PRODUCTIVE AND REPRODUCTIVE PERFORMANCE OF GOATS AS AFFECTED BY L-TYROSINE SUPPLEMENT.

1- Sexual activity and reproductive performance.

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ABSTRACT

Sixty Zaraibi does aged 2-4 years and weighed 35-40 kg were used to define the oral administration influence of L-tyrosine on ovarian activities and reproductive performance. Does were randomly assigned to three equal groups (20 each). The first group (G1): was kept as a control (without L-tyrosine treatment). The second (G2) and third (G3) groups were received oral dose of L-tyrosine at levels 1.0 and 1.5gm / 10 kg live body weight, respectively. L-tyrosine was given one week before the beginning of breeding season.

Results show that

Does treated with L- tyrosine at level 1.0 gm (G2) had significantly (P≤ 0.05) higher oestrus (95.0%), while those treated with 1.5 gm (G3) had insignificant increase in oestrus (90%) compared to the control group (80%). The duration of oestrus showed the longest time (41.94 hr) with does on G2 (1.0 mg) and the shortest (13.73 hr) in G1 (control) (P < 0.05). While G3 (1.5 gm) had a medium duration (20.43 hr) which represent the normal duration. The interval from treatment to onset of oestrus (time to oestrus) was significantly (P≤ 0.05) shorter with does in G 3 and G2 than those in control group (G1). The non-return to oestrus of the does was significantly (P≤ 0.05) higher in G3 than G1.

The does treated with .L-tyrosine at level 1.5 gm (G3) increased (P≤ 0.05) total number of ovulatory cycle and number of oestrus ovulatory cycles compared to the control does. The number of anoestrus ovulatory cycles / doe was insignificantly decrease in G2 compared to the other groups (G1 and G3). Anoestrus ovulatory cycle (%) showed insignificant lowering in the does in G3 than G1 and G2.

At pre-oestrus period, progesterone (P_4) concentration in blood plasma was significantly (P≤ 0.05) higher in G2 does followed by G3 compared with control does (G1). At 4, 8 and 30 days post mating, P_4 concentration was higher in does of G2 and G3 than that of G1.

The pregnancy rate was significantly (P≤ 0.05) higher in G3 does than the control (G1). The interval from buck exposure to kidding was decreased in the does of G2 and G3 compared to G1. Gestation length was insignificantly shorter in does of G3 and G2 than does of G1. The does in G3 attained higher (P≤ 0.05) kidding percentage (200%) followed by G2 (190 %) compared to control group (150%). Number of kids born per doe kidded was higher with G2 and G3 does compared to control group. The percentage of does kidded twins and triplets were higher among does treated with L-tyrosine (G2 and G3) than control group (G1). Litter weight at birth was insignificantly higher for does treated with L-tyrosine (G2 and G3) than control does. Mortality rate was significantly (P≤ 0.05) lower in the does treated with L-tyrosine (G2 and G3) compared with control group (G1).

***Keywords**: Goats, L-tyrosine, ovarian activity, progesterone, reproductive performance.*

PRODUCTIVE AND REPRODUCTIVE PERFORMANCE OF GOATS AS AFFECTED BY L-TYROSINE ADMINISTRATION.

INTRODUCTION

L-tyrosine is a semi essential amino acid involved in formation of catecholamine from adrenal gland and thyroxin from thyroid gland (El-Amrawi, 2008). It has been found that the effect of pituitary gonadotropins (FSH & LH) on gonads is more hastened when thyroxin level is at the peak (Hall *et al*., 1992). In addition, it serves as a precursor for the synthesis of dopamine, norepinepine and epinephrine and is a specific brain neurotransmitter implicated in the control of GnRH and LH (Ramirez *et al.,* 1984). Tyrosine may be involved in stimulating GnRH *via* influencing synthesis of norepinephrine (Acworth *et al*., 1988), a neurotransmitter that stimulates GnRH release (Ramirez *et al.,* 1984 and Terasawa *et al*., 1988).

Many studies have shown that there is a close correlation between the level of some amino acids in the blood and reproductive performance in various stages of the production cycle in animals. The treatment by some amino acids, especially tyrosine at each of this stage led to improve significantly reproductive and productive performance (El-Amrawi, 2008).The conception rate in buffalo after L-tyrosine treatment was observed to be 96 % (El-Amrawi *et al.*, 1991) and 80 % (El-Desouky 1993). Also, El-Amrawi *et al.*, (1994) reported that buffaloes treated with L-tyrosine had a high conception and calving rates. In Balady goats, tyrosine treatment resulted higher conception rate in the treated does than control (Kamel, 1996).

The relationship between tyrosine and reproduction has been reported previously (Gabr, 2009). In dairy cows, tyrosine treatment resulted in expressing oestrus within several days in more than 85% followed by normal estrous cycles. These findings indicated that L-tyrosine has positive effect on induction of oestrus in cows (Munsterer, 1987). In Balady goats, the heat signs observed on the does came to heat after treatment with L-tyrosine were increasing the frequency of bleating, urination tail wagging and anxiety (Kamel, 1996).

Exogenous tyrosine induced follicular growth, oestrus and ovulation in anovulatory dairy cows (Munsterer, 1987) and improved expression of oestrus (Hammerl and Russe, 1987). Kamel (1996) concluded that L-tyrosine can induce ovarian activation through the secretion of pituitary gonadotropin and consequently improving the fertility of Balady goats when administrated orally in water or fed in a dose of 100 mg/kg body weight.

The aim of the present work was to study the effect of L-tyrosine administration on sexual activity and reproductive performance of Zaraibi goats.

MATERIALS AND METHODS

This study was conducted in Faculty of Environmental Agricultural Sciences, El-Arish, North Sinai Governorate Suez Canal University, during the period from mid May, 2008 until mid February 2009. The present work aimed to define the effects of L-tyrosine administration on ovarian activities, progesterone concentration and reproductive performance.

Animals were housed in semi open sheds under natural daylight conditions and fed allowances according to NRC (1981) recommendations for dairy goats. The does were allowed to drink clean fresh water ad libitum.

A total number of 60 healthy Zaraibi does aged 2-4 years and of 35-40 kg body weight were used in the present experiment. The does were assigned to three groups (20 each). The first group (G1) was served as a control, while the second (G2) and third (G3) groups were administrated orally with a single dose before one week from the beginning of breeding season of L-tyrosine at levels of 1.0 and 1.5gm /10 kg live body weight, respectively.

During the breeding season, the buck / does ratio 1:20 and natural mating was applied. Mating season extended for 35 days. Vitamin and minerals block mixture were available all the time to does. Detection of estrous was carried out by exposing the does to teaser buck three times daily

(30 minute each) started immediately after treatments.

Does were considered in heat when they full standing to be mounted by the male. Does were naturally mated and observed for oestrus after 17-25 days of mating. The parameter considered as indicator of estrous activity for does was duration of oestrus (the time between the first and last accepted mount). Heat duration clasified as: short, less than 20 hours, normal between 20-40 hours and long more than 40 hours according to Gareth Evans and Maxwell (1987). Onset of oestrus (onset of post treatment) the mean interval from treatment to the onset of oestrus. Day of oestrus was determined as the first day that marks were seen on the doe from the buck harness or that doe was observed to stand when mounted by the buck. Date of oestrus (date of onset of the first oestrus) was determined as the first oestrus that recorded for each group and considered as an indicator of achieving oestrus. Ovarian activity was defined as monitored by progesterone determination in the blood samples at particular time throughout the estrous cycle.

The studied reproductive traits of does were pregnancy rate (does kidded / does mated X 100), days from introducing bucks to kidding, pregnancy period, kidding rate (the number of kids born divided by the number of does exposed to the buck times 100), litter size (number of kids born per doe kidded), frequency of single, twins and triplets kids; litter weight at birth and mortality rate.

Blood samples (5 ml) were collected randomly from 3 animals in each group of does at morning from jugular vein puncture using heparinized vacutainer tubes. Blood was collected before feeding and drinking. Blood samples were collected before treatments, during the estrous cycle and at 4, 8 and 30 days after mating and every two days weekly up to the end of the experimental period. Blood samples were centrifuged at 4000 rpm for 15 minutes. Blood plasma were carefully separated and stored at -20^0C until analysis.

Quantitative determination of progesterone in the plasma samples was carried out using progesterone radioimmunoassay kit (Diagnostic Systems, Laboratories Texas, USA, DSL-3900). Antisera for the hormone were highly specific with an extremely low cross reactivity to other steroids. The sensitivity of the assay, defined as the minimum concentration of progesterone significantly different from zero ng/ml standard with probability of 95% was 0.12 ng/ml and the intra and intra assay CV were 6.6% and 11.7%, respectively.

Data were statistically analyzed using analysis of variance procedure described by SPSS (1999) and significant differences among treatments were tested by Duncan's Multiple Range Test (Duncan, 1955).

RESULTS AND DISCUSSION

Oestrus activity:

The number of does showed estrous in different treatments is presented in Table 1. G2, treated with L-tyrosine at level of 1.0 gm, had the highest proportion of does in oestrus (95.0 %), ($P \leq 0.05$) followed by G3, does treated with L-tyrosine at level of 1.5 gm, then untreated does (G1, 80.0 %) with insignificant difference inbetween. These results are in agreement with those reported by Ibrahim (2010) on ewes. The increased oestrus may be due to the effect of L-tyrosine on hypothalamic activity and GnRH secretion. The effect on reproductive performance are mediated by changes in ovarian hormones or in hypothalamic-pituitary sensitivity to ovarian hormones (Gordon, 1999). In addition, these results may be due to involvement of tyrosine in stimulating GnRH release via stimulating synthesis of norepinephrine (Acworth *et al*., 1988) and/ or neurotransmitter that stimulates GnRH release (Terasawa *et al*., 1988).

Concerning oestrus duration, the does treated with L-tyrosine at level of 1.0 gm (G2) had significantly ($P \leq 0.05$) longer duration (41.94 ± 10.21 hr) than untreated does (G1) which was the shortest (13.73 ±3.10 hr), while the does treated with L-tyrosine at level of 1.5 gm (G3) showed normal duration (20.43 ±4.02 hr). The increased

duration might be due to development of more ova than in untreated does (G1). In addition, the increased number of developed follicles lead to high level of plasma estrogen, that perhaps cause the longer duration.

Ibrahim (2010) reported that enhancement in oestrus duration may be due to increased plasma estrogen level by L-tyrosine administration. Kamel (1996) also, found that the estrogen concentration in goats treated with L-tyrosine in the 3rd day was significantly higher than that detected in the 3rd and 4th day following administration of placebo in the control group. Additionally, Hall *et al*.(1992) noticed that does treated with tyrosineshowed increased LH pulse frequency. Similarly El-Amrawi *et al.* (1992) indicated that the increase of oestrus duration could be due to increasing estradiol level in follicular phase.

The mean interval from administration with L-tyrosine or start of experimentation to the onset of oestrus (time to oestrus) was significantly ($P \leq 0.05$) shorter for G3 and G2 than for control does (13.72 ± 3.10 and 12.06 ± 3.26 *VS* 17.54 ± 3.74 days, respectively). The extent of this interval depends on the phase of follicular development at the time of L-tyrosine treatment. Does possess dominant follicles that are still growing, will show oestrus in 48 to 60 hrs, while, animals with follicles at the plateau stage or regressing phase will take more than 3 days to show oestrus (Pinheiro, *et al*., 1998). Beal (1996) suggested that variation in the timing to oestrus may be due to differences among animals in the rate of regression of the CL following their treatment. These results are in agreement with those reported by Abu El-Hamed et al. (2010) that interval from treatment to the onset of the first oestrus was significantly shorter in the does treated with L-tyrosine than control. While, Robinson (1988) reported that the period of estrous is depending on the LH peak. Time of onset of oestrus and LH release were significantly correlated (0.93) with ovulation occurred within 24 hrs. Hall *et al*. (1992) reported that exogenous L-tyrosine increased frequency of LH pulses.

Day and date of oestrus were significantly ($P \leq 0.05$) shorter in the does administrated with L-tyrosine (G3 and G2) than control (G1). Non-return to oestrus was significantly ($P \leq 0.05$) higher (100.00%) in the doe treated with L-tyrosine at level of 1.5 gm (G3) followed by G2, doe treated with L-tyrosine at level of 1.0 gm, (89.47%) then untreated does (82.35%). The sign of non-return to oestrus, due to pregnancy, is not physically different from anestrous at the end of the breeding season (El-Shamaa *et al*., 2003). Therefore, pregnancy diagnosis based on non-return to oestrus is not reliable in sheep and goats due to the seasonality in oestrus behaviour (Sallam, 1999). These results are in agreement with those obtained by El-Shamaa *et al*. (2003).

Table 1: Oestrus activity of Zaraibi goats as affected by L- tyrosine administration.

Items	L-tyrosine level (gm /10 kg body weight)		
	G1 (control)	G2 (1.0 gm)	G3 (1.5 gm)
Number of does	20	20	20
Number of does showing oestrus	16 (80 %) ^{b}	19 (95 %) ^{a}	18 (90 %) ^{ab}
Duration of oestrus(h)	13.73 ^{b} ± 2.43	41.94 ^{a} ± 10.21	20.43 ^{b} ± 4.02
Onset of oestrus (d)	17.54^{a} ± 3.74	13.72 ^{b} ± 3.10	12.06 ^{b} ± 3.26
Day of oestrus (d)	9.24 ^{a} ± 3.70	5.01 ^{b} ± 1.97	3.88 ^{b} ± 1.48
Date of oestrus (d)	9.54 ^{a} ± 3.07	3.89 ^{b} ± 1.99	2.19 ^{b} ± 1.46
Non - return to oestrus	14 (87. 5 %) ^{b}	17 (89.47 %) $^{a\,b}$	18 (100 %) ^{a}

a and b, values in the same row with different superscripts are significantly different ($P<0.05$).

Ovarian activity:

Data presented in Table 2 revealed that the total number of oestrus ovulatory cycles were significantly (P≤ 0.05) higher in does administrated with L-tyrosine in G3 than control (G1). While, does treated with L-tyrosine in G2 were insignificantly decreased the number of anoestrus ovulatory cycles / doe as compared to the other groups (G1 and G3). It is worthy noting that, the total number of ovulatory cycles / doe in G3 was associated with oestrus behaviour showing 36.84% silent ovulatory cycles *versus* 42.86 and 61.54% in G2 and G1, respectivily. This results indicates that the exogenous tyrosine induced follicular growth and ovulation in anovulatory cycles (Abu El-Hamd *et al*. 2010). L-tyrosine may involve stimulation of GnRH release because availability of tyrosine influences synthesis of norepinephrine (Wurtman *et al*., 1981), a neurotransmitter that stimulates hypothalamic GnRH release and pulsatile and preovulatory release of LH from pituitary gland (Terasawa *et al*., 1988). The catecholamines may mediate effect of other neurotransmitters and gonadal steroids on release of GnRH (Yen and Vale, 1990). On the other hand, this result may be due to affected by the rate of uterine involution, the rate of development of ovarian follicles, pituitary and peripheral concentrations of gonadotropins and peripheral level of estrogen and progesterone (Stevenson and Britt, 1980). These results were confirmed by incidence of kidding rate in the does (Table 4).

Progesterone concentration:

The blood plasma progesterone (P_4) concentrations of the does with different treatments are shown in Table 3. At pre-oestrus period, P_4 concentration was significantly (P≤ 0.05) increased (3.25 ng/ml) in the does treated with L-tyrosine (G2) and insignificantly increased in G3 (2.63ng/ml) as compared with that in G1 (1.80 ng/ml). At mating (onset of oestrus) P_4 concentration was less than 0.5ng/ml in does for all groups without significant differences although the highest and lowest values of P_4 were recorded with the does in G3 and G2, respectively. At 4 days after mating, P_4 concentration was significantly (P≤ 0.05) higher in G2 than that in G1. While, the differences in P_4 concentration of the does at 8 days were insignificant. The differences in P_4 at 30 days post mating were significantly (P≤ 0.05) higher in the does treated with L-tyrosine in G3 than that in other groups (G1 and G2). These results may be due to the does treated with L-tyrosine induces the release of both LH and FSH, which causes maturation of ovarian follicles and ovulation. The pronounced increase in P_4 concentration post treatment by L-tyrosine inducted ovulation incidence thus activation of corpus luteum development. These results are similar to that reported by Hall *et al*., (1992) and Abu El-

Table 2: Ovarian activity of Zaraibi does as affected by L-tyrosine administration.

Items	L-tyrosine level (gm /10 kg body weight)		
	G1 (control)	G2 (1.0 gm)	G3 (1.5 gm)
Total number of ovulatory cycle / doe	$2.6^{b} \pm 0.24$	$2.8^{ab} \pm 0.37$	$3.8^{a} \pm 0.80$
Number of oestrus ovulatory cycles /doe	$1.00^{b} \pm 0.63$	$1.6^{ab} \pm 0.68$	$2.4^{a} \pm 0.30$
Number of anoestrus ovulatory cycles / doe	1.6 ± 0.68	1.2 ± 0.80	1.4 ± 0.60
Anoestrus ovulatory cycle (%)	61.54	42.86	36.84

a& b symbols in the same raw with different superscripts are significantly different (P<0.05).

Hamd *et al*. (2010). The concentration of P_4 was almost associated with the number of corpora lutea counted on the ovaries of does after mating as affected by L-tyrosine treatment (El-Gohary, 2004). Moreover, Ibrahim (2010) reported that the post treatment with L-tyrosine led to increase significantly estradiol in follicular phase and decrease at luteal phase in sheep.

Reproductive performance:

The obtained results in Table 4 revealed that the pregnancy rate was significantly ($P \leq 0.05$) higher in the does naturally mated and treated with L-tyrosine at level of 1.5 gm (G3) than that in the untreated does (G1) while, insignificantly higher in the does treated with L-tyrosine at level of 1.0 gm (G2). These results were almost confirmed with the percentage of the does which showed estrous. These results may be due to reducing the number of sub-functional corpus luteum and increasing its life span (Williams, 1989). Moreover, this phenomenon might be due to the enhancement of theca and / or granulosa cell development before ovulation or an increase in the pool of follicles from that competent preovulatory follicle form (Ryan *et al.*, 1995). Kandil *et al*. (2001) confirmed that L-tyrosine administration in rabbits raised pregnancy rate and increased litter size. These results are in agreement with the finding of Abu El-Hamed *et al*. (2010) in cows and Ibrahim (2010) in sheep, who found that treated with L-tyrosine administration had higher conception rate compared with untreated.

The mean interval from buck introduction to kidding was insignificantly different between control (G1) and treated groups (G2 and G3). L-tyrosine treatment (G2) decreased the interval by increasing the proportion of fertile mating. These results are in agreement with those of Hassan Ferial *et al*. (1988) who reported that the effect of ram introduction is usually measured by the proportion of ewes displaying oestrus between 4-8 days as a result of male effect. While, Fiorella *et al*. (1997) found that the male introduction (male effect) before treatments failed to induce either short or normal duration of ovarian activity. In the present study, ovarian activity has been only observed after L-tyrosine treatments.

Gestation period showed insignificantly shorter in the does treated with L-tyrosine than the control ones (Table 4). These results may be attributed to litter size or birth weight which were greater in G2 and G3 (Abu El-Ella, 2006). These results are in agreement with those of Ibrahim (2010) who reported that the length of gestation period was shorter in ewes treated with L-tyrosine than that the untreated ewes.

Table 3: Plasma progesterone concentration (ng/ml) of Zaraibi does at pre-oestrus period, oestrus period and post mating as affected by L-tyrosine administration.

Items	L-tyrosine level (gm /10 kg body weight)			
	G1 (c0ntrol)	G2 (1.0 gm)	G3 (1.5 gm)	Average
Pre-oestrus period	$1.80^{b} \pm 0.34$	$3.25^{a} \pm 0.66$	$2.63^{ab} \pm 1.26$	$2.56^{B} \pm 0.75$
Onset of oestrus (at Mating)	$0.28^{a} \pm 0.07$	$0.25^{a} \pm 0.10$	$0.40^{a} \pm 0.17$	$0.31^{C} \pm 0.11$
4 days after mating	$1.17^{b} \pm 0.68$	$3.42^{a} \pm 0.81$	$2.38^{ab} \pm 0.30$	$2.32^{B} \pm 0.59$
8 days after mating	$4.91^{a} \pm 1.32$	$6.24^{a} \pm 0.82$	$5.27^{a} \pm 0.10$	$5.47^{A} \pm 0.75$
30 days after mating	$4.27^{b} \pm 0.85$	$4.83^{b} \pm 0.35$	$7.69^{a} \pm 1.66$	$5.60^{A} \pm 0.95$

a and b, sympols in the same row with different superscripts are significantly different ($P<0.05$).

Does treated with L-tyrosine at level of 1.5 gm (G3) yielded significantly (P≤ 0.05) higher percentage of kidding (200.0%) than the control group (150.0%) as shown in Table, 4. The increase in kidding rate in the treated does may reflect the higher incidence of ovulation rate. However, the kidding rate in the does treated with 1.0 gm L-tyrosine (G2) showed insignificantly higher than that in does in the untreated ones (G1). Ibrahim (1993) reported that the effect of gonadotropin in enhancing fertility is probably a direct consequence of its action in increasing ovulation rate.

Number of kids born per doe kidded was insignificantly higher in the does treated with L-tyrosine at levels of 1.0 (G2) or 1.5 gm (G3) than that the untreated does (G1). The use of L-tyrosine oral dose increases ovulation rate and thus incidence of multiple birth. These findings may be due to that administration of L-tyrosine prior to insemination increased yield of fertilized ova in the doe and initiated a new wave of follicular development and improved the number of ovulation (Cognie, 1990). Ibrahim (2010) found that the number of lambs born per ewe lambed was increased by L-tyrosine oral dose compared to the control.

The percentage of does kidding twins and triplets was higher in does treated with L-tyrosine than in the control does (Table 4). The previous results showed clearly that administration of L-tyrosine increased the multiple births per doe as direct reflection of induced multiple ovulation. These results are in agreement with those reported by Ibrahim (2010).

Littre weight at birth was not significant different between control and treated does (Table 4). These results are in agreement with those of Ibrahim (2010) who found that the birth weights were not significantly different between the control group and ewes treated with L-tyrosine.

Mortality rate was significantly (P≤ 0.05) lower in the dose treated with L-tyrosine at level of 1.0 gm than that the control does (Table 4). This result may be due to the litter size may which affect infant survival through maternal inability to provide adequate nutrition for large liner (Jaquish *et al.*, 1997).

Table 4: Reproductive performance of Zaraibi does as affected by L-tyrosine administration.

Items	L-tyrosine level (gm /10 kg body weight)		
	G1 (control)	G2 (1.0 gm)	G3 (1.5 gm)
Pregnancy rate (%)	70 [b].00 ± 0.10	85 [ab].00 ± 0.08	90.00 [a] ± 0.07
Days from buck introduction to kidding (day)	154.83 ± 0.90	152.86 ± 1.02	153.47 ± 0.93
Gestation period (day)	150.44 ± 1.96	148.07 ± 2.23	146.12 ± 2.02
Kidding rate (%)	150.00[b] ± 0.25	190.00[ab] ± 0.20	200.00 [a] ± 0.18
No. of kids born per doe kidding	2.14± 0.14	2.24 ± 0.17	2.22 ± 0.16
Type of birth			
Doe kidding single (n-%)	1(7.14 %)	…….	…….
Doe kidding twins (n-%)	10(71.43 %)	13(76.47 %)	14 (77.78%)
Doe kidding triplets (n-%)	3 (21.43 %)	4 (23.53 %)	4 (22.22 %)
Litter weight at birth (kg)	3.51 ± 0.21	4.10 ± 0.27	3.92 ± 0.18
Mortality rate (n-%)	4 (20.0 %) [a]	2 (10.0 %) [b]	4 (20.0 %) [a]

a and b, values in the same row with different superscripts are significantly different (P<0.05).

Several factors contributing to lower mortality rate such as birth weight, nutrition of does, litter size and milk yield of does (Willingham and Shelton, 1990) These results are in agreement with those of Ibrahim (2010).

In conclusion, The does received oral dose of L-tyrosine at levels of 1.0 or 1.5 gm / 10 kg body weight showed better ovarian activity and subsequent fertilizing efficiency than the untreated does. Therefore, it can be recommended to administration of the does with L-tyrosine at levels of 1.0 or 1.5 gm /10 kg body weight as a therapy, simply and applicable techniques to enhance of kidding rate.

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الملخص العربى

الأداء الانتاجى والتناسلى للماعز المتأثرة بالمعاملة بـ لـ تيروزين

1: النشاط الجنسى والأداء التناسلى

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استخدم فى هدة الدراسة 60 عنزه زرايبى بمتوسط عمر 4-2 سنوات ومتوسط الوزن 40 كجم ودلك لدراسة تأثيرتجريع ل- تيروزين على النشاط الجنسى والأداء التناسلى. قسمت الحيوانات عشوائيا الى ثلاث مجموعات (20 بكل مجموعه) ، المجموعه الأولى هى الضابطه ، المجموعه الثانية تم تجريعها بـ 1جم ل- تيروزين لكل 10 كجم وزن حى، فى حين أن المجموعه الثالثه تم تجريعها بـ 1.5جم وذلك قبل أسبوع من بداية موسم التلقيح.مع أخد عينات دم كل 3 أيام من البدايه حتى نهاية الموسم لتقدير هرمون البروجستيرون .

أظهرت النتائج أن أعلى نسبه لاناث المعاز الشائعة كانت فى المجموعه الثانية (95 %) بينما كانت أقل نسبه فى المجموعه الأولى (80 %). كانت أطول فترة شياع (41.94 ساعة) فى المجموعه الثانيه وأقصرها (13.73 ساعه) المجموعه الأولى بينما كانت عاديه فى المجموعه الثالثه. كان الوقت من المعاملة حتى ظهور الشياع قصيرا معنويا فى المجموعه الثالثه والمجموعه الثانيه بالمقارنة بالمجموعه الأولى. كدلك كان متوسط يوم وتاريخ التلقيح قصيرا معنويا فى المجموعه الثالثه والثانيه بالمقارنه بالمجموعه الأولى. كانت نسبة العنزات التى لم تظهر علامات الشياع بعد التلقيح عالى معنويا فى المجموعه الثالثه مقارنه بالمجموعه الأولى.

أظهرت النتائج أن اجمالى دورات التبويض الصامت وعدد دورات التبويض الشبقى عالى معنويا فى المجموعه الثالثه مقارنة بالمجموعه الاولى بينما ظهر انخفاض فى عدد دورات الشياع الصامت فى المجموعه الثانية.

أظهرت النتائج حدوث زياده معنويه فى تركيز هرمون البروجستيرون فى دم الاناث التى جرعت بـ لـ - تيروزين مقارنه بالغير معاملة فى الفترة قبل بداية الشياع بينما حدثت زيادة فى تركيز هرمون البروجستيرون فى اليوم الرابع والثامن وفى اليوم الثلاثين من التلقيح فى عنزات المجموعه الثانيه والثالثه مقارنة بالمجموعه الأولى.

أظهرت النتائج أن معدل الحمل كان أعلى معنويا فى المجموعه الثالثه مقارنه بالمجموعه الأولى.كدلك كانت الفترة من تعرض التيوس لاناث الماعز وطول فترة الحمل أقصر فى الاناث التى جرعت بـ لـ - تيروزين عن الاناث الغير معاملة. كدلك كان معدل الولادات أعلى معنويا لاناث المجموعه الثالثه يليها المجموعه الثانية مقارنة بالمجموعه الأولى. وجد ان عدد الجداء المولوده ونسبة الولادات التوأميه والثلاثيه أعلى فى اناث الماعز المعامله بالتيروزين مقارنه بالغير معاملة. كدلك وجد أن معدل نفوق المواليد كان أقل معنويا فى المجموعات المعاملة بالتيروزين مقارنة بالغير معامله.

أوضحت الدراسه أن معاملة اناث الماعز بـ لـ - تيروزين عند مستوى 1.0 أو 1.5 جرام / لكل 10 كجم وزن جى أدت الى زيادة النشاط المبيضى وتحسين الخصوبه ومعدل الولادات وزيادة نسبة الولادات المتعدده وعدد الجداء المولوده لكل معزة مقارنتا بالماعز الغير معاملة .