BUCK SELECTION FOR GOAT BREED IMPROVEMENT

1. Introduction

India own twenty three recognized breeds of goat, which constitute approximately 20% of total goat population (rest 80% population are called 'non-descript' or 'lesser known' breeds /strains). Indigenous goats possess considerable genetic variation in milk, growth and reproduction traits. Goat being meat animal and in high demand for slaughter, unfortunately young male kids are sold at early, between 4-6 m of age across the country limiting the scope of genetic selection and breed improvement. Buyers also tend to purchase superior goats for slaughter from within population resulting in depletion of the genetic base of local animals. Therefore, a structured, systematic and long term breed improvement programme is to be put in place so as to bring about positive, adaptive and sustainable changes in the genetic make up of animals resulting in increased production performance. This can be achieved through selection of genetically superior bucks and dams among farmers' flocks after having proper pedigree and performance recording. Generally, people select animals for breeding based on phenotype or visual appearance. But the phenotype is determined by genotype plus environment. Changes in the environment will modify the gene expression. Therefore, genetic selection through selective breeding is generally recommended (for meat breeds /strains of goat) to improve traits of economic consequences such as body weight, fecundity, litter size etc. Better performance through selective breeding can further be improved by better feeding, health and management practices.

2. Selection of bucks

Step 1: IDENTIFICATION AND SUPPLY OF SUPERIOR BUCKS

To start the genetic improvement programme first, superior bucks of the particular breed/strain need to be procured from farms /farmers across the breeding tract to exploit genetic variation. Survey the villages and select good quality bucks from large flock owners (generally, farmers maintaining small flock do not rear breeding bucks) based on following criteria (applicable for meat type breed):

(a) **Type of birth (Twin/Triplet)**
(b) **Body weight at specific age (at least 2 standard deviations above average)**
(c) **Some associated type traits (phenotypic)**

Bucks selected are to be tested for **libido and semen quality**. They should also be tested for **Brucella**. These bucks can be purchased and supplied to farmers /farmer clusters (1 buck for 20 does). Strategic feeding support i.e. concentrate to the breeding bucks @ 200g/day 45 days prior to and 60 days during breeding seasons (September-October and May-June) should also be made available.

The farmer groups should be advised to castrate the local scrub bucks in use. A MoU may be signed with the groups to use the buck for breeding purpose for at least two years and not to sell /slaughter the buck supplied. However, if they lose the buck on account of sale /slaughter /negligence, they may be asked to pay compensation except in case of predation /disaster.

Step 2: IDENTIFICATION OF SUPERIOR DOES FOR BUCK PRODUCTION

Does in the project will be recorded for their performance and pedigree. Concentrate feed @100g/doe/day may be supplied to the animals under recording, as an incentive. Based on performance and the following parameters, good quality does may be identified:

(a) **Body Type and weight**

(b) **Age at first kidding (and 2nd kidding)**

(c) **Type of Kidding**

(d) **Milk yield (recorded from 20% of high yielding does once in 14 days, 5-6 times)**

Out of the total does under recording, 40% are to be selected for buck production. The farmers should be advised to continue rearing the selected does for production of superior germplasm. Continue supply of concentrate feed to the selected does.

Step 3: CREATE A POOL OF BUCKLINGS FOR SELECTION:

A pool of buckling may be created as follows:

(a) **At the time of selection of does, superior male kids already born and available with farmers may be purchased based on type of birth (twin /triplet) and weight**

(b) **Purchase male kids (reserved at the time of doe selection) born from the selected does at weaning age (2 or 3 months) based on type of birth and weight**

(c) **Pass on the male kids thus procured to identified buck keeper/s for rearing up to 12 months of age so that final buck selection is made from amongst available kids.**

Buck keepers are to be selected in consultation with the community. Their role is to rear the buckling properly till maturity (one year) and release them to farmer groups (1 for 20 does). They also have to keep 30% of bucks as buffer stock on regular basis. In consultation with the community an incentive package needs to be developed for the buck keeper.

Step 4: SELECTION OF FUTURE BUCKS

Based on following parameters, select future bucks (from among buckling reared by the buck keeper):

(a) **First selection is already made at the time of purchase of kids at weaning age (2/3 months) based on type of birth and weight (see Step 3)**

(b) **Second selection at 6 months age: select top 50% of the total males under recording based on weight & phenotype. Castrate the remaining 50%**

(c) **Final selection (95%) shall be made at 12 months age: based on libido and semen quality. After screening for Brucella, supply selected bucks to farmers for breeding (and maintain as buffer stock)**

A MoU may be signed with the groups to use the buck for breeding purpose for at least two years and not to sell /slaughter the buck supplied. However, if they lose the buck on account of sale /slaughter /negligence, they may be asked to pay compensation except in case of predation /disaster. The community should be advised to rotate selected bucks to other clusters after every one year.

Step 5: SELECTION OF BUCKS FROM FUTURE GENERATIONS

As genetic progress will happen gradually generation after generation, the selection process should be continued for years. That is - male kids born out of the subsequent generations (F1, F2, F3, F4, F5 etc.) should be subjected to selection (process same as in step 4) and the selected bucks of each generation can be used for mating selected does (selection process same as in step 2) of the same generation. Thus F5 bucks will be genetically superior than those of F4, which will be superior than F3 and so on. Generally, the genetic progress will be about 1-2% per year (4-5% phenotypic expression, if excellent environment is provided). This progress is permanent in nature. As phenotype is the result of Genetic x Environment interaction, if reasonably good environment is given (e.g. feeding, management), there will be about 10-15% increase in phenotypic expression (e.g. live weight) over a period of five years. It means, a goat having an average of 14 kg adult body weight might increase its adult weight to 16 kg after five years of systematic selection process.

Requirement of bucks and number of animals under Field Performance Recording

The number of bucks to be selected for mating depends on population of adult females in the project location and area. If there are 2000 adult females, the requirement of bucks will be approximately 100 (1:20). See Table 1 for details.

Table 1: Total number of animals under Field Performance Recording

Total population of adult females = 2000 Total Number of bucks required = 100 (1:20)	
Particulars	**Approx. Requirement**
Does to be brought under recording and genetic improvement	**1000**
Does selected (about 40%)	400
No. of kids born/year from 400 does (60% twins, 40% single, 1.5 kidding, 10% mortality & 90% breeding efficiency-roughly 1.68 times)	675
Male kids born (50%)	335
Male kids selected for recording (45%) based on type of birth and weight at weaning and type traits	150 (70% of total requirement)
Male kids initially procured from farmers	60 (30% of total requirement)
Total male kids under recording	**210**
Selection at 6 months age (50%)	105
At 12 months age supply superior bucks (95%)	100

To select 100 bucks, initially 210 male kids (2.1 times) should be identified and brought under care and recording. To meet the requirement of male kids about 70% (150) can be selected from the male kids born out of the selected does. For this, about 1000 does (6.66 times) should be brought under recording. Select 40% (400) from the 1000, which will produce about 675 kids (1.68 times) annually. Out of 675, about 50% (335) will be male kids. From 335 male kids, 45% (150) can be selected based on type of birth.

Remaining 30% male kids (60) can be purchased directly from farmers. Out of the total 210 male kids (150+60) under recording, 50% (105) may be selected at 6 months age and out of 105, 95% (100) may be selected at 12 months age and release for breeding purpose.