



Impact of Follicular Aspiration on Follicular Dynamics and Ovarian Function in Dairy Cattle

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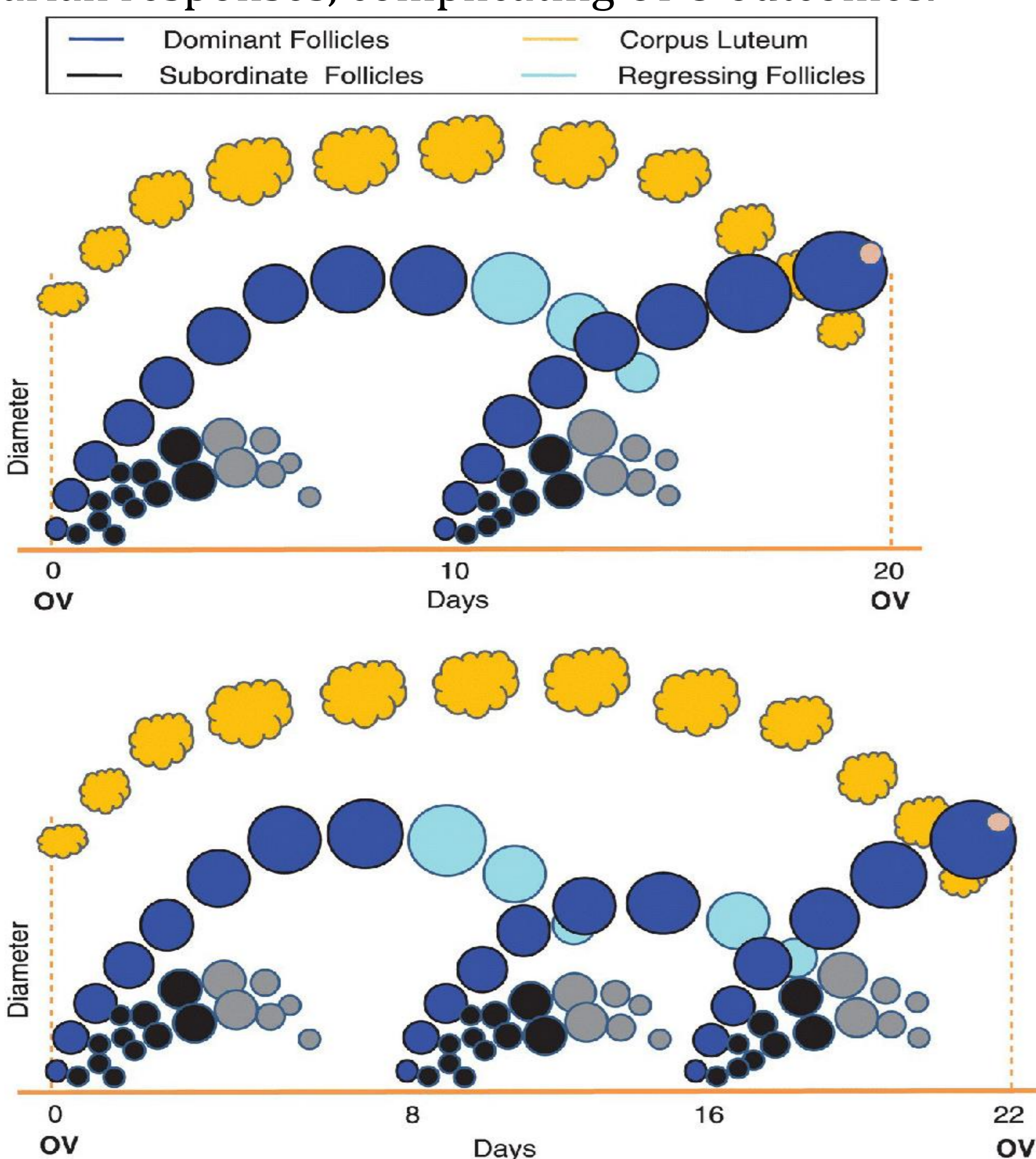
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Abstract: Follicular aspiration is a widely used technique in ovum pick-up (OPU) procedures for harvesting cumulus oocyte complexes (COCs) and plays a significant role in controlling ovarian physiology in dairy cattle. Follicular development occurs in distinct waves regulated by endocrine and intra-ovarian mechanisms including follicle recruitment, selection, and dominance. When follicles are removed through aspiration, this disrupts the natural sequence of events, leading to new follicular wave emergence. Evidence suggests that follicular aspiration can enhance follicular turnover by stimulating new follicle recruitment while preventing prolonged dominance. However, frequent aspiration may lead to local ovarian trauma, affect vascularization, and potentially lower oocyte quality. Key influencing factors include metabolic status, stage of lactation, and antral follicle count. A deeper understanding of its effects is mandatory for optimizing reproductive technologies and improving fertility in dairy cattle.

• Introduction

Follicular development in cattle occurs in recurrent waves driven by FSH and intra-ovarian mechanisms controlling recruitment, selection, and dominance of follicles. The dominant follicle suppresses subordinate follicles through endocrine and local ovarian signals. Follicular aspiration (OPU) enables repeated oocyte retrieval without surgery and is essential for *in vitro* embryo production (IVEP). Aspiration removes growing follicles and thus modifies follicular wave patterns and ovarian function. High-yielding dairy cows under negative energy balance may show altered ovarian responses, complicating OPU outcomes.



• Objectives and Approach

This review evaluates the effects of follicular aspiration on follicular dynamics and ovarian function in dairy cattle, focusing on: (1) follicular wave patterns; (2) oocyte competence; (3) reproductive performance. A narrative synthesis of published literature was performed, covering bovine reproductive physiology, OPU techniques, and outcomes of repeated follicular aspiration procedures in *Bos taurus* dairy cows under varying physiological and management conditions.

• Results and discussions

Removal of the dominant follicle releases subordinate follicle suppression, triggering a new follicular wave earlier than expected. OPU thus resets follicular dynamics by interrupting dominance and enabling FSH-driven recruitment. Repeated aspiration may increase follicular turnover and oocyte availability; however, more oocytes do not always mean better quality. Oocyte competence depends on follicular maturity, donor physiology, and the local follicular environment. Animals with higher antral follicle counts generally show better IVEP outcomes. Negative energy balance in high-yielding dairy cows impairs folliculogenesis, alters progesterone levels, and reduces oocyte developmental potential. Frequent aspiration may also cause local ovarian trauma, affecting vascularization and subsequent follicular development.

• Conclusions

Follicular aspiration is a valuable tool in dairy cattle reproduction, influencing both follicular dynamics and ovarian function. Removing the dominant follicle triggers new wave emergence and supports repeated COCs recovery for IVEP. Its effectiveness depends on donor physiology, ovarian reserve, lactation stage, energy balance, and technical protocol. Optimal outcomes require individualized management, careful timing of OPU procedures, and a thorough understanding of bovine follicular physiology.