Healthy buffalo calves produced from semen of the cloned bulls

Buffalo is the mainstay farm animal in India's agricultural economy. Buffalo contributes approximately 50% of the total milk production, despite its population being half that of cattle; thus, playing important role in farmers' livelihood. Over the decades, the National Dairy Research Institute (NDRI), Karnal under the aegis of the Indian Council of Agricultural Research (ICAR) has been working on genetic improvement of this valuable milch animal species. For the faster multiplication of elite germplasm, NDRI has developed a simple, economical, and efficient animal cloning technology, called handmade cloning, that used to produce over 30 cloned buffaloes in the country. To upgrade the genetic potential of low milk producers and non-descript buffaloes; Indian government has proposed increasing the coverage of artificial insemination (AI) from the current 30% to 80-90% by the end of 2025. Therefore, there is a huge requirement of semen from high genetic merit bulls for breeding (as of 2020, India has 55 million breedable female buffaloes).

In India, due to a severe shortage of elite bulls, semen available from progeny-tested bulls is not sufficient to cover even 5% of the breedable population of livestock. To meet the target of the government, NDRI has been working to propagate quality breeding bulls through buffalo cloning technology. Buffalo cloning is an advanced technology that offers to make genetic copies of the elite bulls in the shortest possible time. NDRI has produced several cloned breeding bulls, of which two breeding bulls (named Swarn and Rajat) were used to demonstrate the fertility of cloned bulls. Scientists of NDRI found that physical semen parameters such as volume, sperm concentration, and post-thaw motility are similar to non-cloned bulls. Also, at the molecular level, sperm transcripts and miRNA regulating spermatogenesis, fertility, and early embryonic development are same between the clones and their parents.

To determine the fertility of cloned bulls, 20 female buffaloes were inseminated with the semen of two above mentioned cloned bulls. Following insemination in female buffaloes, a 65% conception rate was achieved which is normal in buffaloes. Twelve healthy calves (six females and six males) have been produced and further attempts are ongoing to produce more calves. These calves are physiologically normal, growing well and healthy. Very recently, under the NASF-funded project, NDRI has also produced two cloned copies of 1st ranked progeny tested bull Mu-4354 (15^{th} set of ICAR's Network Project on Buffalo Improvement), and these two clones are growing well and healthy, and ready for semen production. Scientists, who are involved in buffalo cloning project, have the opinion that it is necessary to develop a road map to include semen of cloned bulls in classical breeding programs. Trials carried out at the NDRI will certainly help to reach technology at farmer's doors for enhancing the productivity of their animals which will lead to future sustainable milk production in the country.

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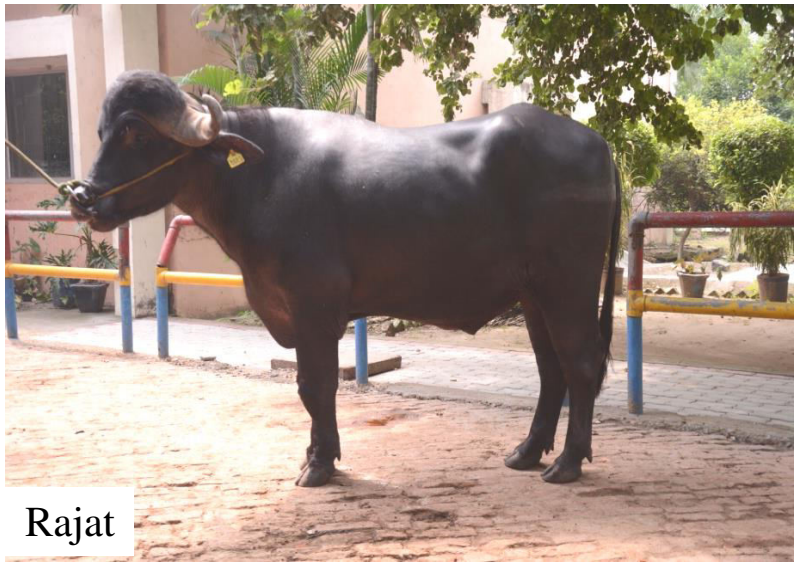
(Source: ICAR-NDRI, Karnal)

Healthy buffalo calves produced from semen of the cloned bulls at ICAR-NDRI, Karnal

Swarn



Rajat

Calves produced using semen of the cloned buffalo bulls namely Swarn and Rajat
(Calves are born between Aug to Dec 2021)