. P. Sharma, Former Director, NRCPB
8. Dr. H. S. Gupta, Director, IARI
9. Dr. Ashok Bhatia, Ex-Advisor, CSIR
10. Dr. C. Devakumar, ADG (EPD)
11. Dr. T.P.Rajendran, ADG (PP)
12. Dr. Dr K.K. Singh, ADG (PE)
13. Dr. Madan Mohan, ADG (Fy.)
14. Dr. B.S. Prakash, ADG (ANP)
15. Dr. J. N. Kataria, Jt. Director (Research), IVRI and
16. Dr. (Mrs) M. Dadlani, Jt. Director (Research), IARI

Dr. Arvind Kumar, DDG (Edn.) welcomed the chairman, experts, DDGs, ADGs, PIs/Co-PIs and other participants for the review meeting. He informed that the annual review meeting has become one of the regular programmes of Education Division and it has helped in refining the objectives and technical programmes of the centres of the NAE. In today's meeting' eight centres would present their progress and seek technical and administrative guidance in pursuing the path of niche with excellence in the chosen area.

Dr. S. Ayyappan, Secretary, DARE & DG, ICAR welcomed all experts and other participants. He reiterated that this concept of NAE is to build a school around an idea of local relevance with global standards. It is not a project but a support for the chosen centre to grow in an interdisciplinary mode creating a brand value for the university. Centres must undertake to carryout training programmes for the targeted students and faculty so that a pool of trained manpower in the area is created and sustained within NARS.

The PIs made brief presentations covering the objectives, technical programme (2011-12), the achievements made and the technical programme (2012-13) with concomitant demand of the budget.

1. Dr. Anna Mercy, PI of the center ***"Integrated Centre for Ornamental fish Research, Training and Management"***, KUFOS explained her difficulties in not making a headway in the programme and reluctantly requested closure of the centre. It was resolved that the centre should be closed and the university may be asked to refund the grant released. The VC who

joined later sought the permission to change the PI and continue the centre. This was not agreed to, as the NAE is based on the expertise and competence of the PIs/Co-PIs collectively, in the chosen field and two Co-PIs have purportedly left the scheme.

2. Dr. C. G. Joshi, PI of the centre ***"Metagenomic Analysis of Ruminal Microbes"***, AAU, Anand made an excellent presentation highlighting the following significant progress made.

Salient achievements:

- The first stage of the experiment which consisted of adaption of animals (Mehsani buffaloes) on high concentrate diet, reared at S.K. Nagar campus, and collection of rumen sample at the end of six week treatment has been successfully completed.
- A pilot study to standardize the methodology for metagenomic analysis of active and total rumen microbial communities was performed using 16 amplicon pyrosequencing from fiber adherent and liquid fraction of buffalo rumen and significant variations were observed in the active and total microbial communities present in the rumen liquid and solid fractions as well as variation between the fiber adherent communities compared to the ones enriched in the liquid fraction.
- Analysis of effect of different feed regimens on rumen microbial communities has been undertaken.

Expert comments:

- The experts appreciated the good work done by the centre. In order to minimize physiological variabilities, the centre was advised to use dry animals as treatments and not to include lactating cattles.

3. Dr. B. P. Mishra, IVRI made a presentation on the work carried out under the centre ***"Development of Bio-sensors for Diagnosis of Peste des petits ruminants (PPR) and Brucellosis"***.

Salient achievements:

- Full length N gene (1578bp) of PPR virus was amplified from vaccine strain using specifically designed primers. The amplified PPR-N gene was cloned in pET 32b vector and recombinant clone was confirmed by RE digestion and nested PCR. Sub-cloning of PPR-N gene was further done in prokaryotic expression vector pQE-30 to produce recombinant N protein.
- Full length p17kDa gene of Brucella S19 strain was amplified using specifically designed primers and cloned in pTZ57R/T vector. The p17kDa gene was further sub-cloned in prokaryotic expression vector pQE30 and recombinant pQEP17 clones generated. Expression of desired recombinant p17kDa protein was checked by SDS-PAGE analysis.
- The PPR virus specific hybridoma clone (4B11) was scaled up in cell culture and virus neutralization efficacy of mAb was checked *in vitro*.

- The monoclonal antibodies (4B11 and 4G6) were purified using protein-A affinity chromatography and after concentration by filtration, tested for their suitability as immobilizing molecule on sensor surfaces.

Expert comments:

- The good progress made by the centre was appreciated. Considering the certain administrative difficulties faced by the scientists, the Jt. Dir. (Research) who was present in the mee*t*ing was requested to ensure smooth running of the centre through periodical monitoring.

4. Dr. (Mrs) Asha Dhwan, GADVASU, Ludhiana made a presentation of the centre ***"Aquaculture Development in Punjab: Culturing of High Value Species and Utilizing Salt-affected /Water-logged Lands".***

Salient achievements:

Diversification of aquaculture with high value species (catfish/air-breathing fishes)

- Fingerlings of *H. fossilis* were successfully reared in the cemented ponds for 3 months (April to June 2011) for production of brood stock. During June & July 2011, breeding trials were carried out (without sacrifying male) by using a synthetic inducing agent 'ovaprim'. Fish (from hatchling to fry stage) reared successfully under indoor conditions for about two months with an average survival of 40-50% and attained average length and weight of 12.5 cm and 12 g respectively.
- Among different diets tried for feeding hatchlings of *H. fossilis* for 25 days, maximum survival (80%) was found in diet containing mixed zooplankton and egg yolk. Further, feeding of fry and fingerlings of *H. fossilis* for 120 days revealed maximum survival of 87.5% and 95.0 % and weight gain of 73.43% and 95.68% was observed in diets having rice bran 1: mustard cake 1: groundnut cake 2 and rice bran 1: mustard cake 1: soybean meal 2, respectively.

Aquaculture technologies for salt-affected/water-logged areas of Punjab

- In carp polyculture (catla, *Catla catla*; rohu, *Labeo rohita*; mrigal, *Cirrhinus mrigala*; grass carp, *Ctenophayrngodon idella* & common carp, *Cyprinus carpio*) trials productivity is enhanced from 2.50 to 2.94 & 3.49 t/ha/yr with increase in stocking density/rate from 10000 to 12,500 & 15,000 fingerlings/ha, respectively. Of all the species stocked registered maximum weight gain followed by rohu, grass crap, catla and common carp.
- In monoculture of *L. rohita* trials, productivity enhanced from 2.83 to 3.23 t/ha/yr with increase in stocking density from 10000 to 12,500 fingerlings/ha. However, with increase in stocking density to 15,000/ha, productivity of 2.97 t/ha was recorded.

- Culture of freshwater prawn, *Macrobrachium rosenbergii* in inland saline waters revealed growth of 23-67 g (male prawn) and 3-16 g (female prawn) in 80 days.
- Trials conducted on integrated fish cum duck farming in inland saline waters revealed that the ducks (Khaki Campbell) not only survived the saline conditions of the pond but also produced eggs at an expected rate of 200-250 eggs/bird/yr,

The PI sought sanction of additional two SRFs which was agreed to.

Expert comments:

- The success story as well as the impact created by this centre within a short period was highly commended.
- At some stage of the programme, the health aspects of the fish culture may also be included.

5. Dr. R. K. Pal, IARI made a presentation about the centre on "***Pilot Scale Process for Coarse Cereal-based Functional Food through Extrusion Processing"***.

Salient Achievements:

- Nutritional and anti-nutritional properties of pearl millet (cv PC443) was evaluated and the antioxidant activity of 12 variety/germplasms of pearl millet was determined.
- Two varieties of carrot namely, Pusa Yamdagni and Nantes were evaluated for powder making using different pre-treatments.
- The extruded products (Pusa Round Breakfast Cereal) was developed from finger millet and QPM.

Dr. Pal requested permission to utilize Rs. 150 lakhs for recreating pilot plant pre-installation facility which would be helpful in creating pilot plant facility in the XII Plan budget of the institute. He was requested to send the break-up of this expenditure.

Expert comments:

- The science of food processing must be kept in focus in all the processes such as extrusion, drying, conditioning, mixing etc.
- The effect of various physical factors such as pressure, retention time, cooling rate etc. on the processed food in the extrusion cooking may be investigated and the parameters may be optimized. The bio-availability and the fortification effect may be critically examined.
- Adequate precaution may be ensured not to lose the functional element during processing.
- In the second year, the objectives of developing functional food for targeted population and determination of shelf life of developed extruded products may

also be incorporated in the Technical programme 2012-13. The target population may also include obese group so that diet foods are included in the work plan. The trait of satiety may be incorporated in such foods.

- Once the pilot plant is available, the economic viability of the products, the consumer acceptability and entrepreneurship development would form the core priorities of the centre.
- The centre may also add on the work on management of stored grain pests of raw material and processed products. It may also focus on perishables.

6. Dr. R. M. Singh, BHU briefed about the progress made in the centre on ***"Molecular Breeding for Improvement of Major Crops of Eastern Indo-Gangetic Plains"***.

Salient achievements:

- RIL and advanced breeding lines in wheat for spot blotch resistance, pea for rust etc. have been developed and being maintained, In pigeonpea, crosses were made to develop RIL for mapping of *Fusarium* wilt resistance.
- SSR Markers linked to spot blotch resistance in wheat were successfully validated and being utilized in MAS.
- Genic and non-genic SSR markers were tested for parental polymorphism in pigeonpea parental lines which would be utilized in mapping of *Fusarium* wilt resistance gene (s).

Expert comments:

- The good progress made by the centre was appreciated and recommended for the extension of financial support to the centre for the next 5 years as sought by the centre.
- The centre was suggested to focus on the varietal development of spot blotch resistant wheat.
- The close rapport with other centres of excellence such as IARI, IIPR etc. established by the centre was noted.

7. Dr. Bains and Dr. Kuldeep, PAU, Ludhiana presented the work "***Creation of Novel Genetic Resources through Alien and Exotic Introgression for Higher Productivity and Resistance in Wheat and Rice"***.

Salient achievements:

- A collection of 376 European winter wheats procured from National Institute of Botany, UK included commercial winter wheat varieties from Germany (95), France(195) England (81) and other countries (5). Data on days to flowering and resistance to leaf rust and stripe rust were recorded. Most of the genotypes were resistant to stripe rust and a relatively small number showed resistance to leaf rust.

- Inspite of the narrow window of crossing, a large number of crosses (>250) were attempted. Three elite spring wheats were used : PBW 621, HD 2967 and PBW 343+*Lr24*+*Lr28*+*Yr10*+*Yr15*. Out of this set, F_1 seed obtained for crosses with PBW 621 were planted at Keylong for backcrossing.
- Selected Ae. *tauschii* accessions were crossed with *T. durum* cvs. in 2010-11 and F_{1s} were crossed with hexaploid wheat and also allowed to self in 2011-12. Spontaneous doubling of chromosomes occurred due to the formation of restitution nuclei. A set of crosses were performed with *T. monococcum* (A genome species). Fifty two embryorescued plants from Ae. *Tauschi* x PBW 621 crosses were obtained and shifted to off-season location.
- About 2500 introgression lines derived from the following complex cross: '(Ttriticale x Ph locus suppressor) x recipient bread wheat' with the objective of inducing translocations between rye and bread wheat chromosomes.
- Screening of wild species of rice (*Oryza punctata*) for brown planthopper (BPH) was undertaken in glass house in the month of April. Out of ~2000 accessions about 1000 accessions have been screened so far. One *O. barthi*, 27 *O. nivara* and 10 *O. rufipogon* accessions have shown resistance.

Expert comments:

- It was suggested that negative correlation of QTLs may also be recorded. The promising F_1 lines may also be sent to National Genetic Screening Centre's for multi-location response.
- The capacity building of promising and bright Ph.D. students may be given training for skills and knowledge development in molecular breeding and marker assisted selection.

8. Dr. B. Malik, UAS, Bangalore made a presentation on ***"Capacity Building in Taxonomy of Insects and Mites"***.

Salient achievements:

- Initiated studies on Hemiptera, Diptera, Hynenoptera and Acari.
- Prepared identification keys to most of the economically important orders of insects and mites to be used for the training programmes.
- One training programme has been scheduled for 25 July- 14 August, for which identification keys to families of different orders have been prepared.

Expert comments:

- The centre was requested to identify the faculty members of SAUs involved in the teaching of insects taxonomy so that they can be asked to undergo customized training in the field.

The meeting ended with the vote of thanks by Dr. C. Devakumar, ADG (EPD) to Chair, resource persons, DDGs, DDG (Edn.) in particular, ADGs and PIs/Co-PIs of the various centres. The support received from Dr. Vanita Jain and other staff of EPD section is duly acknowledged.

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