

# NARI Animal Husbandry Division

## Introduction

The Animal Husbandry Division (AHD) of NARI was started in 1990 by Mr. B.V. Nimbkar, the founder of NARI, who saw an urgent need and potential to **improve the useful but much neglected Indian goats and sheep**. Mr. Nimbkar had worked from 1989 to 1992 as Chairman of the Sheep and Goat Commission appointed by the Maharashtra State Government to look into the problems of rearing these small ruminants. He decided the **goal of the AHD** would be to **genetically improve local goats and sheep** (reared mainly by the most underprivileged class of rural society) and also **improve their feeding and management to increase their productivity and the income earned by their owners**. It is also the AHD's objective to **disseminate improved genotypes and technologies** to end-users, **provide training** to livestock rearers in livestock management and take initiatives to improve livestock marketing. The AHD **carries out research and development projects** designed to achieve these goals. We are dedicated to **excellence in research and extension for the benefit of smallholder livestock keepers**.

## Top achievements

1. **Development of the NARI Suwarna and NARI Composite breeds of sheep with more than 60% ewes having twin instead of single lambs, by introducing the FecB gene from the Garole breed of Sunderban, West Bengal.** This work was done with funding from the Australian Centre for International Agricultural Research, Canberra, Australia from 1998 to 2007 and the Department of Biotechnology of the Govt. of India from 2009 to 2012. These breeds have been **disseminated to smallholder sheep farmers** in Maharashtra, Karnataka, Tamil Nadu and Andhra Pradesh: NARI Suwarna ewes have about 90% Deccani breed proportion or 60% Deccani and 30% Madgyal (and only 10% Garole breed) proportion and are capable of producing and raising twin lambs to a weaning weight of 13-15 kg each (total weaning weight 26 kg) in 3-4 months, with a little supplementary feeding. NARI Composite ewes have 25-30% proportion of the Israeli Dairy type Awassi breed and about 60% of the Deccani and the 3-4 month weights of their lambs can go up to 20 kg. Both the NARI Suwarna and Composite have 50% higher lamb production than the local Lonand type Deccani sheep which have only single lambs. The name of the gene '**FecB gene**' derives from 'Fec' for 'fecundity' and 'B' indicating the name Booroola given to the gene when it was first discovered in Australia in the 1970s. The **DNA test** developed internationally to detect the number of copies of the gene possessed by a lamb or adult sheep, is conducted at **NARI AHD's molecular biology laboratory to detect the genotype of sheep at the FecB locus**. A genotyping service is also made available to other national and international breeding programmes that use the FecB gene.

NARI Suwarna and NARI Composite rams and ewes are available for sale. They are supplied for free to interested local smallholders for breeding their ewes. The NARI AHD and the National Chemical Laboratory (NCL), our collaborator in the project, received the prestigious **‘Science and Technology Innovation for Rural Development’** award of the Indian Government’s Council of Scientific and Industrial Research for this initiative in 2007 at the hands of the Prime Minister.



*NARI Suwarna ewe with its 4-month old twin male lambs weighing 14.5 and 15 kg (lambs have 25% Madgyal proportion)*

2. **Bringing the World's Best Meat Goat Breed, the Boer Breed from Southern Africa into India:** We helped a sister institute, the Maharashtra Goat and Sheep Research and Development Institute to import Boer goat embryos from Australia, transfer them into local goats, establish a nucleus flock of Boer and promote successful crossbreeding of local goats with the Boer. The **Boer** has proved to be a **fast growing and hardy breed** for Indian climates and conditions and thousands of goat keepers from Maharashtra and other States such as Tamil Nadu and Madhya Pradesh have benefited by crossbreeding their goats with the Boer breed. With good feeding, Boer kids attain weights of 25-30 kg in 5-6 months, when farmers can sell them at Rs.200 to Rs.250 per kg live weight. Many farmers have set up their own Boer goat farms and are making good profits. The AHD has also made available **frozen semen of Boer bucks** which can be stored in liquid nitrogen at a temperature of  $-196^{\circ}\text{C}$  indefinitely.



*Adult Boer bucks*

3. **Pioneering establishment of a buck and ram semen freezing laboratory:** The AHD has set up a semen freezing laboratory with a grant from the Government of India, to freeze goat (buck) and sheep (ram) semen in 0.25 ml French mini straws. The usual Artificial Insemination (A.I.) gun used in cows can be used for A.I. in goats using these straws. Use of frozen semen is necessary for wider use of selected good quality bucks and when breeding bucks are not available nearby when a doe comes on heat. Freezing buck semen is also a method of conserving endangered breeds for the future. If a doe is inseminated at the right stage of oestrus, conception rate of up to 60% can be achieved. State Governments, private entrepreneurs and A.I. technicians have started taking buck semen straws for insemination of goats in their areas. Boer and Osmanabadi goat breed frozen semen is currently available at the AHD.

4. **Training of sheep and goat keepers, livestock supervisors and veterinarians:** The AHD has prepared **training material in simple Marathi, Hindi and English** to give **training in sheep and goat management and artificial insemination**. The training programmes range from 2 to 6 days, covering topics such as housing, nutrition, breeding and first-aid and have an important component of practicals. We have experienced trainers such as Dr. Pradip Ghalsasi and Dr. Chanda Nimbkar who are national leaders in their respective fields of ‘small ruminant reproduction and artificial breeding’ and ‘animal genetics and breeding’. We also have experienced livestock supervisors such as Mr. Kanhaiyya Chavan and Mr. Rupsing Khanvilkar who conduct the practical training sessions and an experienced technical officer Ms. Padmaja Ghalsasi who conducts the session on ‘sustainable worm control in sheep and goats’.



*Gopal Mitra trainees from BAIF, Bihar learning how to do AI in goats from the AHD's Mr. Khanvilkar and Chavan*

5. **Multiplication and popularizing of high quality, high yielding fodder varieties:** The AHD is popularizing and disseminating the new hybrid pest resistant and non-seed producing high protein fodder Subabhul KX2 or ‘NARI *Nirbeeja*’ which is an outstanding hybrid of *Leucaena leucocephala* and *Leucaena pallida*. Ten KX2 trees can satisfy the annual protein requirements of one doe or ewe and its kids/lambs, thus eliminating the need for expensive concentrate feeding. The AHD also has available

for sale, seed of *Desmanthus virgatus* (Dashrath) and multi-cut fodder sorghum (COFS-29) developed by the Tamil Nadu Agricultural University.

- 6. Collaborative research nationally and internationally:** The AHD has carried out collaborative research projects with international partners such as the University of New England, University of Melbourne and CSIRO, Australia and national partners such as the National Chemical Laboratory, Pune, Bombay Veterinary College and National Bureau of Animal Genetic Resources of the ICAR.

The AHD welcomes Indian and foreign volunteers. We have had volunteers from India, Australia, France and Ireland. Undergraduate veterinary students come here for their internship and postgraduate veterinary students carry out their research here.

#### **Facilities available for research and extension**

- 1. Land:** 20 hectares irrigated land with improved pastures for grazing sheep at two locations, 6 and 15 km from Phaltan town; at Wadjal and Rajale respectively.
- 2. Building:** The AHD has its own building. It is a 1,400 sq. m. three-storey RCC constructed building with 25 rooms. There is a seminar Hall, library, exhibition hall, two guest rooms with an attached toilet, ample office space and internet facilities. The building is on the 8 hectare Wadjal farm, 6 km from Phaltan. There are farm managers' and labourers' quarters and toilet and bathroom facilities on both farms and a dormitory at Wadjal farm. Both farms also have godowns, animal sheds, chaffcutters and silos for 25 tonnes silage.
- 3. Laboratories:** The AHD has well-equipped Semen freezing and Parasitology laboratories and basic Nutrition and Molecular Biology Laboratories. We also have a diesel generator in case of electricity failure.
- 4. Animals and animal housing:** We have roofed pens with feeders for housing 600 ewes, 200 rams and 150 goats, animal handling facilities such as a sheep race and electronic weighing scales for weighing animals. We have a nucleus flock of 350 selected FecB gene carrier ewes, selected 100 Boer and Boer cross goats and 40 selected Osmanabadi bucks.



**Sheep in FecB carrier nucleus flock at Lundy farm, Rajale**

### **5. Manpower**

- a. Five supervisors trained in management, treatment, semen collection and artificial insemination of sheep and goats.
- b. Two trained extension officers
- c. Experienced office manager and accountant
- d. One technical officer trained in carrying out the direct DNA test for detection of the *FecB* mutation in sheep DNA and in parasitological techniques
- e. One experienced data manager
- f. Twenty experienced farm workers and shepherds

- 6. Linkages to rural communities:** We give FecB gene carrier breeding rams and preventive veterinary services to smallholder sheep owners in Bhadali, Dudhebawi and Kothale villages – about 20-30 km south of Phaltan. Under the All India Coordinated Research Project on Goat Improvement of the Indian Council of Agricultural Research, we record the performance of village goats and train village women in goat health management in Bibi and Wadgaon villages of Phaltan taluka, Satara district, Kamone village of Karmala taluka in Solapur district and Sakat village in Jamkhed taluka of Ahmednagar district of Maharashtra.

## Products, services and technologies available

### Improved breeding animals and frozen semen straws

- ◆ Selected rams, ewes and frozen semen of the newly developed **NARI Suwarna** and **NARI Composite twinning Deccani sheep strains** carrying the *FecB* gene
- ◆ Selected rams, ewes and frozen semen of the **prolific worm resistant micro-sheep breed Garole** from Sunderban, West Bengal.
- ◆ Selected rams and frozen semen of the **dairy sheep breed Awassi** from the Middle East
- ◆ Selected bucks and frozen semen of the **South African Boer meat goat breed**
- ◆ Selected **crossbred Boer-Damascus bucks and frozen semen** to introduce better meat and milk production characteristics into your goat flock
- ◆ **Frozen semen** of selected **Osmanabadi** bucks
- ◆ **Artificial insemination** of does and ewes with fresh or frozen semen

### Training and advice

#### Training courses in

- goat artificial insemination
- machine shearing of sheep
- first-aid and other veterinary treatment in goats and sheep
- practical training in goat and sheep rearing for goat and sheep owners – also for illiterate and semi-literate women and men farmers
- six-days residential course in goat and sheep production technology for a commercial farm
- performance recording of goats and sheep on commercial farms and with smallholders in villages
- ◆ **Advice** on sheep and goat breeding and management
- ◆ **Educational books, pamphlets and CDs** on various aspects of sheep and goat rearing

### Pregnancy diagnosis, disease testing and other services

- ◆ **Sheep and goat faecal sample testing** for worm burden assessment and advice on deworming
- ◆ **Testing** of sheep and goats for *Brucella melitensis*
- ◆ **Laparoscopic diagnosis of reproductive abnormalities** in sheep and goats
- ◆ Sheep and goat **DNA testing for presence of the *FecB<sup>B</sup>* allele** (that induces twinning) at the *FecB* (Booroola) gene locus
- ◆ **Ultrasonographic scanning** for pregnancy diagnosis in sheep and goats
- ◆ **Oestrus synchronization** technology in sheep and goats

## Improved forage and fodder tree varieties

- ◆ **Seeds, seed setts, plants and grafted saplings** of improved and pest-resistant nutritious fodder varieties, grafting and vegetative propagation technology



### Personnel:

Dr. Chanda Nimbkar, Director, Animal Husbandry Division

*MSc (Animal Genetics and Breeding, Edinburgh), PhD (Australia)*

Dr. Pradip Ghalsasi, Associate Director, AH Division

*BVSc, expertise in goat and sheep reproduction, laparoscopy and semen freezing*

Ms. Bharati Pawar, Assistant Director, AH Division

Ms. Padmaja Ghalsasi, Technical Officer

Mr. Kanhaiyya Chavan, Livestock Supervisor and Training and Extension Officer

Mr. Rupsing Khanvilkar, Livestock Supervisor and Training Officer

Mr. Dattatray Ranadive, Accountant and Cashier

Mr. Navnath Patange, Data manager

Mr. Sunil Kulkarni, Office manager

Mr. Dattatray Mulik, Livestock Supervisor

Mr. Dilip Bhandare, Livestock Supervisor