

RABBIT REPRODUCTION AND PERIPARTUM BEHAVIORS OF DOES IN LIGHT OF SCIENTIFIC RESEARCH

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Abstract

The aim of this work was to review the available literature on rabbit reproduction and the peripartum behavior of does. The available literature indicates that maternal behavior in rabbits is highly repeatable, regardless of breed or housing conditions. Interactions between the mother and her young follow a strictly defined circadian rhythm in both wild and domesticated rabbits. Key maternal behaviors include nest building and nursing. The nest-building reflex results from hormonal changes, mainly an increase in β -estradiol and progesterone levels. Before parturition, the doe prepares the nest by lining it with her own fur, which is associated with elevated prolactin levels. After the young are born, the doe no longer modifies the nest, and nursing takes place once a day, usually before dawn, and lasts only a few minutes. Rabbits have a hemochorial placenta, which provides fetuses with passive immunity even before birth. In addition, immunoglobulin-rich colostrum increases their survival. Milk production ceases around day 25 postpartum, and the young are usually weaned after 28 days. Does may become pregnant again immediately after giving birth; however, simultaneous nursing and pregnancy can lead to lactation disorders and an increased risk of stillbirth. Prolonged presence of the young with the mother after weaning may cause social stress and health problems in the doe, such as teat injuries. Under farm conditions, nest quality improves up to the third parturition.

Keywords: domestic rabbit, doe, reproduction, peripartum behavior

Introduction

Reproduction in domestic rabbits is an important issue in both small-scale and commercial breeding. Rabbits are characterized by exceptional fertility and a short reproductive cycle, which allows their populations to increase rapidly. The reproductive process includes a number of important stages, from the female sexual cycle through mating and pregnancy to parturition and care of the young. Understanding peripartum behavior in rabbits is essential for providing appropriate care and minimizing stress during this critical period.

Pregnancy in the doe lasts on average 28–32 days (Wilson and Dudley, 1952), during which the animal may show behavioral changes such as increased aggression or appetite. In the last

days before parturition, the doe intensively builds a nest using hay, straw, and her own fur, which she pulls from the ventral abdominal area. This is a natural behavior intended to provide the young with an appropriate temperature and protection. Parturition usually occurs at night or in the early morning and is relatively brief, typically lasting from several to a dozen or so minutes (Martínez-Gómez et al., 1997). Newborn kits are blind, hairless, and completely dependent on their mother. Research by García et al. (2021) indicates that fetal weight is a key parameter determining fetal survival toward the end of pregnancy. The doe nurses her young once or twice daily, providing high-energy milk that ensures rapid growth and development (Jilge, 1993; Coureaud et al., 2000; Schlolaut et al., 2013). Mother–young interactions are limited, which reflects the instinctive need to minimize the risk of the nest being detected by predators.

Knowledge of these processes enables breeders to prepare appropriate conditions for pregnant does and newborn rabbits, thereby increasing their chances of survival and proper development. Proper herd management, control of litter size, and provision of an adequate diet and hygiene are key factors affecting the health and welfare of these animals. This paper discusses in detail all stages of rabbit reproduction and their peripartum behavior on the basis of numerous scientific studies. The information presented should contribute to a better understanding of this aspect of rabbit biology and to more effective management of rabbit breeding.

Rabbit reproduction

Female reproductive maturation begins at an early stage of postnatal life. By the end of the second week, oögonia, i.e. immature female germ cells, transform into oocytes. During the following week they reach the diplotene stage, the fourth stage of the first meiotic division, and remain arrested in this phase until ovulation. Ovarian follicles begin to mature at approximately 90 days of age and reach full development by day 120. Female rabbits are considered reproductively mature when their reproductive tract has reached a stage that allows capacitation, the process enabling spermatozoa to penetrate the oocyte envelope and requiring factors present in the uterine and oviductal epithelium, as well as fertilization and implantation. In addition, ovulation occurs, the female accepts the male, and the fetuses are capable of surviving with vital functions until the natural termination of pregnancy by parturition, followed by lactation and normal maternal care.

In most mammals, body weight is nevertheless the practical indicator used to determine sexual maturity (May and Simpson, 1975). Rabbits of larger breeds generally reach reproductive maturity later than medium-sized animals (Szendrő et al., 2012). Rabbits are polyestrous animals and undergo many estrous cycles throughout the year; consequently, they can reproduce year-round (Kowalska, 2006; Bernacka and Świącicka, 2015). Estrus in females can be recognized by swelling of the vulva accompanied by red or slightly violet coloration (Maertens, 1998). When the male is placed in the female's cage, mating occurs naturally provided that she accepts him. Otherwise, the doe may need to be restrained by the breeder to prevent escape (Gacek, 2010). It is advisable to mate the female twice (May and Simpson, 1975; Szendrő et al., 2012) to prevent regression of the corpus luteum (May and Simpson, 1975), which produces progesterone necessary for maintaining early pregnancy. However, it should be taken into account that female acceptance of the male decreases with time after copulation (Szendrő et al., 2012). During estrus, domestic rabbit does display a characteristic scent-marking behavior known as “chinning”. It consists of rubbing the ventral surface of the chin against objects, probably depositing secretions from the submandibular glands. The intensity of this behavior decreases within minutes after copulation and remains reduced throughout pregnancy and lactation. Disappearance of chinning is regarded as a behavioral signal of transition from estrus to pregnancy (Chmurska-Gąsowska and Sowińska, 2020). Chen et al. (2023) observed that does

in estrus showed reduced feeding and drinking activity while increasing the frequency of grooming behavior. A study by Iles (2018) involving 107 females indicates that a vocalization test may serve as an additional diagnostic indicator of pregnancy in rabbits, because more than 75% of pregnant does vocalized in the presence of a male.

Sexual activity in rabbits is regulated by the HPG axis (hypothalamic–pituitary–gonadal axis). Gonadotropin-releasing hormone (GnRH), produced by the hypothalamus, subsequently stimulates pituitary secretion of follicle-stimulating hormone (FSH) and luteinizing hormone (LH) (Mattioli et al., 2021). In females, FSH is responsible for ovarian follicle growth, whereas LH is closely associated with ovulation. These hormones also influence the production of ovarian steroid hormones—estrogens and progesterone—which, through feedback mechanisms, affect secretion of the aforementioned hormones. The functioning of this axis may also be influenced by other hormones, such as opioid peptides—endorphins and catecholamines—or hormones produced through activation of the HPA axis (hypothalamic–pituitary–adrenal axis), including corticotropin-releasing hormone (CRH), adrenocorticotrophic hormone (ACTH), and cortisol (Theau-Clément, 2000). Mating is followed by a release of LH and FSH (Szendrő et al., 2012). The rise in LH is caused by stimulation of a neurohormonal reflex triggered by copulation, which induces ovulation (Gogol, 2015). This process is termed induced ovulation and occurs 10–14 hours after copulation (Walton and Hammond, 1928; Hill and White, 1933; Szendrő et al., 2012; Mattioli et al., 2021). The highest fertilization rate is achieved approximately 2 hours after copulation (May and Simpson, 1975), although after ovulation unfertilized oocytes remain viable for another 8–9 hours (May and Simpson, 1975). At the same time, after approximately 6–8 hours (May and Simpson, 1975; Szendrő et al., 2012), they become covered by a mucin coat that prevents fertilization (May and Simpson, 1975). Three days after copulation, blastocysts are transported to the uterus, where they are distributed over the next two days by waves of uterine muscle contractions. Between days 5 and 7 they enlarge rapidly and stretch the uterus, which in turn influences fetal distribution. The position of a fetus relative to the ovary is directly associated with its weight—the farther from the ovary, the lower the fetal weight (May and Simpson, 1975). This also affects the probability of survival to parturition: fetuses with excessively low body weight have a much lower chance of survival than heavier fetuses (Duncan, 1969). In each pregnancy, females of smaller breeds develop an average of 4–5 fetuses, whereas females of larger breeds develop 8–12 (Pinto-Pinho et al., 2023). Kindling occurs approximately 30 days after copulation (Wilson and Dudley, 1952; Hudson et al., 2000; Gacek, 2010; Bernacka and Świącicka, 2015; Lopez-Tello et al., 2017). Results reported by Yunusov et al. (2024) indicate that gestation length in rabbits is directly correlated with litter size. Gestation was found to be longer in females carrying fewer young than in females producing larger litters.

Postpartum estrus occurs within 2–3 days after parturition (Theau-Clément, 2000; Kowalska, 2006). If fertilization does not occur after ovulation, pseudopregnancy lasting approximately 17 days may develop. This is associated with transformation of ovulated but unfertilized ova into corpora lutea, which secrete progesterone and subsequently regress, causing progesterone levels to decline and pseudopregnancy to resolve. Nevertheless, during pseudopregnancy rabbits remain sexually active, copulate, and females ovulate (May and Simpson, 1975). The hormonal profile during the first trimester of true pregnancy in the doe does not differ from that of a pseudopregnant female (Chmurska-Gąsowska and Sowińska, 2020). Researchers recommend using environmental enrichment in cages of pregnant does because it has been shown to positively affect maternal behavior as well as the growth and development of offspring (Nakamura et al., 2025).

Parturition usually occurs in the morning and lasts no more than 10–15 minutes in order to reduce the risk of neonatal death, which increases as delivery is prolonged. This is related to the considerable length of the doe's vagina combined with relatively frequent rupture of the

umbilical cord within the birth canal. Such rapid delivery is enabled by the release of large amounts of oxytocin into the bloodstream and probably by the action of a well-developed set of strong vaginal muscles (Martínez-Gómez et al., 1997). The young are born detached from the placenta and usually already free of fetal membranes (Hudson et al., 2000). Immediately after birth, the kits display characteristic nipple-searching behavior. In many cases this results in rapid intake of colostrum, often within a few minutes or even sooner, while the doe consumes the placenta and parturition is still in progress (Fuentes-Hernandez, 2021). The mother readily eats the placentas and licks remnants of fetal membranes from her offspring (Coureaud et al., 2000; Hudson et al., 2000); however, even when she does not perform these behaviors, the young are able to cope on their own (Hudson et al., 2000). Fernandez-Carmona et al. (2005) found that rabbit does show increased activity on the first day of lactation, which may be associated with a state of stress.

Reproductive problems become more frequent as the doe ages (May and Simpson, 1975). The number of ova released and the implantation rate do not change significantly during the first 11 pregnancies. Thereafter, the number of fetuses surviving to term decreases markedly, although this decline already begins after the third pregnancy. Difficulties in the normal course of reproduction may result from developing uterine abnormalities, a reduced ovulation rate, and deterioration in oocyte quality, which may lower the fertilization rate, increase the probability of arrested zygotic divisions, or cause embryonic death at later stages (May and Simpson, 1975). Abnormal protein expression may reduce uterine resistance to metabolic stress, thereby adversely affecting pregnancy rate (de Nivelle et al., 2020). It has been reported that mating a female born to older parents with a several-year-old male results in a higher frequency of stillbirths. Likewise, reduced fertility is associated with mating young or middle-aged females with old males (May and Simpson, 1975). In males, spermatogenesis begins at approximately day 63, and by around day 84 all seminiferous tubules are active; however, spermatozoa do not reach the lumen of the body of the epididymis until approximately day 112. The accessory sex glands mature much later, with increased secretory activity observed no earlier than one year after birth. Sexual maturity is determined by the ability to produce enough spermatozoa to fertilize the maximum number of ova produced by the female (May and Simpson, 1975), which occurs at approximately 224 days of age (Amann and Lambiase, 1967). Unlike in most mammals, in which sperm transport to the site of fertilization takes only a few minutes, in rabbits it takes several hours (May and Simpson, 1975), and at least 5–6 hours must elapse before a sufficient number of spermatozoa reach the oviducts to achieve maximum fertility (Yanagimachi and Chang, 1963). This is associated, among other factors, with the inhibitory effect of estrogen on sperm motility in the oviduct (May and Simpson, 1975), because spermatozoa reach the cervix within only 5 minutes after copulation (Bedford, 1971). They appear in the ampulla of the oviduct, the site of fertilization, after approximately 10–12 hours and retain fertilizing capacity for about 4 hours (Szendrő et al., 2012). Entry of an excessive number of spermatozoa into the oviduct may adversely affect fertility because of their limited capacity for capacitation (May and Simpson, 1975).

Peripartum behavior of does

Mother–young behavior in rabbits is characterized by marked stereotypy and is largely independent of breed or housing conditions. In addition, rabbits display a strict daily pattern of physiological and behavioral responses that are precisely timed and regulate interactions between the mother and her young (Hudson et al., 2000). This is also reflected in similarities between certain behaviors of wild and domesticated rabbits, even though husbandry conditions do not fully reproduce the natural environment. Maternal behavior in does consists primarily of nest building and nursing (Benedek et al., 2020). The nest-building reflex is induced by an

increase in β -estradiol and progesterone levels on days 25–26 of pregnancy (Benedek et al., 2020). Subsequently, beginning as early as 3 days before parturition (Hudson et al., 2000; Coureaud et al., 2008), progesterone levels decrease, triggering fur pulling and the gathering of material used to fill the nest. A decrease in progesterone is a prerequisite for parturition (Hudson et al., 2000; Benedek et al., 2020). Pulling fur from the abdominal and thoracic regions (Hudson et al., 2000) to line the nest is also influenced by increased prolactin levels (Benedek et al., 2020). After parturition, the doe stops enlarging or modifying the nest (Hudson et al., 2000). In females with elevated cortisol levels, which interfere with progesterone production, nest building is delayed, although nest quality is not affected. Moreover, litters from these females are smaller and have higher mortality (Benedek et al., 2021). Under farm conditions, does usually build nests in nest boxes with a permanently open entrance or an uncovered top. Nest quality gradually improves up to the third parturition (Benedek et al., 2020). Rabbits have a hemochorial placenta (Lopez-Tello et al., 2017; Pinto-Pinho et al., 2023), which is highly permeable and allows the young to acquire passive immunity from the mother before birth. Consequently, it has been suggested that kits do not necessarily need to ingest colostrum immediately after birth; nevertheless, colostrum probably contributes to improved survival, especially in kits from first litters (Coureaud et al., 2000). Colostrum is rich in immunoglobulins (Wise et al., 1971) and contains more protein, lipids, and lactose than milk produced at later stages (Coureaud et al., 2000). Nursing usually occurs once daily for 3–4 minutes (Jilge, 1993; Coureaud et al., 2000; Schlolaut et al., 2013), generally in the early morning before dawn (Hudson et al., 2000; Gerencsér et al., 2008). This time is particularly preferred during the first two weeks of the young rabbits' lives (Hudson et al., 2000). When the nest is continuously accessible, a second nursing bout may occur, mainly during the first week after parturition (Coureaud et al., 2008). The doe may also visit the nest more frequently, but such visits do not result in greater milk intake or faster growth of the young (Hudson et al., 2000; Schlolaut et al., 2013). To nurse, the doe enters the nest and remains motionless above the bedding, leaving the kits to locate the teats and suckle on their own. Mothers rarely change position during nursing, even when kits trapped under the doe's hind legs vocalize and attempt to pull free (Hudson et al., 2000). Despite the effort required to locate a teat, kits switch teats several times during nursing, even though this reduces the actual feeding time to less than two minutes (Hudson et al., 2000). At the end of nursing, the doe abruptly interrupts suckling by jumping out of the nest. Although farmed does cannot close the nest after leaving it, they retain the instinct to dig and scratch at the entrance (Hudson et al., 2000). Does cease closing the nest only around days 20–22 postpartum (Coureaud et al., 2008). To help the young locate the teats, the doe produces a pheromone that acts as an olfactory cue (Hudson et al., 2000). This pheromone is present on the doe's abdomen and in her milk (Hudson et al., 2000), and its production is hormonally regulated and depends on estradiol, progesterone, and prolactin (González-Marsical et al., 1994). Kits recognize their mother using odors already memorized in the prenatal environment and also display general appetitive responses to the milk produced by the doe (Coureaud et al., 2008). Through hormonal mechanisms, milk production ceases around day 25 postpartum (Schlolaut et al., 2013). A doe may become pregnant again immediately after parturition because of postpartum estrus (Chmurska-Gąsowska and Sowińska, 2020). In such females, especially when they are additionally forced to nurse during the day, nursing-related behavior becomes disturbed as early as the first week of the new pregnancy, and gestation is often prolonged and associated with a high risk of stillbirth. This is probably related to disturbed oxytocin production caused by daytime nursing (Hudson et al., 2000). In addition, females remated immediately after parturition reach peak milk production earlier (Schlolaut et al., 2013). Weaning usually takes place around 28 days postpartum (Coureaud et al., 2008; Schlolaut et al., 2013), shortly after the maternal lactation peak, and is a relatively abrupt event. If the young remain with the mother in the same cage beyond this time, they may force access to the teats and cause a form of social stress,

particularly when food availability is insufficient. Limited space means that attempts by the doe to avoid suckling by lying down or fleeing are usually unsuccessful, and the resulting stress may suppress immune processes in the female. At the same time, this behavior of the young toward the mother contributes to teat injuries and secondary disease (Schlölaut et al., 2013).

Summary

Maternal behavior in rabbits is highly repeatable, regardless of breed or housing conditions. Interactions between the mother and her young follow a defined circadian rhythm in both wild and domesticated animals. Key components of maternal behavior include nest building and nursing. The nest-digging reflex results from hormonal changes, mainly an increase in β -estradiol and progesterone levels. Before parturition, the doe prepares the nest by lining it with her own fur, which is associated with elevated prolactin levels. After the young are born, the doe no longer modifies the nest, and nursing takes place once a day, usually before dawn, and lasts only a few minutes. Rabbits have a hemochorial placenta, which provides fetuses with passive immunity even before birth. In addition, immunoglobulin-rich colostrum increases the survival of the young. Milk production ceases around day 25 postpartum, and weaning usually occurs at approximately 28 days. Does may become pregnant again immediately after giving birth; however, simultaneous nursing and pregnancy may lead to lactation disorders and an increased risk of stillbirth. Prolonged presence of the young with the mother after weaning may cause social stress and health problems in the doe, such as teat injuries. Under farm conditions, the quality of nests improves up to the third parturition.

References

- Amann R.P., Lambiase J.T. (1967). The male rabbit. I. Changes in semen characteristics and sperm output between puberty and one year of age. *J. Reprod. Fert.* 14: 329–332.
- Bedford J.M. (1971). The rate of sperm passage into the cervix after coitus in the rabbit. *J. Reprod. Fert.*, 25: 211–218.
- Benedek I., Altbäcker V., Zsolnai A., Molnár T. (2020). Exploring the genetic background of the differences in nest-building behavior in European rabbit. *Animals*, 10: 1579.
- Benedek I., Altbäcker V., Molnár T. (2021). Stress reactivity near birth affects nest building timing and offspring number and survival in the European rabbit (*Oryctolagus cuniculus*). *PLoS ONE*, 16, e0246258.
- Bernacka H., Święcicka N. (2015). Warunki utrzymania królików w różnych systemach chowu. *Prz. Hod.*, 5: 30–32.
- Chen X., Jin R., Yang, A., Li J., Song Y., Zhao B., Chen Y., Wu X. (2023). Behavioral and physiological differences in female rabbits at different stages of the estrous cycle. *Animals*, 13: 3414.
- Chmurska-Gąsowska M., Sowińska N. (2020). Hormonal regulation of pregnancy and related behavioral changes in rabbit. *Vet. Med. – Science & Practice*, 76, 1: 11–16.
- Coureaud G., Schaal B., Coudert P., Rideaud P., Fortun-Lamothe L., Hudson R., Orgeur P. (2000). Immediate postnatal sucking in the rabbit: Its influence on pup survival and growth. *Reprod. Nutr. Dev.*, 40: 19–32.
- Coureaud G., Fortun-Lamothe L., Rödel H.G., Monclús R., Schaal B. (2008). Development of social and feeding behaviour in young rabbits. In: *Proceedings of the 9th World Rabbit Congress, Verona, Italy, World Rabbit Science Association*, pp. 1131–1146.

- De Nivelles J., Thoma J., Toto Nienguesso A., Seeling T., Jung J.-S., Navarrete Santos A., Schindler M. (2020). Rabbit as an aging model in reproduction: advanced maternal age alters GLO1 expression in the endometrium at the time of implantation. *Appl. Sci.*, 10: 7732.
- Duncan S.L.B. (1969). The partition of uterine blood flow in the pregnant rabbit. *J. Physiol.*, 204 (2): 421–433.
- Fernandez-Carmona J., Solar A., Pascual J.J., Blas E., Cervera C. (2005). The behaviour of farm rabbit does around parturition and during lactation. *World Rabbit Sci.*, 13, 253–277.
- Fuentes-Hernandez V.O. (2021). Nursing behaviour of White New Zealand rabbit does. Effect of an opioid antagonist. *IJVSAR*, 3, 4: 43–50.
- Gacek L. A. (2010). Produkcja żywca króliczego. *Wiad. Zoot.*, XLVIII (2-3): 34–40.
- García M.-L., Muelas R., Argente M.-J., Peiró R. (2021). Relationship between prenatal characteristics and body condition and endocrine profile in rabbits. *Animals*, 11: 95.
- Gerencsér Zs., Matics Zs., Nagy I., Princz Z., Orova Z., Biró-Németh E., Radnai I., Szendrői Zs. (2008). Effect of lighting program on the nursing behaviour of rabbit does. In: *Proceedings of the 9th World Rabbit Congress, Verona, Italy, World Rabbit Science Association*, pp. 1177–1181.
- Gogol P. (2015). Indukcja owulacji u królików poprzez podanie analogu GnRH – desloreliny w dawce inseminacyjnej. *Wiad. Zoot.*, LIII, 4: 25–28.
- Hill M., White W.E. (1933). The growth and regression of follicles in the oestrous rabbit. *J. Physiol.*, 80 (2): 174–178.
- Hudson R., Schaal B., Martínez-Gómez M., Distel H. (2000). Mother–young relations in the European rabbit: Physiological and behavioral locks and keys. *World Rabbit Sci.*, 8 (2): 85–90.
- Iles I. (2018). Vocalizations as an indicator of pregnancy in local domestic rabbit does: preliminary study. *Livestock Res. Rural Develop.*, 30, 5: 84.
- Jilge B. (1993). The ontogeny of circadian rhythms in the rabbit. *J. Biol. Rhythms*, 8 (3): 247–260.
- Kowalska D. (2006). Królik – użytkowanie mięsne czy futerkowe? *Wiad. Zoot.*, XLIV (2): 55–62.
- Lopez-Tello J., Arias-Alvarez M., Jimenez-Martinez M.A., Garcia-Garcia R.M., Rodriguez M., Lorenzo Gonzalez P.L., Bermejo-Poza R., Gonzalez-Bulnes A., Garcia Rebollar P. (2017). Competition for materno-fetal resource partitioning in a rabbit model of undernourished pregnancy. *PLoS ONE*, 12 (1), e0169194.
- Maertens L. (1998). Effect of flushing, mother-litter separation and PMSG on the fertility of lactating does and the performance of their litter. *World Rabbit Sci.*, 6 (1): 185–190.
- Martínez-Gómez M., Lucio R.A., Carro M., Pacheco P., Hudson R. (1997). Striated muscles and scent glands associated with the vaginal tract of the rabbit. *Anat. Record.*, 247: 486–495.
- Mattioli S., Maranesi M., Castellini C., Dal Bosco A., Arias-Álvarez M., Lorenzo P.L., Rebollar, P.G., García-García R.M. (2021). Modulation factors of ovulation in rabbit reproduction management. *World Rabbit Sci.*, 29: 221–229.
- May D., Simpson K.B. (1975). Reproduction in the rabbit. *Animal Breeding Abstracts*, 43 (6): 253–261.
- Nakamura G.K.C., Alencar D., Costa L.B., Daros R.R. (2025). Behavioral and performance effects on female offspring from rabbit does housed in enriched cages during gestation and lactation. *Appl. Anim. Behav. Sci.*, 285: 106576.
- Pinto-Pinho P., Pinto M. d. L., Monteiro J., Fardilha M., Pinto-Leite R., Colaço B. (2023). Pregnancy complications and feto-maternal monitoring in rabbits. *Vet. Sci.*, 10 (10), 622.

- Schlolaut W., Hudson R., Rödel H. G. (2013). Impact of rearing management on health in domestic rabbits: A review. *World Rabbit Sci.*, 21: 145–159.
- Szendrő Zs., Szendrő K., Zotte A. D. (2012). Management of reproduction on small, medium and large rabbit farms: A review. *Asian-Aust. J. Anim. Sci.*, 25: 738–748.
- Theau-Clément M. (2000). Advances in biostimulation methods applied to rabbit reproduction. In: *Proceedings of the 7th World Rabbit Congress, Valencia, Spain, World Rabbit Science Association*, pp. 61–79.
- Walton A., Hammond J. (1928). Observations on ovulation in the rabbit. *J. Exp. Biol.*, 6 (2): 190–204.
- Wilson W.K., Dudley F.J. (1952). The duration of gestation in rabbit breeds and crosses. *J. Genetics*, 50: 384–391.
- Wise R.D., Lichter E.A., Dray S. (1971). Presence in rabbit colostrum of IgA autoantibodies to a gastric antigen. *J. Immunol*, 107 (1): 47–55.
- Yanagimachi R., Chang M.C. (1963). Sperm ascent through the oviduct of the hamster and rabbit in relation to the time of ovulation. *J. Reprod. Fert.*, 6: 413–420.
- Yunusov K., Djambilov B., Xolmirzayev D., Bakhodir I., Daniyerov R. (2024). The period of gestation of rabbits and its fertility connection. *BIO Web of Conferences*, 95: 01029.

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SUMMARY

The aim of this work was to review the available literature on rabbit reproduction and peripartum behaviors of does. The literature indicates that maternal behaviors in rabbits are highly repetitive, regardless of breed or housing conditions. The interactions between the mother and her young follow a strict daily rhythm, which occurs in both wild and domesticated rabbits. Key maternal behaviors include nest building and nursing. The nest digging reflex is a result of hormonal changes, mainly the rise in β -estradiol and progesterone levels. Prior to giving birth, the doe prepares the nest by lining it with her own fur, which is associated with elevated prolactin levels. After the young are born, the doe does not make any further changes to the nest, and nursing occurs once a day, typically before dawn, lasting only a few minutes. Rabbits have a hemochorial placenta, which provides passive immunity to the fetuses even before birth. Additionally, colostrum rich in immunoglobulins increases the survival rate of the young. Milk production ceases around the 25th day after birth, and weaning typically occurs around the 28th day. Does can become pregnant again immediately after giving birth, but simultaneous nursing and pregnancy may lead to lactation disorders and an increased risk of stillborn offspring. Prolonged presence of the young with the mother after weaning can cause social stress and health problems in the doe, such as nipple damage. In breeding conditions, the quality of nests improves up to the third litter.

Keywords: domestic rabbit, doe, reproduction, perinatal behavior