

FACTORS RELATED TO THE INCIDENCE OF RETAINED PLACENTA IN FRIESIAN COWS KEPT UNDER EGYPTIAN CONDITONS.

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ABSTRACT

The present study aimed at evaluating the general assessment of retained placenta over 3 years in a dairy flock, belonging to Sakha Experimental Station, Animal Production Research Institute, Agricultural Research Center, Ministry of Agriculture. The study included a special assessment of incidence of retained placenta (retention of fetal membranes for more than 12 hours post-partum) of 783 Friesian cows (350-650 kg and 1-11 parities) covering a period from 2001 to 2003. Results revealed that Percentage of incidence of retained placenta was significantly ($P<0.05$) the highest during August and September months (43.2 and 36.4%, respectively) and the lowest in October and December (5.3 and 8.3%, respectively). However, frequency distribution of retained placenta incidence was not affected significantly by month of the year. Higher percentage and higher distribution of retained placenta incidence occurred in February (32.1 and 17.7%, respectively), however, the lowest corresponding values were observed in October (5.3 and 0.52%, respectively). The highest incidence of retained placenta was significantly ($P<0.05$) observed in the heaviest cows having body weight more than 550 Kg (34.25%) while the lowest incidence (12.19%) was significantly ($P<0.05$) obtained from cows ranged between 350 and 400 Kg LBW. The highest distribution was associated significantly ($P<0.05$) with cows weighing between 450-500 Kg (41.6%), while cows having 350-400 kg showed significantly ($P<0.05$) the lowest percentage and frequency distribution of incidence of retained placenta, being 12.2 and 2.6%, respectively. The highest percentage (65.6%) and the lowest frequency distribution (10.9%) of retained placenta incidence were significantly ($P<0.05$) observed when the birth weight of calf was more than 40 kg. Percentage of retained placenta incidence varied from 21.2 to 33.8% when the calf birth weight was less than 40 kg, however, the highest frequency distribution (45.3%) was significantly ($P<0.05$) obtained for calves weighing 20-30 kg. Percentage of incidence of retained placenta was 25.94 and 22.47% after male and female calves calving, respectively. The distribution of retained placenta after male calving was 53.64%, being comparatively more than frequent following the birth of females (46.35%), but the difference was not significant. Percentage of retained placenta incidence in calving multiparous was two folds of that in calving primiparous cows (28.4 vs. 14.5%). The frequency distribution of retained placenta was 81.72% being comparatively more frequent following calving multiparous than 18.27% in case of primiparous cows. The percentage of incidence of retained placenta was 23.8% in cows fed on green fodders (*Trifolium alexanderenum*), being lower than that in cows fed on dry feeding 25.7%. Also frequency distribution of retained placenta incidence was insignificantly higher during green feeding period than dry feeding period.

From the obtained results, it could be concluded that month of year, weight of dam and born had pronounced effects on incidence of retained placenta in Friesian cows under Egyptian conditions.

Keywords: Friesian cows, retained placenta, LBW, parity, male, female.

INTRODUCTION

Retention of foetal membranes more than six (Vandeplasscha, and Martens, 1961) or 24 hours (El-Swiefy, 2003) post-partum is defined as retained placenta, particularly in older cows). Placental retention is usually accompanied and followed by delayed involution of the uterus (Peters and Ball, 1995) and adversely affected reproductive performance (Fourichon *et al.*, 2000 and El-Swiefy, 2003). There are many factors affecting retention of placenta in cows. It often occurs as a result of premature birth, which may arise in a variety of circumstances and was also recorded in cases of twin births (Morrison and Erb, 1957). There is evidence that retention may be a result of an endocrine imbalance and low plasma estrogen concentration (Chew *et al.*, 1978). Deficiency in dietary factors such as vitamin E and selenium have also been implicated as a cause of retained placenta (Harrison *et al.*, 1984).

According to Gordon (1996), bovine placenta is normally expelled between 30 min and 8 h after the fetus has been delivered. Placental retention is seemed to have occurred if the fetal membranes remained attached more than 8 to 12 h after birth.

Around the world, the incidence of retained placenta following normal unassisted calving appears to be 8–11% (Arthur *et al.*, 1982 and De Bois, 1982). In Egypt, incidence of retained placenta seems to extremely variable from farm to farm and from year to year on the same farm. However, little attention has been paid to make an accurate survey about frequency of placental retention incidence in dairy cattle kept under Egyptian condition. Retained placenta was observed in 25% (EL-Naggar, 1977). Several factors have been detected in this concept likewise, season of the year (Dyrendahl *et al.*, 1977 and Dubois and Williams, 1980), herd (Roberts, 1971), gestation length (Muller and Owens, 1974 and Grunert, 1983), age (Dyrendahl *et al.*, 1977; Erb and Martin, 1980) and hormonal levels (Chew *et al.*, 1979 and Bosu *et al.*, 1984).

The present study was conducted to evaluate different factors affecting incidence of retained placenta in Friesian cows kept under the same conditions in Sakha Experimental Station.

MATERIALS AND METHODS

The present study aimed at studying the general assessment of retained placenta over 3 years in a dairy flock, belonging to Sakha Experimental Station, Animal Production Research Institute, Agricultural Research Center, Ministry of Agriculture.

The study included a special assessment of incidence of retained placenta for 783 Friesian cows covering a period of 3 years from 2001 to 2003 collected from Sakha experimental station. All cows ranged between 350–650 kg in weight, 3–13 years in age and were between 1–11 parities. Within the collected records, the normal cows expelled their foetal membrane immediately after calving, while cows, which expelled their foetal membranes

after 24 hours or more after calving were considered as retained placenta cases (El-Swiefy, 2003).

Animals were housed loose in semi-open sheds. The feeding system was reasonably that applied in the dairy farms of Animal Production Research Institute, Ministry of Agriculture of Egypt. Cows were fed concentrate feed mixture provided once daily at morning and rice straw (*ad libitum.*), during green feeding period from May to end of November. During the period of green feeding from December to end of April, they were fed Egyptian berseem (*Trifolium alexandvium*) along with rice straw (*ad libitum.*) and concentrate feed mixture. Nutritional requirements were determined in accordance with their LBW and level of milk production according to NRC (1988). The concentrate feeding mixture contained 14% CP and about 60% TDN. Drinking water was available all daytime.

Data obtained from this study were statistically analyzed by using Chi-Square test according to Snedecor and Cochran (1980).

RESULTS AND DISCUSSION

Factors affecting incidence of retained placenta:

Month of the year:

Percentage of incidence and frequency distribution of retained placenta during different months of the year are presented in table (1) and illustrated in fig. (1). Data collected over three years showed that month of the year significantly ($P<0.05$) affected the percentage of incidence of retained placenta in Friesian cows. Percentage of incidence of retained placenta was significantly ($P<0.05$) the highest during August and September months (43.2 and 36.4%, respectively), while the lowest incidence of retained placenta occurred during October and December (5.3 and 8.3%, respectively).

Frequency distribution of retained placenta during different months of the year was not affected significantly by month of the year (Table 1), although there was a tendency of distribution of retained placenta cases to be the highest in February, March and May months, moderate in January, Jun, July and August months and the lowest in April and September-December months. It is worthy noting that, higher percentage and higher distribution of retained placenta incidence occurred in February (32.1 and 17.7%, respectively), however, lowest corresponding values were observed in October (5.3 and 0.52%, respectively, Table 1).

After calving the uterus was expelled the fetal membranes by continued contractions waves beside reducing the size of the uterus and aiding in forcing the placenta to birth canal, probably markedly reduce the amount of blood circulating in the endometrium (Roberts, 1971).

Results indicated wide variation in incidence of retained placenta around the months of the year. In agreement with the present trend, Joosten *et al.* (1988) in cattle and Awad *et al.* (1980); Samad *et al.* (1984) in buffaloes stated that the highest incidence of retained placenta was found during summer season (August and September months). Also, Youssef (1973) found that the highest incidence of retained placenta in buffaloes (10.89%)

was recorded in August while the lowest one (0.81%) was in April. Moreover, Atallah (1993) reported that the high incidence of retained placenta in buffaloes was observed in summer (3.03%) as compared to that noticed in winter (1.4%) and in autumn (0.82%).

Recently, Deyab (2000) found that the incidence of retained placenta in cattle was insignificantly higher in summer season (45.0%) than in winter (39.3%), autumn (31.4%) and spring (31.2%).

Table (1): Effect of live body weight of dam on percentage of incidence and frequency distribution of retained placenta during different months of the year.

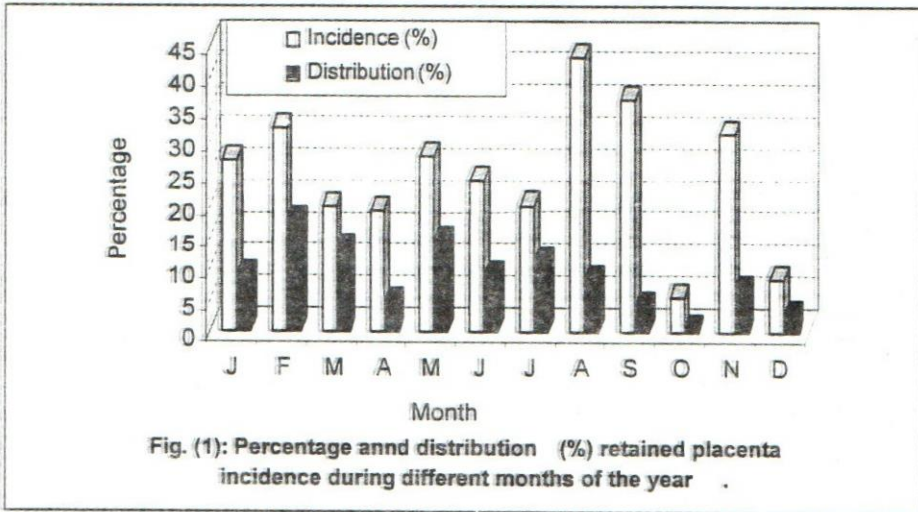
Month of the year	LBW category (kg)					Overall means
	350-400	400-450	450-500	500-550	550-650	
Percentage of incidence (%):						
January	-	45.5	30.8	14.3	50.0	27.0 ^{ab}
February	40.0	33.3	32.6	10.3	64.7	32.1 ^a
March	100	42.9	28.2	9.30	20.0	19.8 ^b
April	-	0.00	26.7	16.7	25.0	19.1 ^b
May	-	40.9	23.1	40.0	55.6	27.8 ^{ab}
Jun	33.3	5.90	18.5	60.0	-	23.9 ^{ab}
July	-	-	24.6	16.1	-	20.0 ^b
August	-	-	29.4	55.6	60.0	43.2 ^a
September	-	-	33.3	50.0	40.0	36.4 ^a
October	-	-	7.10	-	-	5.30 ^c
November	-	36.4	18.8	66.7	36.4	31.0 ^a
December	-	22.2	3.60	100	-	8.30 ^c
Overall mean	12.2^B	26.7^{AB}	24.0^{AB}	21.5^{AB}	34.3^A	24.5^{AB}
Frequency distribution (%):						
January	0.00	29.4	47.2	17.6	5.88	8.85
February	5.88	11.8	41.2	8.82	32.4	17.7
March	4.00	12.0	44.0	20.0	20.0	13.0
April	0.00	0.00	44.4	22.3	33.3	4.60
May	0.00	33.3	33.4	14.8	18.5	14.1
Jun	11.8	5.88	29.4	52.9	0.00	8.85
July	0.00	0.00	76.2	23.8	0.00	10.9
August	0.00	0.00	31.3	31.3	37.5	8.33
September	0.00	0.00	37.5	37.5	25.0	4.16
October	0.00	0.00	100	0.00	0.00	0.52
November	0.00	30.8	23.1	15.4	30.8	6.70
December	0.00	50.0	25.0	25.0	0.00	2.80
Overall mean	2.60^C	14.60^{BC}	41.70^A	21.90^B	19.30^B	

A, B and C Means having different superscripts within the same row for each classification is significantly different at P<0.05.

a, b and c Means having different superscripts within the same column for each classification is significantly different at P<0.05.

On the other hand, Muller and Owens (1974) and Karen (1996) disagreed the present trend, reporting that the incidence of retained placenta in cows was higher in winter season.

Mahfouz (1986) claimed that the incidence of retained placenta was higher in autumn (29%) and winter (28%) than in summer and spring (17%). Also, Karen (1996) found that the time needed from calving to release of fetal membranes in cattle was higher in winter (8 hours) than in summer (5.3 hours). The retained placenta in cattle was significantly higher in spring (18.13%) and winter (16.74%) than in autumn (14.88%) and summer (13.45%).



Live body weight of dame:

Data in table (1) revealed that live body weight of dams had a significant ($P < 0.05$) effect on the incidence of retained placenta in Friesian cows.

The highest incidence of retained placenta was significantly ($P < 0.05$) observed in the heaviest cows having body weight more than 550 Kg (34.25%), while the lowest incidence (12.19%) was significantly ($P < 0.05$) obtained from cows ranged between 350 and 400 Kg LBW. However, cows having 400-500 kg showed moderate values of retained placenta incidence.

These results may suggest that the optimum weight of cows for minimizing the incidence of retained placenta ranged between 350–400 Kg.

Regarding the frequency distribution of retained placenta incidence at different LBW of cows (Table 1), it was observed that the highest distribution was associated significantly ($P < 0.05$) with cows weighing between 450–500 Kg (41.6%), while cows having 350–400 kg showed significantly ($P < 0.05$) the lowest percentage and frequency distribution of incidence of retained placenta, being 12.2 and 2.6%, respectively.

Cows weight more than 450 Kg may suffer from over fattening. The increment in fat adipose tissues may result in trapping the steroid sex hormones, which are known to be fat-soluble.

Weight of born calves:

Effect of live body weight of born calves on percentage of incidence and frequency distribution of retained placenta during different months of the year are presented in table (2). Data showed significantly ($P < 0.05$) highest incidence of retained placenta in association with the heaviest average birth weight of the newly born calves. The highest percentage of retained placenta incidence (65.6%) was observed when average birth weight of calves was more than 40 kg; meanwhile it varied from 21.2 to 33.8% when the calf birth weight was less than 40 kg.

Table (2): Effect of live body weight of born calves on percentage of incidence and frequency distribution of retained placenta during different months of the year

Month of the year	LBW of calves (kg)			
	15-20	20-30	30-40	>40
Percentage of incidence (%):				
January	16.7	33.3	23.5	50.0
February	100	44.4	8.33	57.1
March	50.0	7.84	22.0	50.0
April	-	14.3	28.6	75.0
May	33.3	25.8	13.3	71.4
Jun	-	23.5	30.8	100
July	43.8	20.0	-	50.0
August	-	33.3	50.0	100
September	-	16.7	60.0	-
October	-	8.33	-	-
November	-	-	40.9	80.0
December	-	6.66	14.3	-
Overall mean	33.8 ^B	21.2 ^B	22.2 ^B	65.6 ^A
Frequency distribution (%):				
January	5.88	41.2	47.1	5.88
February	17.6	58.8	11.8	11.8
March	28.0	16.0	52.0	4.00
April	0.00	44.4	22.2	33.3
May	11.1	63.0	7.40	18.5
Jun	0.00	70.6	23.5	5.88
July	33.3	61.9	0.00	4.76
August	0.00	31.3	62.5	6.25
September	0.00	25.0	75.0	0.00
October	0.00	100	0.00	0.00
November	0.00	0.00	69.2	30.7
December	0.00	50.0	50.0	0.00
Overall mean	12.5 ^{BC}	45.3 ^A	31.3 ^{AB}	10.9 ^C

A, B and C Means having different superscripts within the same row for each classification is significantly different at $P < 0.05$.

Inspite of the highest percentage of retained placenta incidence (65.6%) when average LBW of calves increased more than 40 kg, it showed significantly ($P < 0.05$) the lowest frequency distribution of this incidence (10.9%). However, the highest frequency distribution was obtained for calves weighing 20-30 kg.

Many investigators showed that the incidence of retained placenta increased with increasing birth weight (Joosten *et al.*, 1988 and Ghassange and Brochart, 1985). The increase in percentage of incidence of retained placenta as the fetal birth weight increased may be due to an expected pressure of the fetus on the placenta and fetal membrane, so that the attachment between the cotyledons and the fetal membrane become stronger.

On the other hand, Karen (1996) and Marques *et al.* (1993) reported that the incidence of retained placenta was not influenced by fetal birth weight of the calf.

Sex of calves:

Effect of sex of born calves on percentage of retained placenta incidence and its frequency distribution during successive months of the year are shown in table (3). The percentage and frequency distribution of incidence of retained placenta were not affected significantly by sex of born calves. Percentage of incidence of retained placenta was 25.94 and 22.47% after male and female calvings, respectively. Muller and Owens (1974); Mutiga *et al.*, (1993) and Awad *et al.* (1980) obtained similar trend in dairy cattle.

Table (3): Effect of sex of born calves on retained placenta incidence and its frequency distribution during successive months of the year.

Month of the year	Percentage of incidence		Frequency distribution	
	Male	Female	Male	Female
January	25.0	29.0	47.1	52.9
February	39.7	20.9	73.5	26.5
March	18.6	20.9	44.0	56.0
April	25.0	6.66	88.9	11.1
May	17.8	36.5	29.6	70.4
Jun	31.4	16.7	64.7	35.3
July	14.3	22.0	38.1	61.9
August	43.5	42.9	62.5	37.5
September	28.6	40.0	25.0	75.0
October	-	9.09	0.00	100
November	47.4	17.4	69.2	30.8
December	16.7	3.33	75.0	25.0
Overall mean	25.9	22.5	53.5	46.4

On the other hand, some authors reported that the incidence of retained placenta increased two folds with male calves compared with female calves (Bendixen *et al.*, 1987 and Saini *et al.*, 1983). Mahfouz, (1986) reported that the male calf births increased the risk of retained placenta in normal calving.

The distribution of retained placenta after male calvings was 53.64%, being comparatively more than frequent following the birth of females (46.35%), but the difference was not significant (Table 3). The slight increase in percentage and distribution of retained placenta observed with male born

calves may suggest that the fetal androgenic hormone from the fetal testes may partially affect process of retained placenta.

Other possibility, greater expected birth weight of the male as compared with the female calves, with a relatively greater sized placenta and with closer attachment with endometrium may be responsible for such increment in percentage of retained placenta.

Parity of dams:

Effect of parity on percentage incidence and frequency distribution of retained placenta during successive months of the year are presented in table (4). Data showed that parity insignificantly affected the incidence of retained placenta in Friesian cows, although percentage of retained placenta incidence in multiparous was two folds of that in primiparous cows (14.5 vs. 28.4%).

Table (4) Effect of parity dams on the incidence and frequency distribution of retained placenta during successive months of the year

Month of the year	Percentage of incidence		Frequency distribution	
	Premiparous	Multiparous	Premiparous	Multiparous
January	7.69	31.4	5.80	94.1
February	27.8	33.4	13.9	86.1
March	-	22.8	0.00	100
April	8.69	20.6	22.2	77.8
May	26.5	34.7	43.3	56.7
Jun	5.26	42.9	11.8	88.2
July	14.8	13.8	30.7	69.2
August	20.0	39.0	5.89	94.1
September	25.0	50.0	20.0	80.0
October	40.0	-	100	0.00
November	14.0	37.5	14.3	85.7
December	-	18.4	0	100
Overall mean	14.5	28.4	18.3^B	81.7^A

A, B and C Means having different superscripts within the same row for each classification is significantly different at P<0.05.

The present results may indicate that the incidence of retained placenta progressively increased with the advancement of parity. Also, the frequency distribution of retained placenta was 81.72% being comparatively more frequent following calving multiparous than 18.27% in case of primiparous cows. Karen (1996), Saini et al. (1988) and Kudlae and Zameckik (1984) came to a similar conclusion when they reported that the incidence of retained placenta increased in old cows with parity over fourth. It could be explained on the basis of the uterine musculosa and /or aging of the animals with the increase of parity

Feeding type:

It is clearly that the feeding type had no significant effect on the proportion of the incidence of retained placenta in Friesian cows (Table 5).

The percentage of incidence of retained placenta was 23.8% in cows fed on green fodders (*Trifolium alexanderenum*), being lower than that in cows fed on dry feeding 25.7%. Also frequency distribution of retained placenta incidence was insignificantly higher during green feeding period than dry feeding period. The beta-carotene may play an important role in this concept. According to Akordor *et al.* (1986) and Inaba *et al.* (1986), beta-carotene remarkably affects the ovarian function and the gonadal hormones, which may be associated with late pregnancy with expulsion of fetal membranes.

The insignificant differences between feeding systems may be due to that cows were fed silage during dry feeding period and/or the significantly ($P < 0.05$) the highest incidence of retained placenta during dry feeding period (August and September months). Such trend may indicate stronger effect of season rather than feeding system on incidence of retained placenta.

Table (5): Effect of feeding system of cows on incidence of retained placenta during successive months of the year

Item	Feeding system	
	Dry feeding	Green feeding
Percentage of incidence (%)	25.7	23.8
Frequency distribution (%)	27.0	20.0

CONCLUSION

From the obtained results, it could be concluded that month of year, weight of dam and born had pronounced effects on incidence of retained placenta in Friesian cows under Egyptian conditions.

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العوامل المتعلقة بحدوث احتجاز المشيمة في أبقار الفريزيان تحت الظروف المصرية.

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- استهدفت الدراسة المقدمة التقييم العام لحدوث احتجاز المشيمة في أبقار الفريزيان على مدى 3 سنوات في قطيع محطة سخا، معهد بحوث الإنتاج الحيواني، مركز البحوث الزراعية، وزارة زراعة. تضمنت الدراسة تقييم خاص لحدوث احتجاز المشيمة (احتجاز الأغشية الجنينية لأكثر من 12 ساعة بعد الولادة) لعدد 783 بقرة فريزيان (350-650 كجم و1-9 مواسم) خلال السنوات من 2001 إلى 2003. أظهرت الدراسة النتائج التالية:
- 1- أثرت شهور السنة تأثيرا معنويا على نسبة احتباس المشيمة في أبقار الفريزيان وكانت النسبة المنوية لحدوث احتجاز المشيمة أعلى معنويا في شهري أغسطس وسبتمبر (43,2 و 36,4%، على التوالي)، بينما كانت أقل حدوثا معنويا في شهري أكتوبر وديسمبر (5,3 و 8,3%، على التوالي). ولم يتأثر التوزيع التكراري لحدوث احتجاز المشيمة معنويا بين شهور السنة. وكانت النسبة المنوية والتوزيع التكراري لحدوث احتجاز المشيمة أعلى في شهر فبراير (32,1 و 17,7%، على التوالي)، والأقل في أكتوبر (5,3 و 0,52%، على التوالي).
 - 2- كانت النسب المنوية لحدوث احتجاز المشيمة أعلى معنويا (34,25%) في الأبقار الأثقل وزنا (أكثر من 550 كجم) وأقل معنويا (12,19%) في الأبقار التي يتراوح وزنها بين 350-400 كجم. وكان التوزيع التكراري لحدوث احتجاز المشيمة أعلى معنويا (41,6%) للأبقار التي تزن 450-500 كجم، بينما الأبقار التي تزن 350-400 كجم سجلت أقل النسبة المنوية وأقل توزيع تكراري لحدوث احتجاز المشيمة (12,2 و 2,6%، على التوالي).
 - 3- كانت النسبة المنوية لحدوث احتجاز المشيمة أعلى معنويا (65,6%) والتوزيع التكراري أقل معنويا (10,9%) عند ولادة عجول أكثر من 40 كجم، وتراوحت النسبة المنوية لحدوث احتجاز المشيمة بين 21,2-33,8% عندما كان الوزن عند الولادة أقل من 40 كجم. وكان التوزيع التكراري لحدوث احتجاز المشيمة أعلى معنويا عندما تراوح وزن العجول 20-30 كجم.
 - 4- كانت النسبة المنوية لحدوث احتجاز المشيمة 25,94 و 22,47% لولادة الذكور والإناث، على التوالي. وكان التوزيع التكراري لحدوث احتجاز المشيمة بعد ولادة الذكور 53,64%، والإناث 46,35%، ولم تكن الفروق معنوية.
 - 5- كانت النسبة المنوية والتوزيع التكراري لحدوث احتجاز المشيمة أعلى في الأبقار متعددة الولادات (28,4% و 81,72%، على التوالي) عن أبقار الموسم الأول (14,5 و 18,3%، على التوالي)، وكانت الفروق معنوية فقط للتوزيع التكراري.
 - 6- كانت النسبة المنوية والتوزيع التكراري لحدوث احتجاز المشيمة أعلى في الأبقار المغذاة على العلائق الجافة (24,5% و 27,0%، على التوالي) عن تلك المغذاة على العلائق الخضراء (23,9 و 20,0%، على التوالي)، وكانت الاختلافات غير معنوية.
- ومن النتائج السابقة نستخلص ان شهور السنة ووزن الأم و المولود من أهم العوامل التي تؤثر في حدوث احتباس المشيمة في الأبقار الفريزيان تحت الظروف المصرية.