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Innovation in livestock production: the example of the adoption of *in vitro* fertilization by the Brazilian embryo industry

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There was a significant increase in bovine embryo production in Brazil in the last decade. This increase was directly related to the expansion in the use of *in vitro* fertilization (IVF), which became the technique of choice to increase the number of embryos and offspring from genetically superior animals, mainly in zebu breeds. The growing adoption of IVF resulted in expansion in the Brazilian embryo industry, and consequently in the participation of the country in the total of embryos produced in the world. But more than only increasing the number of embryo transfers, IVF is changing embryo business. After the initial period, during which the technique was labeled as "elitist", IVF was progressively recognized as a strategy for large scale embryo production, allowing genetic progress to reach all productive sector. Moreover, IVF brought new possibilities, such as the production of offspring from pre-pubertal heifers or pregnant cows, and caused the emergence of a parallel market of equipments, media and disposables. The embryo production process, initially performed in the farms by one or few practitioners, shifted to an "industrial stile" chain, with many different tasks being performed by different teams, with different skills, and in different places. More recently, the emergence of sex-sorting semen technology allowed the increase in the use of IVF in dairy breeds, and also changed paradigms. Some interesting examples are the use of IVF for the generation of crossbred animals, and the partnership of dairy cooperatives and IVF labs to produce replacement heifers for small dairy farms. In conclusion, the use of IVF technologies in Brasil can be a model to study innovation in livestock production.

SP 6013
P. 155

SP 6013 P. 195
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