

# RESEARCH FOR DEVELOPMENT

## BAIF Central Research Station, Uruli Kanchan, Pune

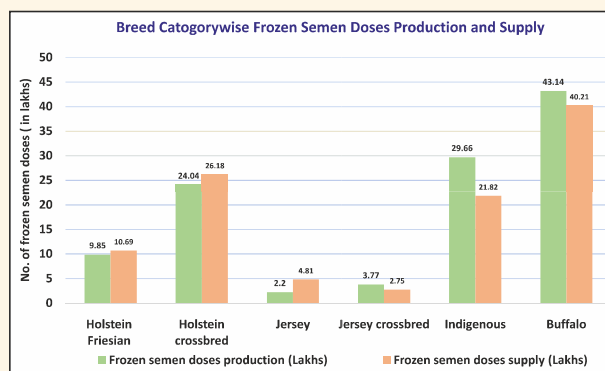
The Central Research Station spread over 227 ha, is engaged in applied research and need-based training. Recognised by the Department of Animal Husbandry, Dairying and Fisheries, Government of India as a Training Centre for conducting certificate courses in Artificial Insemination and as a Study Centre for Degree and Diploma courses conducted by YCMOU, Nashik.

**Semen Freezing Laboratories: Semen produced at Urulikanchan and Jind:** 112.66 lakh (11.26 million) doses of indigenous and exotic breeds, crossbreds and buffalo breeds, including 1.13 lakh (0.113 million) doses of sorted semen. 51.90 (5.19 million) lakhs were used in BAIF's programme and 54.65 lakh (5.465 million) doses were supplied to Government, Cooperative and private agencies.

**Sex Sorted Semen Technology Programme:** 1.13 lakh (0.113 million) Sex Sorted Semen doses were produced during the year. Total 9.24 lakh (0.924 million) doses were produced from Gir, Sahiwal, Tharaparkar, Red Sindhi, Red Kandhari Rathi, Khillar, Gaolao and Deoni breeds, Holstein Friesian and Jersey Crossbred, Pure HF and Jersey and Murrah, Jaffarabadi, Mehsana and Pandharpuri buffalo breeds. 2.51 lakh (0.251 million) doses were supplied to BAIF field programme, livestock breeding organisations, Animal Husbandry Departments, Milk Unions, private dairies and dairy farms.

**Goat Semen Laboratory at Wagholi:** 1.86 lakh (0.186 million) doses of frozen goat semen of 9 breeds were produced, with a conception rate of 42% to 50% in 4 centres.

The Central Cattle Breeding Farm maintained 120 disease-free elite bull mothers and produced 36 bull calves of Holstein and Jersey breeds. Conservation and Multiplication of Superior Germplasm of indigenous dairy breeds such as Gir, Sahiwal, Deoni, Dangi, Gaolao and Red Kandhari by OPU-IVF Technology is being



implemented under Rashtriya Gokul Mission to standardise techniques and to produce elite bulls and bull dams.

The Ova Pick Up (OPU) and In-vitro Fertilisation (IVF) Embryo Transfer Laboratory produced 1894 embryos of indigenous breeds and 45 embryos of exotic breeds and recorded birth of 15 indigenous and three exotic calves. Training was conducted for 15 field technicians. This technology is being extensively applied at the doorstep of farmers free of cost.

**Livestock Genomics Research Laboratory:** 11,567 crossbreds and indigenous cattle have been genotyped using low and high-density SNP

Donor and calves born through OPU-IVF technology



arrays. The small SNP set of 400 SNP markers to estimate breed composition and parentage assignment with high accuracy in Indian cattle population was submitted to Thermo-Fisher (Affymetrix) for synthesis and validation by using genotyping by sequencing platform - a low-cost technology to facilitate animal breeding decisions. SNP chips designed specifically for genotyping cattle and buffalo population are available for use. The EGP Phase II started in 8 states for performance recording, aims at genomic evaluation and selection for cattle and buffaloes. Identifying various mastitis-causing organisms using genome sequencing techniques was also initiated to understand the genetic basis of Theileria disease resistance in Indian cattle.

Genomics Research was also targetted towards developing systems to deliver adapted genotypes applying genomic selection, standardising genomic selection protocols for Indian cattle and buffaloes, developing medium SNP chip for regular genotyping and a low-density SNP assay for breed diversity analysis. Field performance recording was carried out in 36,587 animals of diverse genetic background across nine states and more than 18,000 blood samples were processed for DNA extraction.

**Field Progeny Testing of Frieswal Bulls:** Under this ICAR-sponsored project through Central Institute for Research on Cattle (CIRC), Meerut, the milk production performance of 4238 progenies was completed, with an average milk production of 3067.41 kg in 305 days, with 3.6% fat. The average age recorded at first calving was 32.34 months. Out of 9161 progenies born from 215 bulls, 54.88% were from BAIF bulls. The breeding value of 107 bulls has been rated as +ve out of which, 54.21 percent bulls are from BAIF. From 10 bull batches, BAIF bulls were top-rated in 5 bull batches. The breeding

value indicating genetic superiority over population was +106.43 kg which was highest for Darpan bull, followed by Daljeet (+105.25 kg). Both these bulls were tested under bull batch No. 8. The mean population yield was 2963.19 kg.

#### **Production of High Genetic Merit Crossbred Holstein Friesian bulls through Progeny Testing:**

This project sponsored by the National Dairy Plan (NDP) Phase-I, continued in 38 centres in Pratapgarh, Amethi, and Sultanpur districts of Uttar Pradesh, recording 9051 daughters. Among them, the performance recording of 1<sup>st</sup> and 2<sup>nd</sup> batch daughters has been completed and the daughters of 3<sup>rd</sup> and 4<sup>th</sup> batches are under milk recording.

#### **Animal Disease Diagnostic Laboratory:**

Samples collected from the cattle breeding farm and bull station were analysed for 2383 tests including hemogram (185), serum biochemistry (2024), Brucella testing by RBPT (29), milk sample culture and antibiotic sensitivity (1), Brucella testing by ELISA (7), IBR testing by ELISA (14), BVD testing by ELISA (10), Tuberculosis testing by ELISA (5), Paratuberculosis testing by ELISA (5) and faecal sample analysis (103).

**BAIF Kisan Mart and Milk ATM:** The Kisan Mart is a one-stop shop for agricultural inputs, milk, fresh and processed food products and silk fabrics at a fair price. An innovative Cow Milk ATM has been set up to supply superior quality milk produced on BAIF's farm through Self Help Groups and Farmer Organisations.



Inauguration of BAIF cow Milk ATM at Uruli Kanchan

**Studies on Animal Nutrition:** The ICAR-Coordinated Project on Nutritional and Physiological Interventions for enhancing reproductive performance in animals recommended a new semen extender for subsequent dilution and cryo preservation of the semen especially in buffaloes.

Based on a survey, 20 farmers from SC category were provided 815 kg of BAIF MIN-C without Salt and VIMICON (40 kg each) under SCSP component of the ICAR Coordinated Project to make livestock rearing a profitable activity.

**Forage Research Programme:** The ICAR-Coordinated Project on Forage Crops and Utilisation is engaged in development of new varieties/hybrids of maize, pearl millet and B x N Hybrid, evaluation of new entries through on-station and Multi Location Trials (MLT), generation of new forage production technologies, breeder seed production and Forage Technology Demonstrations.

BAIF contributed two varieties of Forage pearl millet and one variety of forage maize in the All India coordinated trials. Two varieties of multicut Pearl millet, BAIF Bajra 5 and 6 were identified for release by ICAR, New Delhi.

The performance of 180 newly released varieties of 15 crops was demonstrated during

*kharif* and *rabi* seasons under Western Maharashtra conditions in the Golden Jubilee Forage Garden established at the BAIF Central Research Station at Uruli Kanchan.

Under the Tribal Sub Plan, 50 tribal farmers in five villages of Nandurbar district of Maharashtra were supported to adopt new technologies for improving agricultural production.

**Microbial enriched Bio char and its utility:** Microbial-enriched charcoal (*Azotobactor*, *PSB*, *KSB* and *Trichoderma*) at 7.5 t/ha of Biochar + 100% GRDF gave the highest yield in Soybean (25.33 q/ha ) and Wheat (43.59 q/ha) thereby making biochar an ideal soil amendment to improve soil fertility and crop yield.

**Azolla as a supplementary nutrient-rich feed for livestock and poultry:** 298 dairy farmers including 50 backyard poultry families from 16 villages in Akole and Sangamner blocks in Ahmednagar took up azolla cultivation with women assuming responsibility for feeding and promotion. 561 farmers were trained in cultivation, powdering and feeding of Azolla. In a period of three months, higher Azolla yield of 21.18 kg was recorded by cultivating in river water source. The crude protein content of fresh Azolla varied from 22% to 28%. It was fed to

BAIF Bajra-5



New fodder varieties evolved by BAIF

BAIF Bajra-6



backyard poultry birds. The average weight increase of the birds was 0.36 kg after 3 months of continuous feeding and the average increased egg weight was 7.6 g after one month of continuous feeding.

**Techno-Economic Feasibility Studies on Ozonated Cotton Stalk as Roughage:** The newly-installed Cattle Feed Unit to scale up and undertake studies on complete feed for animals



to ensure a standardised protocol for ozone treatment, drying and complete feed production, produced 25 MT of complete feed pellets and initiated trials of ozonated cotton stalk-based feed pellets on lactating cows.

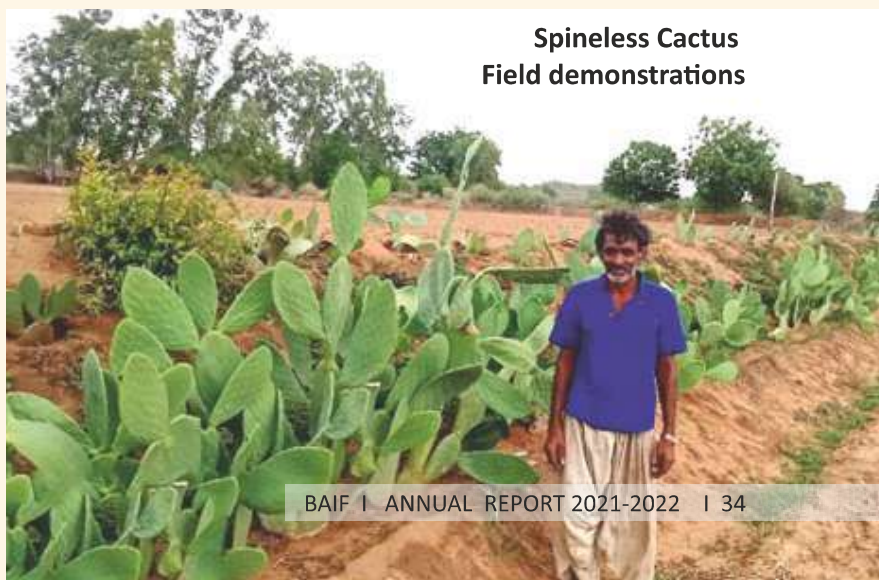
**Crop-Livestock Production Systems:** The cactus feeding trial in lactating cows improved milk production of experimental animals with an average daily milk yield being  $9.60 \pm 0.62$  kg, compared to  $6.92 \pm 1.45$  kg for control. Cactus feeding increased the body weight gain. Feeding in lactating cows and Osmanabadi goat kids with cactus enhanced their total body weight and average daily gain in body weight.

**Adaptability and performance trial of spineless cactus accessions for fodder production:** Spineless cactus was introduced in Maharashtra, Rajasthan, Gujarat, Andhra Pradesh and Karnataka with 800 field demonstrations and a cactus arboretum with 100 different accessions. A protocol for feeding cactus to milking cows, buffaloes and

goats and as a potential source of green fodder during fodder scarcity in summer, has been developed.

**Studies on *Jatropha curcas*:** The *Jatropha* genotype comparison trials - a collaboration with JatroSolutions GmbH, Germany, has been concluded. During the period of experimentation, 150 naturally-occurring genotypes and 200 hybrids were evaluated under three agro-climatic conditions. Data on key parameters to assess growth, yield, plant health and flowering characteristics were collected and analysed. Additionally, a trial to compare the influence of plant density was conducted. The protocol of edible and non-edible hybrid seed production was standardised. The comparison of plants propagated vegetatively with seed-raised plants revealed no significant difference in phenotypic traits, but early flowering was observed in vegetative-propagated plants.

**Technology Demonstration Farm, Wagholi, Pune:** Spread over 93 ha, it comprises of the BAIF Water Academy for soil and water conservation, arboreta of trees, shrubs and indigenous grass species, medicinal garden, plant propagation, vermicomposting, organic farming and ultra-high density orchards. The Goat Semen Freezing Laboratory is engaged in the production of semen from genetically superior bucks of Osmanabadi, Sangamneri, Berari, Sirohi, Beetal, Jamnapari, Barbari, Black Bengal and Ganjam breeds.



**Spineless Cactus  
Field demonstrations**