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POPULAR ARTICLE

## Achieving Gender Selection in Livestock by Sex Sorted Semen Technology

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### Introduction:

In most states of India, the slaughter of cows and the consumption of beef are currently illegal, and due to the development of new technologies in agriculture, the use of bullocks is decreasing day by day, which results in livestock owners showing less interest in keeping male animals, and they are generally left to roam outside, sometimes causing accidents on the roads. For all these reasons, the demand for calf production is increasing in India. Livestock owners typically hope for the birth of females to enhance milk production, and keeping all these reasons in mind, scientists have continuously worked to develop a new technique that determines the sex of the animal before conception.

### What is sex-sorted semen?

In the semen of male animals, there are two types of sperm, X and Y. When an X chromosome sperm meets with a female's egg, a female calf is produced, while a male calf is produced when a Y chromosome sperm meets with a female egg. Sex-sorted semen technology involves removing or killing the Y chromosome sperm when we want to produce a female calf, allowing only the X chromosome sperm to remain active in the semen, and this type of semen is called sex-sorted semen. Generally, when artificial insemination is done using normal semen, the likelihood of producing a female calf is 50%, whereas using sex-sorted semen increases the probability of producing a female calf to over 90%.

### History of Sex-Sorted Semen Technology:

In the 1990s, scientists in the USA first developed this technology in Beltsville, Maryland and patented it under the name 'Beltsville Sperm Sex Technologies.' Later, in 2001, the firm was licensed to commercialize sex-sorted semen. Currently, this firm commercially produces sex-sorted semen in several

countries including Europe, Canada, the USA, Brazil, China, Japan, and India.

In India, sex-sorted semen technology has been approved by the Government of India to establish a sex-sorted semen laboratory in the state of Uttarakhand under the National Gokul Mission, making Uttarakhand the first state in the country to enter into a contract with an American sex technologies firm and begin the production of sex-sorted semen in Rishikesh since April 2019. Currently, sex-sorted semen is being produced here for Holstein, Jersey, Red Sindhi, Gir, Sahiwal cows, and for Murrah and Mehsana buffaloes. Presently, in India, Genus ABS company is producing sex-frozen semen at the station in Gujarat, Junagadh and at the Livestock Development Board in Uttar Pradesh, Ballabgarh, while ST Genetics company is producing deep-frozen semen production facilities in Bhopal, Madhya Pradesh, and sex-sorted semen is being produced at BAIF - Development Research Foundation in Pune, Maharashtra.

### Benefits of Sex-Sorted Semen:

- Its main benefit is that it results in the birth of only females, reducing the costs associated with raising male animals.
- The higher number of female calves will increase milk production.
- With more female calves, farmers will not have to purchase animals from outside for dairy purposes.
- The highest quality semen is used in sorted semen, resulting in calves of good breed that produce more milk, thereby increasing the farmer's income.

### Challenges:

- Challenges arise from the use of high technology in the production of sex-sorted semen, which significantly increases its price compared to conventional semen. Making it available at an affordable rate through new technologies remains a challenge.
- Sex-sorted semen contains fewer sperm compared to regular semen, resulting in a lower chance of conception than traditional semen.

### Conclusion:

In India, sex-sorted semen technology has the potential to revolutionize the livestock sector, as it would not only reduce the number of stray male animals but also increase the income of farmers due to the production of female animals. The application of this technology can lead to the generation of high-yielding female livestock with good milk production and disease resistance. This technology can also be used in breeding improvement programs. Currently, sex-sorted semen is expensive, making it unaffordable for farmers. Efforts are being made to make sex-sorted semen available to farmers through the use of new technologies and government subsidies.

In the future, this technology could prove to be a boon in increasing the income of livestock farmers.