THE BEHAVIOR OF THE RABBIT

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Abstract - This paper is a short review of the observations of the author about the territorial, reproductive and feeding behaviors of rabbit. The fine description of fighting and mating comportment can be underlined. Comportment of the rabbit doe is described before and during parturition. The time for parturition is very short : from 5-7 to 10-14 minutes according to the litter size. Suckling time is a decision of the mother only and it's duration is about 1.5-2 minutes once a day, between 0 and 6 o'clock. Feeding behavior is also described with ingestion of solid food, water intake and caecotrophy practice.

The behavior of the rabbit has not been studied systematically in China. The author has, in recent years, made observations and studies of the territorial behavior, reproductive behavior and feed intake behavior of the rabbit which have close relationship with the rabbit's practical production.

TERRITORIAL BEHAVIOR

Under domestication, rabbits are provided with permanent housing or a protected safety environment. Here, the first rabbit alerted by any sudden noise and /or disturbance will stamp on one hind foot to pass (transmit) the message to its companions (fellows). When a rabbit has been moved into a new cage, he will smell round the new environment and try his best to engrave this new smell onto its memory. If a buck is being put into a doe's cage, his first reaction is to smell around, scent marking (for)) his new environment. If the doe is in heat, the buck will come to chase after and mount the doe after a some-what slow start and some/smell about. If the doe is not in heat or not in full heat, she will try to drive out the intruder. However, if the doe is in heat and is being put into the buck's cage, then both the buck and the doe will promptly be sexually activated. This is why it is better to put the doe into the buck's cage for successful mating.

REPRODUCTIVE BEHAVIOR

Fighting for sexual possession

Rabbits tend to fight within the same sex. This instinct will be more pronounced if sexual demand is involved. There are 3 different conditions under which two bucks will fight when met :

- Both have just mated; fierce fighting will start very quickly;
- Both have not mated ; time lapse before actual fight starts will be long, the fight will not be severe;
- One of the bucks have just mated; the time lapse and severity of fighting will be in between the 2 previous situations.

When the two bucks facing a fight differ drastically in strength, the weaker one will flee away while the stronger one will give chase. If the two bucks are about even in strength, then the fight will be very fierce. The head may be hurt badly, the skin may be torn and the flesh gapes open. Each buck will choose to attack the vital parts of his opponent, e. g. the testicles, penis, the head, hind limps, or rump. In order to race to control the strategic position, each buck will try to circle around to its enemy's hind quarters. Some of the defeaters, in order to get away, choose to duck under the abdomen of the opponent. In severe fighting, a buck will try to bite into the opponent's skin, tear its furs off, even swallow it. If the defeater is taken away from this cage at this time, the remaining winner will be still seeing the red, turning around in the cage looking for the now non-existing enemy, while uttering an intermittent challenging noise for continuing the fight.

Fighting can also break out between two does met ; however, it is not as fierce as that between two bucks. fight will stop as soon as one doe admits defeat. If one doe is put into another doe's cage, the new corner will often smell around the cage wall or the floor, then it will smell the vulva etc. of the other doe. In fighting, parts of the

enemy being attacked are mainly the head and rump regions. If does that have just delivered several days ago are put together, fighting will generally be more intense.

Sexual behavior

Any buck with normal mating ability will display it only in a more or less decree, when come across with a doe. The buck will start by smelling the doe's flank, then the rump and the vulva. If the doe is in full heat, she will just evade several steps then squat down and let the buck mount. If the doe is not in sufficient heat or not in heat, she will refuse the buck and run away with the buck chasing behind or blocked by the buck stopping right in front of her, then the buck may poke his head under the doe's abdomen and thus massage her udder etc. If the doe squats still, the buck will quickly move to behind the doe with an attempt to mount. For does that are not in heat they will not only refuse mounting, but some will even bite and fight off the buck.

End of the courting process will lead to the mating process during which the doe squats, and slightly raises her hind quarters to meet the buck when the latter mounts. Then the buck embraces tightly the flanks of the doe by his forelimbs, while continuously adjusts his hind quarters so as to be in the best position for mating, The buck's penis then penetrates into the vagina of the doe and gives several (3-5) thrusts. While his hind rump area quarters show continuous shaking, the buck suddenly inserts a powerful forward thrust, followed by prompt contraction of his hind legs. The buck then falls off to one side of the doe, and utters the 'koo koo' noise, which signals the completion of ejaculation. Then the buck gets up and walks ¯away from the doe

If the doe doesn't cooperate well during mating, the buck's mounting effort and thrusting will be unduly interfered. He will then climb down and again mount and thrust. If this series repeats a no. of times and copulation is still unsuccessful, the buck will again rub or even push the doe, or rub her udder with his head, and mount again, until copulation is completed. After this, the buck will again push the doe with his head before leaving. If mating is satisfactory, the buck will stamp his hind foot time and again, stand side by side with the doe, or sit aside, lick his hair coat or leg coat, and pay no attention to the doe. Similarly¸, the doe will also lick her hair coat after mating.

Parturient behavior

When the doe is pregnant, she becomes mild in disposition, moves slowly and carefully, has bigger appetite, often rests after feeding, and her abdomen gradually becomes larger and larger. The doe's appetite, however, will drop when getting very near to parturition. At this time she will show a liking for chewing the cage (box) and pushing the feed trough. If the doe is moved now into a maternity pen or box at this stage, she will be even more excited. She will push the litter here and there with her head and face. Her 4 paws (claws) will work as if she was digging a hole. Two to three days before parturition the doe will start to collect the straws for making a nest in the cage (box). She will also pluck her own hairs from the chest and abdominal regions, to line them at the nest box. This activity will continue till right up to actual delivery. Large amount of hairs will be plucked down 3-5 hours before delivery begins. When the doe is plucking her hairs or is collecting nesting material, she will often raise her head, looking around, and prick her ears and listen for the sound of something disturbing. Nest building will be continued when the doe is convinced that she is in a harmless environment with no disturbance. It is clear that, a doe even before parturition also needs a peaceful and quiet environment.

At the time of delivery, the doe lies quietly to one side of the nest ,with the fore legs stretching up, the hind legs open apart, the body bend over to form an arch back. Form time to time she will turn back her head to her hind quarters and frequently lick her genital region. Uterine contractions and contractions of the abdominal muscle will cause the tail head to spasm, which is a sign of ready-for delivery. When the above motion attains a high frequency, the first young will be delivered very soon, When this occurs, the mother rabbit will tug on the foetal membranes, near to the chest with her teeth, breaks up the foetal membranes bites off the umbilical cord, swallows up the placental membranes, and licks away the mucus on the body of the new born, then licks her own vulva. This process will be repeated for each of the young born later. If the intervals between successive deliveries are short and the doe has not sufficient time to lick each new born as comes out, then she will lick them when all young are delivered. When the delivery intervals are long, there will be sufficient time for the doe to lick each new born as it comes out, and to lick away blood stains in her genital region and the hind legs, sometimes the doe will even swallow up the blood stained hairs in the nest bedding.

From the author's observation, lengths of interval between successive new borns will generally be 40-60 seconds. The short intervals would be just over 10 seconds, and the long intervals from 1-3 minutes. Total parturition time for a complete litter would last 5-7 minutes. With large litters it will last 10-14 minutes.This is much shorter than the generally reported delivery time of 15-30 minutes.

FEEDING BEHAVIOR

To obtain nutrients through feed intake is a basic condition for the rabbit's living. It is also a condition for the rabbit's other behaviors.

Ingestion behavior

Having the same rodential behavior as true rodents, the domestic rabbit, when not feeding, will often chew the caee, litter box or feed troughs etc. material that have hard, projected surfaces. This behavior is manifested more strongly when the rabbit keeper comes near to the cage before feeding. When hay or fresh grass is fed to the caged rabbit, they will be pulled out from the rack piece by piece. The rabbit will eat the leave first then the stem. What remains plus those pulled out in passing will drop to the floor and represent wastage. The rabbit's lower jaw moves, rather rapidly when eating short grass, reaching 170-200 movements /min. The domestic rabbit has a habit of pushing aside grasses or other feeds out of the rack or feed trough using the forepaw. Sometimes it will even turn over the feed trough. The rabbit can be very choosy to the type and quality of feed , with a liking for pellet feeds, sweet feeds and fresh, juicy, green feeds, while meal or porridge feeds are disliked. According to the author's observation, when feeding ad *libitum* , the no. of feed intakes during the night takes about 61.3 % of 24 hr. total, while that during the day takes about 38.7 %.

Suckling behavior

The new born rabbit will quickly look for the mother's nipple. Delivery and suckling may go on at the same time. Some young may have already fully suckled when parturition finishes. Within 12 days of age, all young rabbits do is suckling and sleep. Within this period the doe holds the initiative for each suckling. She will come into the nest at the appropriate time for suckling and wake up the litter by gentle pushing. The young, after wakening, will look for the nipples. The young suckles mostly in a face-up position ; however, there are also sideways or face-down positions. During suckling, the young emits some sucking noise, while their hind legs kick up continuously trying rof appropriate support. A young rabbit will only suck a nipple several times before changing for another nipple, so this is not like the baby pig each with a fixed nipple. Young rabbits are reluctant to give up their nipples which they hold up very tightly during suckling, so it is not uneasy for such young to be dragged up and brought out of the nest by the leaving doe after suckling is fmished. If this is not discovered in time , such young may be chilled to death. The main cause for such dragging out is insufficient milk supply by the doe.

Generally the doe will suckle the young once a day. The usual time is between 0 and 6 o'clock in the morning. Each suckling will last for 1.5-2 minutes. Whether or not the litter have been fully fed, the mother stops suckle as soon as the time is up. After that it is difficult, even with forced suckling, for the young to get more milk. The eyes of the young will open by about 12 days of age. By this time they have attained a faster rate of growth and development, and there is a continuously increasing demand for milk. The young will pursue after the doe even during non suckling time, trying to get extra milk through more sucking stimuli. However, the doe still only suckles once a day, and usually does not come into the nest box when not at suckling time. This excludes the young any more chance.

Watering behavior

The body of the domestic rabbit contains about 70% water, the figure for a young rabbit is somewhat higher. Water performs important functions in the process of digestion, absorption of feeds, the excretion of metabolic products, and the regulation of body temperature.

Rabbits are nocturnal animals. More than 60 % of the water intake occurs at night. Water intake is usually after that of dry feeds. When there is sufficient supply of green feeds, water intake will be reduced accordingly. The amount of daily water intake is about 2-2.5 times the amount of dry matter intake. If dry feeds are fed without

giving water, then decrease of feed intake follows. Long period trial of limiting rabbit's water intake shows, *if* the drinking time is limited to 10 minutes per every two days, then the amount of feed intake will be 14-24 % lower than normal, growth will be retarded, the body weight decreased drastically. If water drinking time for 10 minutes daily is allowed, there is no significant effect to feed intake or growth rate.

When water intake is insufficient, milking production of the lactating doe, growth and development of the suckling young and growing rabbits are all noticeably adversely affected, particularly when this is associated with a high environmental temperature.

Caecotrophy behavior

The domestic rabbit has the habit of ingesting its own feces. This is a natural instinct, and is different from the feces eating habit of dogs and pigs. Soon after a young rabbit is able to take solid food, he will acquire caecotrophic behavior. This is a normal physiological process of the rabbit that comes by birth.

Early study of the rabbit caecotrophic behavior could be traced back to 1602 or even earlier. Since that time, there have been some reports in the literature from time to time, but the first scientific paper being quoted most was that by Morot in 1882. Later reports generally classify the rabbit feces into 2 different kinds, i.e. a hard feces excreted during the day, and a soft feces excreted during the night. It is the latter that is being eaten. However, according to the author's observation (1986), rabbit's caecotrophy was not confined totally during the night. It also happened during the day. There is no significant difference between the two. sometimes it happened more during the day than during the night. (table 1).

Table 1 : Caecotrophy by the Rabbit Doe : Number of soft faeces intakes within 24 hrs.

Period of Time	Nonpregnant Doe Feeding *ad libitum*	Lactating Doe	Pregnant Doe Limited Feeding	Pregnant Doe *ad libitum* Feeding
Day	**6.3**	**28**	**24**	**29.5**
Night	**5.6**	**44. 5**	**22**	**26**
24 hr. day	***11.9***	***72. 5***	***46***	***55.5***

The rabbit will stretch out its head and wait underneath its anus, the soft feces will be eaten once excreted. However, soft feces that has fallen on the floor will not be eaten.

Soft feces differ greatly in nutritive composition from the hard feces. The crude protein content of the former is much higher, while the crude fiber content is obviously lower, than that of the latter. According to analysis, there are 9.56 billion and 2.7 billion micro-organisms in 1 g of soft and hard feces respectively.

It is important for the rabbit to digest and absorb his nutrients thoroughly. Caecotrophy achieves this by making one part of the nutrients go through the digestive tract once more to be digested. For some authors, this has similar significance as regurgitation in the ruminants. Therefore, rabbits have sometimes been called pseudo-ruminants. The rabbit obtains, through caecotophy, large amount of protein and other nutrients, as well as large amount of watersoluble vitamins, but digestion of fibre is not improved by this practice. Some reported that the domestic rabbit does not chew the feces but swallow it whole ,while others reported that rabbits do chew feces once or twice per swallowing. According to observations by the author, for each soft-feces eaten, 1560 seconds will be taken in chewing up to 40-50 times. Caecotrophy will stop, however, when the rabbit is sick.

MAIN REFERENCES

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