
EFFECT OF DIFFERENT SEASONS OF THE YEAR ON THE PREGNANCY RATE IN MARES IN IRAQ.

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ABSTRACT
A study was conducted to evaluate the effect of seasons of the year on the pregnancy rate, early embryonic death (EED), and abortion in mares in Iraq. One hundred seventy three mares from different breed (Arabian, Thoroughbred and cross breed) type with the history of at least one foaling, age > 5 years were used in the current study. This study was conducted during one year calendar (2006) in a private equine station south west of Baghdad. Obtained results showed that the percentage of pregnancy in mare was occurring in spring (30.13%) which significantly higher (p<0.05) than the percentage recorded during the other seasons. Meanwhile high percentage of pregnancy (13.69%) was recorded in the mares bred in August and October. In the same season the percentage of non pregnant (60.98%) were significantly higher than the percentage of pregnant mares in winter. The incidences of early embryonic death differed according to the season of the year, it was higher in winter and autumn as compared to spring and summer, the high percentage of abortion was recorded during Autumn. In conclusion the breeding season is not obvious in mares in Iraq and most mares can be bred during different months and seasons of the year.


تأثير مواسم السنة المختلفة على نسبة الحمل في الأفراش في العراق

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المستخلص
تهدف الدراسة الحالية إلى تقييم تأثير مواسم السنة المختلفة على نسبة الحمل والهيكلا الجنيني المبكر والإجهاض في الأفراش، تم استخدام 173 فرساً من سلالات مختلفة (العربى و خيول السباق والمشربة) تجاوزت أعمارها 5 سنوات ولديها ولادة سابقة واحدة في الأقل. أجربت الدراسة الحالية خلال عام 2006 في أحد المزارع الخاصة جنوب غرب بغداد. أظهرت نتائج الدراسة الحالية أن أعلى نسبة حمل في الأفراش (30.13%) سجلت خلال فصل الربيع، في حين إن أعلى نسبة للأفراش الحوامل (13.69%) سجلت في الأفراش التي تم تفديها خلال شهري أب وتشرين الأول. أظهرت نتائج الدراسة أن أعلى نسبة للأفراش غير الحوامل (60.98%) سجلت خلال فصل الشتاء مع الأفراش الحوامل خلال نفس الموسم، خلت نسبة الهيكلا الجنيني المبكر في فصول السنة المختلفة وأظهرت أعلى نسبة لها خلال فصل الشتاء والخريف مقارنةً مع فصول الربيع والصيف، بينما سجلت أعلى نسبة للأجهاض في الأفراش التي تم تفديها خلال فصل الخريف. تستنتج من نتائج هذه الدراسة عدم وجود موسمية واضحة للتناسل في الأفراش ويمكن الحصول على شيق وتسفيف حمل على مدار السنة.
Introduction
Mares have a unique reproductive cycle, both behaviorally and physiologically. One of the interesting features is the seasonality, mares are considered seasonal polyestrous (1) which mean that non pregnant mare (north hemisphere) during the breeding season or reproductive competence exhibit numerous, repeated estrous cycle, receptive to the stallion and ovulate only during spring-summer, while reproductive incompetence (anestrous) occurs in winter(2). This cyclic pattern is a trend and does not include all mares because some mares will shown behavioral signs of sexual receptivity throughout the year (2,3). Photoperiod is the most important factors that regulates seasonality, mares enters the ovulatory season as the daylight hours (photophase) increase, while mares enters the anovulatory season when the hours of darkness (scotophase) increase (4). Photoperiod influence the ovarin activity through a complex neuroendocrine pathways signal and entrains the pituitary-gonadal axis (4,5). The reproductive seasonality can be manipulated in mares by alter the duration of light with other factors held constant (5,6). Therefore seasonality of mares in different countries can be evaluated using various reproductive aspects such as ovulation and pregnancy rate record in different months and season of the year (3,5). The objective of the current study is to evaluate the effect of different seasons of the year on the pregnancy rate, early embryonic death and abortion in mares in Iraq.

Material and Methods
The present study was carried out in a private equine station during one year calendar (2006). A total number of 173 mares age >5 years with the history of at least one foaling and from different breed types (Arabian, Thoroughbred and cross breed) were used in the current study. Mares were breed during foal estrous or other subsequent estrous, all mares were subjected to detail clinical, ultrasonographical and vagionscopic examination and only eligible mares were bred. ultrasonographic examination was accomplished using ultrasound scanner (pie medica 480, Holland) equipped with multi frequency rectal probe. 5MHZ frequency was used in the current study. Pregnancy diagnosis was done on 12-20 days post breeding

Early embryonic loss was determined by disappearance or collapse of the embryonic vesicle on the next ultrasound scanning after their detection in previous examination. On the other hand, the heart beat was no longer detected.

Aborted mares were diagnosed by observed the aborted fetus and confirmed by ultrasonic and clinical examination of the suspected mares.

Statistical analysis:
Statistical analysis was performed on the data using chi-square test. The procedure for analysis using the contingency tables as outlined by (7) was used for determining the significant differences existed among the studies percentage the general liner model procedure (8) was used in the statistical analysis to find the expected values.

Results and Discussion
The result obtained from table 1 revealed that percentage of pregnant mares bred during spring (30.13%) were significantly higher (p<0.05) than mares bred during other seasons. Meanwhile no significant differences were statistically recorded between non pregnant mares bred during all seasons of the year. This finding coincidence with the fact that the incidence of ovulation was minimal or absent during winter transitionally increasing during spring, maximal during summer, and transitionally decreasing during the fall. The increasing incidence of ovulation in spring approximately paralleled the increasing day lengths. The ovulation rate seems to increase simultaneously with increase day length in mares (5). Nie (4) indicated that the time of reproductive competence occurring from mid spring through summer.
Furthermore the mare in lower latitudes of temperate zone foal earlier than the mares in higher latitudes (9), the greater the distance from equator, the mare is longer anovulatory winter anestrous will be (10). In Iraq large number of mares foaled during later winter and early spring that give chance to increased number of breeding during spring by applied foal breeding to these foaling mares.

The percentage of non pregnant mares was significantly higher than percentage of pregnant mares in all seasons (Fig 1). This result could explain according to management and reproductive problem in mares at the time work (5).

In the same season, the result revealed that the percentage of Non-pregnant mares (60.98%) were highly significant differences (p<0.01) from the percentage of pregnant mares in winter, Meanwhile the difference between pregnant and non pregnant mares in spring were lesser than other seasons (Fig 1). This result might be reflected the influence of short day light on ovarian activity and ovulation which lead to rise the percentage of non pregnant mares (5). In one study Omran and Ishak (11) found that most mares of the study maintain regular ovarian activity throughout the year. On the other hand the stallion may be involved in poor pregnancy rate when breeding is done early in the year (12). Similarly (13) indicated that the seasonal effect is the most important factor affecting testicular function and sperm production in stallions.

According to month's distribution (Fig 2), the result showed that high percentage of pregnant mares (13.69%) was diagnosed in mares bred during August and October. This could explain that the time of the mares' reproductive competence occurring from mid spring through summer. (3,4), also (15) indicated that the breeding season in horses extending from February to November, peak fertility is obtained in mares are bred between May and July.

Percentage of early embryonic death in mares bred during winter and autumn (33.33%) were significantly higher (p<0.05) than the percentage of mare (16.67%) bred during spring and summer (Table 2). High percentage of abortion (50%) was recorded in mares bred during autumn which significantly higher (p<0.01) than the percentages which recorded during the other seasons (Table 2).These number indicated that EED and abortion were a sporadic cases and might be due management and stress factors other than infectious factors. Meanwhile, number of these mare foaled during winter and autumn, nutrition and temperature stress could play large role in this result (2,5,15). In conclusion seasonality of mares in Iraq is not obvious with significant increase of pregnancy rate in mare bred during spring.

Table 1. Effect of different seasons of year on percentage of pregnant and non pregnant mares.

<table>
<thead>
<tr>
<th>Season</th>
<th>No. of Breeding mare</th>
<th>Pregnancy diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pregnant No. / %</td>
</tr>
<tr>
<td>Winter</td>
<td>41</td>
<td>16 (21.91%) b</td>
</tr>
<tr>
<td>Spring</td>
<td>48</td>
<td>22 (30.13%) a</td>
</tr>
<tr>
<td>Summer</td>
<td>42</td>
<td>17 (23.28%) b</td>
</tr>
<tr>
<td>Autumn</td>
<td>42</td>
<td>18 (24.65%) b</td>
</tr>
<tr>
<td>Total</td>
<td>173 (100.00%)</td>
<td>73 (42.29%)</td>
</tr>
<tr>
<td>Chi-square</td>
<td></td>
<td>3.711 *</td>
</tr>
</tbody>
</table>

Percentages with different superscripts within each column differ significantly* (P<0.05).

ns: non-significant.
Figure 1. Percentage of pregnant and non pregnant mares in different seasons of the year.

Figure 2. Percentage of pregnant mares in different months of the year.
Table 2. Percentage of EED and abortion during different season of the year.

<table>
<thead>
<tr>
<th>Season</th>
<th>EED</th>
<th>Abortion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter</td>
<td>2 (33.33%)a</td>
<td>2 (25.00%)b</td>
</tr>
<tr>
<td>Spring</td>
<td>1 (16.67%)b</td>
<td>2 (25.00%)b</td>
</tr>
<tr>
<td>Summer</td>
<td>1 (16.67%)b</td>
<td>0 (0.00%)b</td>
</tr>
<tr>
<td>Autumn</td>
<td>2 (33.33%)a</td>
<td>4 (50.00%)a</td>
</tr>
<tr>
<td>Total</td>
<td>6 100%</td>
<td>8 100%</td>
</tr>
</tbody>
</table>

Chi-square 4.618* 6.25**

Percentages with different superscripts within each column differ significantly* (P<0.05), ** (P<0.01).

References