



Impact evaluation of goat production technologies in farmers' flocks

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Received: 16 February 2012; Accepted: 2 November 2012

ABSTRACT

A study was conducted to determine the impact of goat production technologies under farmers' flocks under the transfer of technology programme in 4 adopted villages having sizable goat population. Operational villages were provided with goat production technologies viz. improved breeding bucks (6), reproductive and regular health care (preventive and curative), managerial practices and products technologies. Regular visits were undertaken in operational villages at fortnight intervals for 3 years. Data related to natural mating by institute's Barbari bucks and Non-descript village bucks, pregnancy diagnosis, progeny born, reproductive parameters and gyneco-obstetrical disorders were collected on prescribed schedules. Goat farmers were also motivated to adopt improved goat production practices by arranging on and off campus trainings besides health camps and kishan goshies at their door steps. Kidding rate was numerically higher in all village flocks sired by improved Barbari bucks and was statistically higher in village-Barka Nagla. Irrespective of villages, kidding rate in goats sired by Barbari buck was significantly higher to Non-descript buck. A visible improvement (12%) in terms of multiple births (twins and triplets) following introduction of improved Barbari breeding bucks was observed. A 2-fold increase in triplet births was also recorded. Introduction of Barbari bucks in these villages also upgraded the non-descript goat population which fetched higher price in the market. Anoestrus and abortion were encountered as major reproductive disorders with a relative incidence of 35.14 and 15.32%, respectively. During and after kidding, retention of placenta (ROP) and insufficient dilatation of cervix (ring womb) were encountered as major obstetrical problems with an incidence of 12.61 and 10.81%, respectively. Reduction in occurrence of reproductive disorders over the years also indicated a favorable impact of goat reproduction and production technologies. Study indicated a viable impact of breed improvement after introducing superior Barbari breeding bucks and other goat production technologies in the terms of increased multiple births and overall kidding rates with reduction in occurrence of pre and post parturient disorders in progeny born out of Barbari bucks and goat population. Long term adoption of such practices will help in prevention of dilution of prolific Barbari breed in future.

Key words: Breed improvement, Goat production technologies, Farmers' flocks, Barbari, Kidding rate, Reproductive disorders

Goat, one of the most important livestock species, is an important source of livelihood security, poverty alleviation and employment generation to a millions of resource poor of this country (Kumar *et al.* 2006). One of the objectives of extension programmes is to transfer viable technologies to its end users to address emerging issues in food, agriculture and agri business. Over the years, animal research has generated a vast number of outputs in the form of technologies, knowledge and practices (TPK) but have been exploited by limited number of end users. The resource poor livestock small holders are unable to take optimum advantage

of these TPKs. Barbari is a well known dual purpose, prolific and non-seasonal breed (Acharya 1982, Prasad and Bhattacharyya 1980) and its home tract lies in Agra, Etah and Mathura districts of Uttar Pradesh. Several times goat farmers face non availability of goat production technologies. Considering these, a multidisciplinary programme on transfer of improved goat production technologies was undertaken by the institute in the home tract of Barbari breed after conducting the base line survey. Goat farmers in these villages were provided with goat production technologies on breeding, feeding, reproductive and other health care, management including products technologies. Present investigation was aimed to study the impact of goat production technologies after the introduction of Barbari breeding bucks and reproductive health care besides above mentioned technologies on reproduction rate and reproductive disorders under farmers flocks.

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MATERIALS AND METHODS

Present study was undertaken in 4 selected villages of Mathura district having sizable goat population. For selection of these villages, a bench mark survey was conducted in different villages of Mathura district and data on socio economic attributes of goat farmers were collected on structured schedules. Based on this survey, four villages, namely Pauri Shahjadpur, Pophu Burj, Jalal and Bar ka Nagla were finally selected for undertaking transfer of improved goat production technologies. Later on depending upon the number of goats 6 breeding bucks of Barbari breed (age 1.5 to 2.5 years) were provided to goat keepers of selected villages. During the breeding season bucks were provided with concentrate ration by the institute. Regular visits were undertaken in all 4 villages at fortnight intervals for 3 years. Data related to natural mating by institute's Barbari bucks and non - descript village bucks, pregnancy diagnosis, progeny born and reproductive parameters were collected on prescribed schedules developed for this purpose.

Pregnancy diagnosis in goats: Goats under 4 different villages were screened for their pregnancy status by abdominal palpation carried out at 80–90 days after mating. In doubtful cases, abdominal palpation was repeated at 15 days interval. Goat keepers were made aware for care and management of pregnant does. Before, during and after parturition and timely colostrum feeding to newly born kids.

Diagnosis and treatment of reproductive and parturient disorders in goats: Reproductive health care of affected goats of different villages was provided by undertaking regular visits at fortnight intervals. All goat farmers were kept in regular touch with the institute through 'Farmers Helpline

Service' provided by the institute. Goats suffering with particular reproductive disorder were treated and parturient disorders were attended in time.

Capacity building of goat keepers: In addition to regular visits in these villages, goat farmers were also motivated for adopting improved goat production practices by arranging on and off campus trainings besides health camps and kishan goshthies in operational villages.

Statistical analysis: Data related to reproduction parameters and kidding rate were analyzed by Student's 't' test and Analysis of Variance (ANOVA) at 95% confidence level (Snedecor and Cochran 1989).

RESULTS AND DISCUSSION

Reproduction rate/kidding rate and multiple births in goats: Data on kidding rate and multiple births and associated parameters under farmer's flocks following mating by village bucks and improved Barbari bucks supplied by the institute for breed improvement and ultimate enhancement in reproduction rate are presented in Tables 1, 2, respectively. Kidding rates of progeny born out of non descript and improved Barbari bucks are given in Table 3. There was a substantial improvement (12%) in multiple births (twins and triplets) following the introduction of improved Barbari breeding bucks under farmers flocks. A 2-fold increase in triplet births was also recorded (Tables 1, 2).

Reproductive and obstetrical disorders: Relative incidence of reproductive and obstetrical ailments in village goats was set out in Table 4. Among the reproductive disorders, anoestrus and abortion were encountered as major reproductive problems in the present study with an relative

Table 1. Distribution of births and kidding rate in goats reared in farmers' flocks using non descript bucks (village bucks)

Village	Type of birth (No.)			Totalbirth (No.)	Kids born (No.)			Kidding rate (mean $\pm$ SE)
	Single	Twin	Triplet		Male	Female	Total	
Pauri Shahjadpur	15	16	01	32	27	23	50	1.562 $\pm$ 0.101
Pophu Burj	26	17	01	44	32	31	63	1.438 $\pm$ 0.083
Jalal	32	16	-	48	33	31	64	1.333 $\pm$ 0.069
Barka ka Nagla	67	51	02	120	103	72	175	1.458 $\pm$ 0.048
Pooled	140	100	04	244	195	157	352	1.440 $\pm$ 0.033
Per cent	57.37	40.99	1.64		55.40	44.60		

Table 2. Distribution of births and kidding rate in goats reared in farmer's flocks using Barbari bucks (improved Bucks)

Village	Type of birth (No.)			Totalbirth (No.)	Kids born (No.)			Kidding rate (mean $\pm$ SE)
	Single	Twin	Triplet		Male	Female	Total	
Pauri Shahjadpur	14	30	02	46	48	32	80	1.739 $\pm$ 0.079
Pophu Burj	23	27	-	50	50	27	77	1.540 $\pm$ 0.071
Jalal	33	20	01	54	40	36	76	1.407 $\pm$ 0.073
Barka ka Nagla	40	47	05	92	90	59	149	1.619 $\pm$ 0.061
Pooled	110	124	08	242	228	154	382	1.578 $\pm$ 0.035
Per cent	45.45	51.24	3.31		59.70	40.30		

Table 3. Comparison of kidding rate using non descript (village bucks) and improved Barbari bucks (institute bucks)

Village	Kidding rate		Level of significance at 5% or 1%
	Non descript buck (mean $\pm$ SE)	Barbari buck (mean $\pm$ SE)	
Pauri Shahjadpur	1.562 ^a $\pm$ 0.101 (32)	1.739 ^a $\pm$ 0.079 (46) (46)	Non significant
Poppha Burj	1.438 ^a $\pm$ 0.083 (44)	1.540 ^a $\pm$ 0.071 (50) (47)	Non significant
Jalal	1.333 ^a $\pm$ 0.069 (48)	1.407 ^a $\pm$ 0.073 (54) (55)	Non significant
Bar ka Nagla	1.458 ^a $\pm$ 0.048 (120)	1.619 ^b $\pm$ 0.061 (92) (87)	**
Pooled	1.440 ^a $\pm$ 0.033 (244)	1.578 ^b $\pm$ 0.035 (242)	*
Overall kiddings	486		

Note: Means in a row with different superscript differ significantly; number of kiddings is in parentheses. *= At 5% level; ** = At 1% level

incidence of 35.14 and 15.32%, respectively (50.00%). During and after kidding retention of placenta (ROP) and insufficient dilatation of cervix (ring womb) were encountered as obstetrical problems with an incidence of 12.61 and 10.81%, respectively.

Kidding rate: Barbari breed has been well adapted to different agro-climatic regions of the country and used in several states under goat development programmes and also for commercial rearing (NBAGR 2005, Mohanasundarraj *et al.* 2011). In the present study there was a visible impact of superior breeding bucks of Barbari breed along with management of reproductive disorders (gynecological and obstetrical). Kidding rate was numerically higher in all village flocks sired by Barbari bucks, though it was statistically higher ($P < 0.01$) only in village Jalal. Irrespective of villages, kidding rate in goats sired by Barbari buck was significantly higher to non-descript buck ($P < 0.05$). The higher kidding rate in goats is one of the most desirable economic traits as increase in kidding rate lead to higher body weight/doe for meat and more female progeny for replacement (Singh *et al.* 2010). Introduction of Barbari bucks in these villages also upgraded the non descript goat population which fetched higher price in the market. There is a paucity of such information in literature, therefore comparison is not possible for kidding rate under village flocks. The present study indicated the positive impact of superior breeding bucks of Barbari breed and other goat production technologies in the terms of increased multiple births in progeny born out of Barbari bucks. It was ultimately reflected in increased kidding rates in overall goat population under farmers' flocks in village conditions.

Reproductive and obstetrical disorders: In the present study the incidence of reproductive disorders was of moderate degree. Anoestrus and dystocia followed by abortion were major gynaco-obstetrical problems observed in this study. In most of the cases narrow pelvic inlet (ring womb) resulted in dystocia. Other workers also reported similar findings while attending different reproductive disorders in small ruminants (Das *et al.* 2010, Goel and Sinha 2005, Islam *et al.* 2012, Purohit 2006). In the present study, with the

Table 4. Occurrence of reproductive and obstetrical disorders in goats reared in Farmers' flocks

Type of disorder (reproductive and obstetrical)	Year			Total (Relative %)
	2006-07 (No.)	2007-08 (No.)	2008-09 (No.)	
Anoestrus	18	17	4	39 (35.14)
Abortion(3 - 4 M)	10	7	-	17 (15.32)
Abortion(1-2 M)	-	-	3	3 (2.70)
Repeat breeding	-	2	2	4 (3.60)
Dystocia	10	08	07	25 (22.52)
Retention of placenta	5	5	4	14 (12.61)
Premature birth	2	2	1	5 (4.50)
Still birth	-	-	3	3 (2.70)
Uterine prolapse	-	-	1	1 (0.90)
Sub total	45	41	25	111

introduction of reproductive health care and prophylactic and therapeutic measures, a progressive trend in reduction in occurrence of reproductive disorders was evident over the years (Table 4). It clearly indicated a positive impact of goat reproduction and production technologies under field conditions.

Present study aimed to enhance performance of small ruminant value chain for increasing household income, generate employment and food security for multiplying goat development models to reduce the vulnerability of poor goat keepers. Thus use of Barbari bucks besides, awareness programmes for strategic supplementation of feed, health cover practices (including reproductive disorders) to be followed, will help in development of a sustainable and profitable goat production system for goat owners of this region. Combined genetic improvement and *in-situ* conservation will contribute for conservation of goat genetic resources in the country (Bhat 2011). In conclusion, study suggests that use of improved breeding bucks for longer period will bring visible breed improvement in farmers flocks by increase in Barbari population in its home tract. Technologies are expected prevent breed dilution and accelerate *in-situ* conservation approach to maintain biodiversity.

ACKNOWLEDGEMENTS

Authors are thankful to the Director, CIRG, Makhdoom for providing necessary facilities to carry out this study under field conditions. Thanks are also due to Mr. H. K. Himkar, Technical Officer of PRSM Division for technical help.

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