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## PLACENTOMES

By Andy Cowan

As I farm near a state park, I am very conscious of animals straying from the group or escaping. It does not make for good publicity for the deer industry if farmers allow their deer to roam off their farm. Also, this sort of behavior makes it impossible to single sire mate with 100% certainty.

As a result of this, I have to shoot one of my hinds recently. She was constantly pushing her way under fences, and annoying neighbours. This trait should not be tolerated in any stock because, from past experience, if such an animal remains in the herd her offspring will do exactly the same thing and, more often than not, she will encourage other animals to do the same.

As well as saving some venison from the animal, for general interest, I examined the internal organs of the hind. As you would expect from an animal that has wandered off the property quite frequently, she was in very good health. I suspect that this is because she was able to consume a more varied and preferred diet. What confused me was that she had a number of unexpected lumps on her uterus. I went to chat with my local Vet and took a few pictures. By dissecting the specimen I got him to explain the process of embryo development in layman's terms.

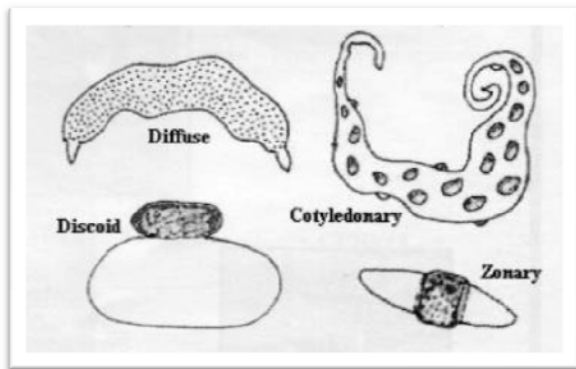
Before it was explained to me, I was concerned when I found all these "lumps" when I inspected the uterus. I guess what intrigued me throughout the discussions with my bet was the actual number of variations in placentas. I should not have been surprised but I had never really thought about this before and had assumed that every animal was "human-like". Fortunately, nature is not so limited. There are some really helpful sites on the internet which explain the process of embryo development in greater detail than I will ever understand.

As I am not sure how the photos will turn out in this edition, I will give a farmer's/layman's description of what I found. First, I cut out the hind's reproductive organs. This included the vagina, cervix, uterus, uterine horns, fallopian tubes and ovaries. After feeling a number of lumps in the uterus, I cut into the uterus revealing the foetus.

The foetus was about 10cm long. It had an umbilical cord which was a bit smaller in length than the foetus. This was connected to the placenta which branched out into a number of "lumps" which were connected to the uterus.

In the natural world, there are four basic types of placental shapes which are species related. These are diffuse, cotyledonary, zonary, and discoidal placentas. For example, humans have discoid placenta which means that there is only one connection between the placenta and the uterus. In the case of ruminants, cattle, sheep, goats and deer, etc, they have cotyledonary placentas. Instead of having a single large area of contact between maternal and foetal vascular systems, these animals have numerous smaller areas. Ruminants have predetermined sites on the uterus wall, caruncles, to which the developing placenta will connect. The membrane that encloses the embryo in early stages of its development produces cotyledons which attach themselves to the caruncles and form placentomes. These were the "lumps" that I was initially concerned about!! It is the placentome which permits the metabolic interchange between foetus and mother.

## Types of Placenta



*Taken from "Placental Structure and Classification"*

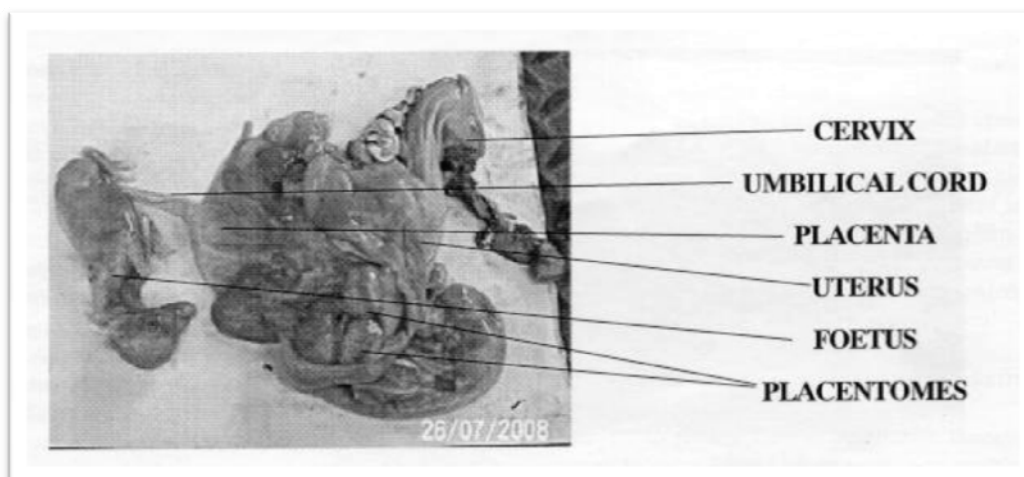
The placenta is the attachment between the foetus, (via the umbilical cord) and the lining/wall/endometrium of the mother's uterus. The placenta allows nutrients, as well as oxygen and hormones, to flow from the mother's blood to the foetus while passing out waste. It also forms a barrier which filters out harmful substances which could damage the foetus. The placentomes are responsible for working as an interchange between the blood supply of the mother and the foetus. Small blood vessels carrying the foetal blood run through the placenta. Nutrients and oxygen from the mother's blood are transferred to the foetal blood, while waste products are transferred from the foetal blood to the maternal blood, without the two blood supplies mixing. A barrier keeps the blood supplies of the mother and the foetus separate. If the blood types didn't match, the foetus would be destroyed if the blood from the mother was mixed with that of the foetus. Also, it does not allow antibodies from the mother to get through to the foetus. This is one of the reasons why colostrums is so important to a new born calf.

The number of placentomes varies between species. A normal cow will have 70-120 placentomes. Deer placenta, as a rule, will have between 4 and 10 cotyledons. In my case, the red hind had 8 placentomes.

The umbilical cord's measurements vary within species and can be up to 20cm long. It contains two arteries, two veins and the allantoic duct. Its length will vary depending on the stage of growth.

The foetus actually develops in the amnion which is surrounded by the placenta. The amnion, which contains the amniotic fluid, has many purposes. It helps to cushion hard blows and jolts to the belly (hitting fence posts or other deer when in yards) to protect the foetus. It allows it the freedom to move while permitting foetal development. It also maintains an even temperature so that it does not get too hot or too cold, even if the mother is extremely hot or cold. Amniotic fluid also helps the fawn/calf develop its lungs.

Later in this edition I have outlined a procedure for doing post-mortems on deer. I certainly do not have any sort of detailed knowledge of the internal workings of the animal. However, I am getting to the stage where I can pick up some abnormalities and if I have any problems or queries I certainly involve my local Vet.



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Dr Doug Norman – personal communications.