

Estrus synchronization and fixed time

artificial insemination (AI) in pig: Improving the pig productivity

**Mahak Singh*, R Talimola Mollier, Rakesh Kumar, Rahul Katiyar,
D J Rajkhowa and V K Mishra**

ICAR Research Complex for NEH Region, Nagaland Centre, Medziphema 797 106

Pig rearing is being practiced in North Eastern Hill (NEH) region of India since time immemorial. This region has around 46% of total pigs of the country. In India, the per capita consumption of pork is highest in NEH region. However, pig production system of this region faces several challenges for its sustainability. The pig productivity is low in this region, mainly because of lack of adoption of scientific pig breeding. There is a need to improve the pig productivity through use of modern reproductive biotechnology like estrus synchronization and artificial insemination. Estrus synchronization and fixed time artificial insemination is proven second generation reproductive biotechnology used in animal breeding. This involves synchronization of estrus in a group of breeding female followed by artificial insemination at fixed time. In pigs, this technology is being successfully used in Western Europe and other countries; however, it has not been used on commercial scale in India. A new protocol for estrus synchronization suitable for Indian condition has been described in this article.

Keywords: Artificial insemination, Estrus synchronization, Pig productivity

ECONOMICAL pig production warrants the high reproductive efficiency of the sows. In Indian condition, this means production of minimum 20 numbers of piglets per sow in a year from two farrowings. Pig production system in NEH region is dominated by small holders for fattening, in which least priority is given to reproductive efficiency. Also, there is lack of awareness among the farmers about improved pig breeding technologies. Here, we describe a new technology of estrus synchronization and fixed time artificial insemination in pigs to improve the reproductive efficiency. This technology can be adopted by small farmers particularly in remote areas and for commercial farms, this technology is a boon to improve the farm efficiency and productivity

Pig population in Nagaland is around 4 lakhs (2019), which has decreased from 2012 livestock census. The per capita consumption

of pork is highest in Nagaland. However, the state is deficient by almost 50% in pork and depends upon imports from other states. In long run, this is not economical and environmentally sustainable. The pig production system in the region is low in input and output with rearing of 2–3 pigs per household. Here, pigs are reared in traditional way with use of outdated technologies. The farmers prefer fattening system over breeding system. The reasons for low reproductive efficiency of pig in Nagaland are lack of knowledge about breeding; unavailability of breeding boars; high cost of natural breeding; inbreeding due to prolonged use of same boar in a village; and over use of breeding boars. However, with artificial insemination coupled with estrus synchronization, these constraints can be addressed.

Estrus synchronization

The key reproductive events that determine the reproductive output of sow is beginning of estrous cycle whose duration is 21 days in sow. In estrous cycle, estrus phase is most crucial as this is the window during which breeding takes place and this is the only identifiable period. Estrus last for two days in gilt and three days in sow. Estrus synchronization is the technology by which estrus in large numbers of gilts or sows are expressed at given time. This can be done by several methods including hormonal and non-hormonal methods. Latter includes, synchronized weaning, boar parading, biostimulation and transportation stress. Hormonal methods include injection of cocktails of hormones or oral administration. The most common hormonal method is use of PG 600. This contains 400 IU of pregnant mare serum gonadotrophin



Estrus synchronization of pig at Phek district, Nagaland



Artificial insemination in pig after estrus synchronization



Farmers at ICAR Nagaland centre for collection of AI kit



Hormones for estrus synchronization in pig

(PMSG) and 200 IU of Chorulon. However, readymade PG 600 is not available in India and therefore requires mixing of two hormones at the time of administration. PG 600 was developed for European and American pigs. In general, body size of pigs in Europe and USA is larger than in India. Therefore, it warrants development of estrus synchronization protocol suitable for Indian condition.

ICAR Research Complex for NEH Region, Nagaland Centre, Medziphema has developed a new protocol for estrus synchronization in pig. In this, healthy non-pregnant animals are selected for estrus synchronization. For this, age of gilt should be 10 months or above and sow should have weaned 15 days before the start of treatment. The body condition core of the animal should be 3 on 1–5 scale before start of synchronization. The animal should be de-wormed before start of estrus synchronization protocol. Also, the animals should be given

20 g of mineral mixture daily in the feed. Then, the animals should be injected with 300 IU of PMSG and 150 IU of Chorulon. For 10

animals; mixing of three vials of PMSG and one vial of Chorulon in 30 ml of sterile water is required. Then injected 3 ml to each animal in

Success story

ICAR Nagaland Centre in collaboration with KVK Porba has demonstrated this technology in far flung area of Nagaland. In March 2021, 30 numbers of sows and gilts were selected for estrus synchronization in Pfutsero block of Phek district. The district was selected because of its remoteness and willingness of the farmers to participate in this study. The district is inhabited by Chakeshang tribe and tribal authority has imposed a total ban on import of adult pig in the district to stop the African swine fever. Therefore, to make it self-sufficient in pork production, KVK Porba approached ICAR Nagaland Centre. Estrus synchronization was done with new protocol developed by ICAR Nagaland Centre. Out of 30 pigs, 24 came into heat within 72 hours and were inseminated with AI technology of our centre at once. At the end of gestation period, 20 pigs farrowed (farrowing rate 83%) and gave births to 142 numbers of live piglets. The value of piglets produced at Pfutsero is ₹9.94 lakhs (₹7000/piglet). Within a four month period, the farmers earned the profit from adoption of modern technology. This is the first time that at a remote place, estrus synchronization and artificial insemination technology was demonstrated. Artificial insemination coupled with estrus synchronization reduced the breeding cost significantly and improved the reproductive efficiency.

vulvar submucosa or at neck region intra-muscularly. The animals should be observed in morning and evening for estrus. Estrus signs include swelling and reddening of vulva, frequent urination, grunting, less feed intake, mounting on other pigs or wall. The animals should be tested for standing heat by back pressure test. In this protocol, animals will exhibit estrus within 48–96 hours of injection. Artificial insemination can be done after 20 hours of estrus exhibition in gilts and after 30 hours in sows. Artificial insemination should be repeated after 12 hours. It is important to note that timing of AI is very important to get good farrowing rate and litter size. With this protocol, 80–90% animals come into estrus.

Advantages and application of estrus synchronization and fixed time AI in pig:

- It is easy and cost effective compared to natural breeding.
- This technology facilitates

introduction of new genetics in a short period.

- Sows in a village can be bred at one time and therefore, saves time and money.
- It increases reproductive efficiency of farm and helps in obtaining two farrowing per pig in a year.
- This is of much importance to pigs in remote area.
- It helps in better management of animals during pregnancy and farrowing.
- It facilitates better record keeping.
- Piglet crop will be uniform in age and size.
- It provides better marketing opportunities.
- If a sow is not giving sufficient milk then its piglets can be fostered at other sows.

breeding technology which offers great advantages over conventional breeding. Besides improving pig productivity and efficiency, it also improves farm management. With this, pig germplasm of North East India can be improved in a shorter time interval. This technology is of much help to the farmers in remote areas where access to good breeding boar is a problem. This also significantly reduces the management cost and thereby improves the efficiency of the pigs. As there is no need to keep the boar for breeding thereby reduces the environmental footprints. Therefore, there is urgent need to percolate this technology to the farmers of this region.

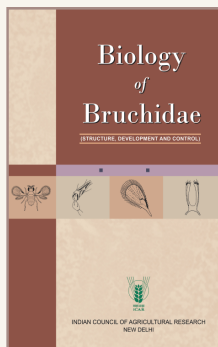
SUMMARY

Estrus synchronization and fixed time artificial insemination in pig is a low cost second generation

*Corresponding author's e-mail: smileymahak@gmail.com

Biology of Bruchidae

(STRUCTURE, DEVELOPMENT AND CONTROL)



The family Bruchidae includes simple and clean beetles, friendly in their appearance and open in their ways of life. Bruchids are in direct competition with human beings for exploiting the rich food sources and hence the concern for the suppression of the populations of pest species. Different control measures against bruchids can be successful only by first acquiring knowledge on the true identification, complete life-cycles and other biological characteristics of the pest species. At the same time, the host ranges, polymorphism, trophic relationship and interaction between pests and parasitoids, need to be studied for the success of any control measure. All these problems have been discussed in the '*Biology of Bruchidae*'. Although the details of the taxonomy are beyond the scope of this book yet a list of known Indian species along with their hosts and apparent identification remarks on the pest species have been added for the benefit of the workers interested in the Bruchidae. Also the recent nomenclature has been given for the species referred to in the text which is not usually available to researchers on different aspects of Bruchidae.

TECHNICAL SPECIFICATIONS

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