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EFFECT OF DIETARY SELENIUM AND ZINC ON SOUME SEX HORMONES ANDPERFORMANCE OF GOLDEN MONTAZAH DURING SUMMER SEASON.

2- EFFECT ON MALES.

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ABSTRACT: The present work was carried out at the Poultry Research Station, El-Azab, Fayoum belonging to Animal Production Research Institute, Agricultural Research Center, Ministry of Agriculture, during the summer season (July to September) the to study the effect of supplemented Selenomethionine (Sel-Plex); Zinc Glycine (Zn-Gly) to the diet and their interaction on productive, physiological performance, testosterone hormone, and some semen quality in natural environments during Egyptian summer months from July to September. A total number of 162 Golden Montazah (GM) cocks from 29 to 40 weeks of age were randomly divided into 9 equal treatments (T) with3 replicates each of 6 cocks. The first treatment was fed the basal diet and served as control, while treatments 2, 3, 4, 5, 6, 7, 8 and 9 were given the basal diet supplemented with 0.2 mg Selenomethionine (Sel-Plex); 0.3 mg (Sel-Plex); 100 mg Zinc Glycine (Zn-Gly); 125 mg (Zn-Gly); 0.2 mg (Sel-Plex) + 100 mg (Zn- Gly); 0.2 mg (Sel-Plex) + 125 mg (Zn-Gly); 0.3 mg(Sel-Plex) + 100 mg (Zn-Gly) and 0.3 (Sel-Plex)+ 125 mg/ kg diets, respectively. Results revealed that adding Sel-Plex with Zn-Gly or either alone to the diet (T9, T8, T7, T5 and T3), respectively, of GM cocks results in significant ($P<0.05$) increase in live body weights (LBW), change BW, aspartate-aminotransferase (AST), alanine aminotransferase (ALT), ejaculate volume, alive sperm (%) and sperm concentration. Testosterone hormone values was significantly increased ($P\leq0.05$) by cockerels fed on T9, T8, T7, T6 and T4, respectively, compared to T1 (control). Therefore, adding Sel-Plex, Zn-Gly and the effect of Se combined with Zn to the diet could be used as an efficient tool for maintaining high potency of GM males under hot climate condition.

Key Words: Selenium, Zinc, Testosterone, Semen Quality in Local Chickens.

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INTRODUCTION

Deficiencies of the trace minerals Se and Zn have been linked to impaired reproductive performance in male and female farm animals (Smith and Akinbamijo,
2000). Research has shown that trace elements such as Zn and Se can alter reproductive functions in vivo. However, few research exists regarding the direct effects of these trace elements on avian semen quality in vivo. Se-dependent glutathione peroxidase is an essential component of the antioxidant system in avian semen (Surai, 2000). Edens and Sefton, (2002) found that selenomethionine added directly to spermatozoa in vitro also alters sperm function. El-Mallah et al., (2011) reported that dietary organic Se alleviated heat load on performance, and some biochemical blood parameters of laying hens under summer season in Egypt. Kamel, (2012) found that organic selenium improved semen quality, antioxidant status and reproductive traits of rabbit bucks during heat stress. Also exposure of rabbits to high ambient temperature (30^0C) negatively affects the fertility, growth and reproductive traits (Ahmed et al., 2005). Moreover, exposure to hyperthermia is harmful for spermatogenesis and also decreases testosterone levels (Murray, 1997). A high ambient temperature causes also, an increase in oxidative stress due to the increase in production of reactive oxygen species (ROS), which determines semen characteristics and sperm-oocyte fusion (Akiyama, 1999).The US Food and Drug Administration approved the use of organic selenium as a feed supplement for all classes of poultry(Federal Register, 2002).The Se requirement of poultry in physiological conditions is thought to be quite low, varying from 0.06 ppm (laying hen) up to 0.2 ppm (turkey, quail, duck; NRC, 1994).Selenium is an essential element for spermatogenesis; also it can protect the biological membranes during spermatogenesis. Also in the seminal plasma itself, selenium can reduce the peroxidation of seminal lipids and enhance the glutathione peroxidase (GPx) activity leading to maintain adequate viability of sperms to complete the fertilization process under high ambient temperature (Ebeid, 2009). Dietary selenium could influence the semen quality in mice (Gutiérrez et al., 2008), pigs (Lasota et al., 2004) and rabbit (Cesare et al., 2002). Selenium as a component of glutathione peroxidase, can serve as the first line of defense against oxidative and nitrosative stress and probably could protect testicular spermatozoa from free radicals toxic (Klotz et al., 2003), and it is hence fundamental to cell differentiation and replication. Also increasing the selenium status will increase the antioxidant glutathione peroxidase activity, thus decreasing the reactive oxygen species and leading to an increase in male fertility (Surai, 2002 and Gallo et al., 2003).

Zinc is involved extensively in nucleic acid and protein metabolism (Hassan et al., 2003).It is the most common metal constituent of cellular enzymes which plays essential roles in cell proliferation and death, immune development reproduction, gene regulation, and defense against oxidative stress and damage (Namra et al., 2009).The European Commission issued Regulation No.1334/2003, limits the maximum tolerable organic zinc levels in feed mixtures for livestock at 150 mg/kg. Zinc is a cofactor of the main antioxidative enzyme Cu Zn-superoxide dismutase; it may play a key role in suppressing free radicals and inhibiting NADPH-dependent lipid peroxidation (Prasad, 1997) as well as in preventing lipid peroxidation via inhibition of glutathione depletion. Zinc is an essential component of both DNA and RNA polymerase enzymes and is vital to the activity of variety hormones including glucagon insulin, growth and sex hormones. Zinc is an integral part of more than 300enzyme systems that are involved in metabolism of energy, carbohydrates, nucleic acids and protein (Ibs and Rink, 2003). In this context, zinc deficiency causes atrophy of the seminiferous tubules, failure of spermatogenesis and decreased testosterone secretion in the rat (Vallee and Falchuk, 1993). Further, zinc in seminal fluid helps to stabilize the cell membrane and nuclear chromatin of spermatozoa (Kvist, 2008). Among the most notable effects of Zn deficiency on hormone production and secretion are those related to testosterone, insulin and adrenal corticosteroids, spermatogenesis and the development of the primary and secondary sex organs in the male and all phases of the reproductive process in the female can be adversely affected by Zn deficiency (Insler and Lunenfeld,1993). Zinc also is a necessary component of sperm structure and spermatogenesis. Feeding zinc to male breeders chicken has increased sperm concentration and sperm motility (Zinpro, 2002).

Samar et al., (2014) reported that body weights of broilers fed the Zn+Se supplemented in the diet under natural summer conditions gained 80g more than those fed control diet. Shanmugam et al., (2015) found that live sperm% from the Se combined with Zn, fed male of laying breeder were significantly higher than the control group also, observed improvement in semen quality and fertility at 37 weeks of age. Zinc as well as selenium have role in anatomical development of reproductive organs and in spermatogenesis (Yamaguchi et al., 2009). The effects of zinc and selenium at different concentrations on male sex hormones and semen quality in cocks of Golden Montazah (GM) chickensas a developed local strain in Egypt.

MATERIALS AND METHODS

The present study was carried out at El-Azab Poultry Research Station, (El Fayoum Governorate). Animal Production Research Institute, Agriculture Research Center, Ministry of Agriculture, during the summer season (July to September).

Birds:

One hundred and sixty two of Golden Montazah cocks (GM) local strain at 29 weeks of age was used in this study which lasted up to 40 weeks of bird's age in natural environments during Egyptian summer months from July to September. Averages of body weight for the 9 experimental treatments were apparently uniform. The cocks were randomly distributed into 9 experimental treatments (control and 8 supplemented treatments) with 3 replicates (6 cocks each).

Diets and experimental design:

The basal experimental diet was formulated to meet the nutrient requirements of local strain of chicken at laying period as recommended by Feed composition Tables for animal & poultry feedstuffs used in Egypt (2001), basal diets contained 15.67% protein and 2747 kcal of ME/kg in both ingredients and chemical composition of the control diets are shown in Table 1. While treatments 2 to 9 were given the basal laying diet supplemented with Selenomethionine (Sel-Plex) or Zinc Glycine (Zn-Gly) and their combination to compose the experimental dietary groups, namely as follows:

T1 (served as control).
T2 control + (0.2mg Sel-Plex /kg feed).
T3 control + (0.3mg Sel-Plex /kg feed).
T4 control + (100mg Zn-Gly /kg feed).
T5 control + (125mg Zn-Gly /kg feed).
T6 control + (0.2mg Sel-Plex +100mg Zn-Gly /kg feed).
T7 control + (0.2mg Sel-Plex +125mg Zn-Gly /kg feed).
T8 control + (0.3mg Sel-Plex +100mg Zn-Gly /kg feed).
T9 control + (0.3mg Sel-Plex +125mg Zn-Gly /kg feed).

Selenium yeast (SelPlex™ Alltech Inc.) contains 1000 ppm Se and produced by the fermentation of yeast (Saccharomyces cerevisiae) in a high Se medium Nicholasville, USA, Zinc Glycine was Glyadd-zn 26% (znglycinate 26%) Liptose Spain. Selenomethionine or Zinc Glycine was mixed well with feed every other day to avoid decomposition. The role of trace elements to increase poultry productivity is very important in the high-stress production environment. Nutritionists realize that both the level and the source of trace elements play an important role in ration formulations and optimizing production level, product quality, health status of birds and economic returns. Using chicken eggs in the human diet leads to additional benefits that can be derived from modifying the egg nutritional profile, particularly egg fats and antioxidants. In this regard, Kucharzewski et al. (2003)

Cocks were housed individually in single cages provided with waterier and feeders. All cocks were kept under the same environmental conditions and managerial hygienic. Cocks were kept in an open-sided house with light cycle regimen of 16 hours light and 8 hours darkness, throughout the experimental period (29-40 weeks of age), feed and water were provided ad libitum. The mean value of high ambient daily temperature 35.6, 36.8 and 34.5^{0}C and relative humidity 48, 50 and 58% throughout the experimental period (July, August and September) in the house respectively were two times daily recorded inside the chickens using electronic digital thermo-hygrometer.

Measurements and observation:

Cocks were individually weighed at the beginning of the experiment then every four weeks, to the nearest 0.10 gram in early morning before feeding and watering, change in live body weights (LBW) were calculated as the differences between the two weights 29 and 40 weeks of age, while, feed consumption (FC) was recorded every 4 weeks for each replicate and treatment and the average feed consumption/ cock/ day was calculated. On the last day of the trial, 9 cocks were randomly chosen from each treatment and blood samples were obtained from the brachial vein for serum total protein, albumin, globulin, aspartate-aminotransferase (AST), alanine aminotransferase (ALT) and testosterone hormone (PTA) determination. Blood serum was separated by centrifugation of blood at 3000 rpm for 15 min and was then frozen at -20^{0}C for analysis serum total protein, albumin by spectrophotometer using available commercial kits produced by Biodiagnostic, Egypt, while testosterone determined in serum by using Ria testosterone, direct. Beckman Coulter Company. At the end of the experiment, three cocks from each treatment were massaged and semen was collected to determine some semen physical properties such as ejaculate volume (ml), alive sperm (%) and sperm concentration (10^6/mm^3).The volume of the ejaculated semen was assessed by using a 1 ml syringe. The appearance of raw semen was scored 1 to 5 visually (McDaniel and Craig 1959). Percentage of progressively motile sperm was assessed subjectively by placing a drop of diluted semen on a Makler chamber and examining at 20 × magnifications. Sperm concentration was determined in a colorimeter at 540 nm of wavelength (Taneja and Gowe 1961).The obtained data were statistically to analyzed using analysis of procedure of (SAS, 2000). Significant differences among treatment means were determined by using Duncan's Multiple Range Test (Duncan, 1955), at 5% level of significance using the following model:

$Y_{ij} = u + N_i + e_{ij}$ Where Y_{ij} = the observed value, u = population means, N_i = the effect of strain, e_{ij} = the standard error.

RESULTS AND DISCUSSION

Productive performance:

Live body weight (LBW):

The results of the live body weight of Golden Montazah male (GMM) at different ages are shown in Table (2). In general, the results showed that the LBW was increased as the age of GMM increased for all groups. Furthermore, the increment in the LBW at week 33, 37 and 40 of age was significantly ($P \leq 0.05$) higher for the most treated groups compared to control group. In addition, the groups T9, T8 and T7 were recorded the significant ($P \leq 0.05$) higher in change body weight throughout of experimental period. The results indicated that both of group T9 and T8were significantly ($P \leq 0.05$) the highest in live body weight of GMM compared to all other groups including control group at the end of experiment (40 weeks). Whereas, control group was significantly ($P \leq 0.05$) the lowest in live body weight of GMM compared to all other groups. These results may be due to that supplementation of Sel-Plex, Zn-Gly and their combination improved feed utilization and metabolism. This connotation may be confirmed by that feed consumption was insignificantly lower in all treated groups compared to control group. However, the results signified that there may be an additional requirement for Se and Zn for GMM chicken. Likewise, the improvement observed in the LBW of birds fed vitamin E and selenium could be attributed to some of its biological function such as its role on enzymatic oxidation-reduction, nucleic acid metabolism and in promoting the activity of easily oxidized substances as carotenoides and vitamin A (Shlig, 2009). Also, use of organic mineral sources can improve intestinal absorption of trace elements as they reduce interference from agents that form insoluble complexes with the ionic trace elements (Van Der Klis and Kemme, 2002). Choct et al., (2004) found that the significant differences in LBW at 42 day may be due to that selenium is an essential element for growth and performance. Many results reported that theL BW was increased with organic selenium supplementation in the diets of broiler chickens and quail (Sahin et al., 2008 and Skrivan et al.,2008). These results are in agreement with those found by Maysa et al., (2009) indicated that overall means of LBW was significantly ($P \leq 0.05$) increased in males of Bandarah chickens fed Sel-Plex supplementation during period from 40 to 60 weeks of age compared with the control group. However the result was in contrast with those of Ihsan and Qader., (2012) who found that no differences were observed in final live weight of chickens' supplemented selenium in the diet.

On the other hand, these results agreed with Abdallah et al., (2009) who indicated that chicks fed diets containing100% organic minerals zinc had significantly higher body weight compared with those of inorganic control minerals treatment. These results are not agree with the findings of Rossi et al., (2007) and Nollet et al., (2007) found that using trace minerals with greater bioavailability (Bio-plex™ trace minerals) did not affect body weight gain. Moreover, the improvement achieved by zinc supplementation may be due to its involving in many biochemical processes supporting life (Chan et al., 1998) and its important roles in metabolism of energy and protein (Ibs and Rink, 2003) further, the better change of body weight may be due to that Zn is an essential nutrient required for many physiological functions, including antioxidant function, growth and fertility (Shay and Mangian, 2000).

Concerning the Zn combined with Se supplementation, Samar et al., (2014) reported that LBW of broilers fed the Zn+Se supplemented diet reached 600 g at 21 days of age gained 80 g more than those fed control diet, while showed insignificant improvement at 42 days in this respect. Such finding coincides with that obtained by Upton et al., (2009) and Khajali et al., (2010), but is in contrast with Choct et al., (2004).

Feed consumption (FC):

The results of FC of GMM at different ages are given in Table (3). The addition of Sel-Plex, Zn-Gly and their combination had no affected FC values all over the experimental periods. Whereas, there were insignificant numerical reduction in FC for GMM of all treated group compared to control group. However, groups of T5, T3, T7 and T9 were insignificantly lower in FC compared to all groups. It is seems that addition of Se or Zn alone or in combined in the diet had no effect FC in GMM chicken at age ranged between 29 to 40 weeks. These results are supported by Maysa et al., (2009) indicated that overall means of feed consumption was no significant effected throughout all studied periods (44 to 60 weeks of age) in males of Bandarah chickens fed selenium (Sel-Plex™) supplementation compared with the control group. Likewise, many results mentioned that the feed consumption was no significant with organic selenium supplemented in the diets of laying hens (Ziaei et al., 2013 and El-Mallah et al.,2011) and in broiler chickens Niu et al., (2009). Our results are in contrast with the finding of Attia et al., (2010) who reported that the increasing Se level to 0.25 and 0.40 ppm significantly decreased feed intake 15% compared with those in hens fed the control diet. On the other hand, these results are in agreement with those reported by Abdallah et al., (2009) and EL-Faham (2014) reported that differences in feed consumption due to the effect of organic zinc at 32 or 35 days of age of broiler chicken was no significant, but these results are not agree with the findings of Bahakaim et al., (2014) found that laying hens fed diets supplemented with organic zinc significantly consumed feed intake through the second and third periods (28-32 and 32-36 weeks of age) compared with the control group. However, El-Husseiny et al., (2008) indicated that feeding laying hens diets supplemented with Zn up to 175 mg/kg significantly decreased in feed intake from 28 to 43 weeks of age.

Concerning the effect of Se combined with Zn, Samar et al., (2014) found that broiler chicks fed diets supplemented with 40 mg Zn + 0.30 mg Se/kg diet feed intake was insignificant through the period (o-42 days of age), while through the period (21-42 days of age) the increasing in feed intake were significant.

Some plasma constituents and testosterone hormone:

The impact of Sel-Plex, Zn-Gly and Sel-Plex companied with Zn-Glyin the diets of GM cocks at 40 weeks of age on plasma total protein (PTP), plasma albumin (PA), plasma globulin (PG),plasma ALT, plasma AST and plasma testosterone hormone (PTH) are presented in Table (4).

The results showed that there was no significant effect for addition of Se or Zn alone or in combined in diets of GM males on PTP, PA and PG parameters. However, PTP, PA and PG values were insignificantly increased for all treated groups compared to the control except group of T9 was insignificantly lower in PG compared to all other treatments. These results are in agreement with the findings of Attia et al., (2010)reported that the organic selenium (selenomethionine) did not significantly affect the total protein, albumin, globulin concentration of the plasma compared with the control treatment of Gimmizah breeding hens at 50 weeks of age, Similar results were also found by El-Sheikh et al., (2010) on Bandarah males chicken. Gružauskaset al., (2014) indicated that the supplementation of organic selenium in the diet had no substantial effects on serum total protein, albumin of broiler cockerels. However, Maysa et al., (2009) found that selenium supplementation at 0.2 and 0.3 to Bandarah male's chicken diets increased ($P \leq 0.05$) serum total protein and globulin, while no significant effects on serum albumin concentration were observed compared with the control group. While, Al-Draji, and Amen, (2011) found significant ($p<0.05$) increase in blood plasma protein concentration in broiler breeders males fed diet supplement with the Zn during 58 and

66 weeks of age when compared with control group. Regarding to the results of plasma ALT and AST, the control group was significantly ($P \leq 0.05$) higher in both of ALT and AST compared to all other groups. While the results of plasma ALT and AST were significantly ($P \leq 0.05$) decreased as the level of Se or Zn and combination increased in the diets of GM males chicken. The reduction level in plasma ALT and AST concentrations were significantly ($P \leq 0.05$) higher and more clear in groups fed 0.3mg Se combined with the two levels of Zn (T8 and T9) compared to all other groups. The supplementation of Se and Zn in GM cocks diets may be led to enhance the status of liver function and activity. Furthermore, plasma ALT and AST usually appear in serum when there is damage on the liver and muscle tissues caused by excessive stress (Vahdatpour et al., 2011).

In this context, Iqbal et al., (2013) found that dietary supplementation with selenium caused significant decrease in blood plasma concentration of ALT and AST values of laying hens in comparison with control group. Our results are in contrast with the finding of Gružauskas et al., (2014) who found that selenium (organic or inorganic) supplementation had no significant influence on ALT and AST values of broiler cockerels. Similar results were recorded by El-Mallah et al., (2011) on laying hens. Moreover, zinc is essential for nucleic acid synthesis and activity of many enzymes (Beissbarth et al., 2003).

With respect to testosterone hormone, the results displayed that group of T9 was significantly ($P \leq 0.05$) higher in concentration of plasma testosterone hormone compared to control group. Whereas, groups of T1 and T2 were significantly ($P \leq 0.05$) lower in concentration of plasma testosterone hormone compared to the most of rest groups. In this respect, it can be said that concentration of plasma testosterone hormone increased gradually as the level of Se or Zn or their combination increased in the diet of GM cocks but there was no significant differences among T1, T2, T3 and T5 values in this respect. These findings are agreement with those found by Kamel, (2012) indicated that blood plasma testosterone concentration of male rabbits was significantly increased due to supplementation of organic selenium in the diets compared with control group under heat stress in summer season. These results are in disagreement with findings reported by Pavitra and Bansal, (2010) found significant decrease in the levels of serum testosterone in selenium deficient group after 8 weeks of diet male mice. These results may indicate that addition of Se and Zn in cocks' diets increased the secretion of testosterone hormone in the blood. Selenium is important and essential for reproductive functions such as testosterone metabolism and production and is a constituent of sperm capsule selenoprotein (Moslemi and Tavanbakhsh, 2011). These results may be due to that zinc supplementation activates secretion and action of testosterone and can lead to increased efficiency of spermatogenic machinery and increased number of germ cells in the seminiferouse tubules (Abdella et al., 2011). Thus oral zinc supplementation within tolerable level has beneficial effects. Earlier, (Fu-Yu et al., 2007) had noted that zinc deficiency lowers plasma testosterone levels but over supplementation has no effect on testosterone level (Egwurugwu et al., 2013). Testosterone deprivation has negative impact on the structure of penile tissues and erectile nerves (Grahl et al., 2007). Also, zinc is one of the classic testosterone boosters and it’s rightly labeled as one. If you’re depleted in zinc supplementation with it will significantly increase testosterone levels. The biologically damaging effects of reactive oxygen species are controlled in vivo by a wide spectrum of antioxidant defense mechanisms. Testosterone show direct antioxidant effects by increasing the activities of some enzymes and they also cause an increase in antioxidant vitamin levels and trace elements hence indirectly also contribute to antioxidant capacity (Halifeoglu et al.,2003). The improvement in plasma testosterone concentration may be also due to factors affecting the semen quality, such as the increase of relative weight and volume density of leydig cells (interstitial cells) which produce testosterone hormone. The interstitial cells produce several androgens, but the major hormone in blood is testosterone. These significant increment ($p<0.05$) and amelioration in plasma testosterone concentration may be attributed to that the zinc is an inherent component of cortical substance of suprarenal gland. It is also participates in regulating the function of sexual gland system. The synthesis of testicosteroid depends on the existence of zinc. Zinc plays an important role on testosterone externalization through affecting the release of gonadotropic hormones (Abdella et al., 2011).

Some semen physical characteristics:

The results in Table (5) summarized the effect of supplementation Se, Zn and Se combined with Zn on ejaculate volume, a live sperm% and sperm concentration of GM cocks at 40 weeks of age. The results of ejaculate volume showed that addition of 0.3mg Se/Kg diet,125mg Zn/Kg diet, 0.2 Se and 0.3 Se combined with 100 and 125mg Zn /Kg diet were significantly ($P\leq0.05$) higher in ejaculate volume compared to all other groups. However, group of T9 was the highest in ejaculate volume while group of T1 was the lowest one in this trait. Respecting to a live sperm % at 40 weeks of age was significantly ($P\leq0.05$) lower in control group compared to all groups. There were no significant differences among, T3, T5, T7 and T8 values in this respect. On the other hand, sperm concentration at 40 weeks of age was increased with addition of Se, Zn alone or in combination between them. Group of T9 was the highest in sperm concentration whilst control group was the lowest in this trait compared to all other groups. There were no significant differences among T3, T5, T7, T8 and T9 in sperm concentration.

From the above results it can be deduced that dietary supplementation with the certain quantity of Se, Zn and Sel-Plex companied with Zn-Glyto improvement in semen quality traits. Analysis revealed that the treatment has statistically significant effects on the ejaculate volume, percentage of live and sperm concentration at 40 weeks of the age. The improvement occurred in the semen quality may be return to the beneficial effects of Se and Zn supplementation in the diet and might indicate that the minerals indirectly improved semen quality by acting at the reproductive tissue level during spermatogenesis, rather than acting directly on the spermatozoa. Additional in vivo research should be conducted to determine the manner in which these minerals improve semen quality (Gallo et al., 2003 and Barber et al., 2005). Also, agreement with the results of Renema (2006) who found that feeding broiler breeder males 0.2 mg/ kg Sel-Plex increased semen concentration. As well as, Spring, (2006) indicated significant improvements in spermatozoa concentration and activity, when fed diets were supplemented with Se yeast in comparison to selenite. Furthermore, these results are supported by Maysa et al., (2009) reported that overall means of ejaculate volume, a live sperm (%) and sperm concentration were significantly ($P\leq0.05$) increased for males of Bandarah local chickens fed Sel-Plex supplementation compared with the control group. Likewise, Kamel, (2012) published that the ejaculate volume, live sperm% and sperm concentration were significantly increased in male rabbit received organic selenium compared to control group under heat stress in summer season. On the other hand, it has been observed that zinc is required for normal functioning of the hypothalamic pituitary-gonadal-axis (Hong-Yu et al., 2006). Hypogonadism and lack of secondary sexual characteristics have been noted in severely undernourished male rabbits during summer season and these abnormalities tend to respond to dietary supplementation of zinc (Moce et al., 2000). Zinc deficiency leads to gonadal dysfunction, decreases testicular weight, and causes shrinkage of seminiferous tubules (Hassan et al., 2003 and Bedwal and Bahuguna, 1994). Zinc is an essential element in some reproductive process (Egwurugwu et al., 2013). Moreover, the amelioration observed in semen volume of supplemental dietary zinc or as total mean might directly be attributable to the increase in zinc concentration in the diet which led to increase of testosterone concentration in blood plasma and other factor might possibly be involved in this variation in semen volume (Amen and Al-Draji, 2011). In addition, zinc as well as selenium have role in anatomical development of reproductive organs and in spermatogenesis (Yamaguchi et al., 2009). Our results are in agreement with Amen and Al-Draji, (2011) who reported significant ($p<0.05$) increase ejaculate volume, total mean of spermatocrit % and sperm concentration in broiler breeders males fed diet supplemented with the Zn during 50 to 66 weeks of age compared with control group. In contrast, Oliveira et al., (2004) who found that there was no increase in mean ejaculate volume with supplemental dietary zinc of rabbit breeders. Concerning the effect of Se combined with Zn, these results agree with Shanmugam et al., (2015) who found that live sperm% from the Se combined with Zn, fed male of laying breeder were significantly higher ($P\leq0.05$) than the control group, also, found improves semen quality and fertility at 37 weeks of age. The results indicated that supplemental zinc and selenium, after absorption, gets incorporated in many enzymes and other proteins at molecular level and have played role in bringing about higher fertility. Conclusion: It may be concluded from this study that dietary supplementation selenium or zinc and their combination had no adverse effects on the blood plasma parameters of GM males and improved semen quality. The synergistic effect of these two elements seems to be helpful for maintaining high potency of male chickens under hot climate condition.

Table (1): Ingredients and nutrient composition of basal diet.

Yellow corn	66.00
Soybean meal44%	23.00
Wheat bran	2.50
Di-calcium phosphate	1.50
Limestone	6.20
Salt (NaCl)	0.40
DL-Methionine	0.10
Vit.& Min. Mixture*	0. 30
Total	100.00
Analysed composition	
(Metabolizable energy (Kcal / Kg)	2747
Crude protein%	15.67
Crude fiber %	3.46
Crude fat %	2.96
Calcium %	3.34
Available phosphorous %	0.42
Lysine%	0.89
Methionine%	0.39
Met+cystine%	0.66

*Supplied per kg diet: Vit A, 10000IU; Vit D3, 2000 IU; Vit E, 10 mg; Vit K3, 1 mg; Vit B1, 1 mg; Vit B2, 5mg; Vit B6, 1.5 mg; Vit B12, 10 mcg; Niacin, 30 mg; Pantothenic acid,10 mg; Folic acid,1 mg; Biotin, 50mcg; Choline, 260 mg; Copper,4 mg; Iron, 30 mg; manganese, 60 mg;Zinc, 50 mg; Iodine, 1.3 mg; Selenium, 0.1mg; Cobalt,0.1mg
According to Feed composition Tables for animal & poultry feedstuffs used in Egypt (2001).

Table (2). Effect of dietary organic elements on live body weight (g) (LBW) change BW of Golden Montazah male at different ages [1].

Treatment	**Age (wk)**				**Change BW**
	29	**33**	**37**	**40**	**29-40 (wk)**
T1	2225	2309 ^{e}	2409 ^{e}	2513 ^{f}	288.0 ^{g}
T2	2195	2331 ^{de}	2449 ^{de}	2559^{ef}	364.3 ^{f}
T3	2240	2429 ^{a}	2546^{bc}	2633 ^{cd}	426.3 ^{d}
T4	2177	2358^{cde}	2459 ^{de}	2568 ^{def}	391.7 ^{e}
T5	2205	2368^{bcd}	2503 ^{cd}	2617^{cde}	411.7 ^{d}
T6	2200	2402^{abc}	2505 ^{cd}	2618^{cde}	412.7 ^{d}
T7	2212	2418^{ab}	2555^{abc}	2675^{bc}	462.7 ^{c}
T8	2177	2456 ^{a}	2597^{ab}	2716^{ab}	539.0^{ab}
T9	2192	2459 ^{a}	2604 ^{a}	2765 ^{a}	573.0 ^{a}
Sig	NS	**	**	**	**
SEM	±6.727	±11.080	±13.356	±15.738	± 16.082

[1]Data expressed as LSM ± S.E
2 a, b….Means with different superscripts within column are significantly different (P≤0.05).

Table (3): Effect of dietary organic elements on feed consumption (FC, g/hen/day) of Golden Montazah male at 40 weeks of age [1].

Treatment	Age (wk)			
	29-32	33-36	37-40	29-40
T1	125.3	126.0	121.5	124.3
T2	126.8	125.0	120.7	124.2
T3	125.5	122.2	120.4	122.7
T4	124.8	124.1	121.9	123.6
T5	122.7	123.6	120.1	122.1
T6	125.1	125.3	119.9	123.5
T7	125.3	122.0	120.8	122.7
T8	124.2	124.1	121.6	123.3
T9	125.1	124.3	118.7	122.7
Sig	NS	NS	NS	NS
SEM	±0.428	±0.412	±0.300	± 0.203

1Data expressed as LSM ± S.E

2 a, b…. Means with different superscripts within column are significantly different (P≤0.05).

Table (4): Effect of dietary organic elements supplementation on some plasma constituents and testosterone hormone of Golden Montazah male at 40 weeks of ages [1].

Treatment	PTP mg/dl	PA mg/dl	PG mg/dl	ALT U/L	AST U/L	PTH ng/mL
T1	6.80	3.03	3.77	24.12 [a]	36.35 [a]	1.48 [c]
T2	7.31	3.40	3.91	23.76[ab]	34.49 [b]	1.51 [c]
T3	7.32	3.54	3.79	22.75[bc]	33.88[bc]	1.84[bc]
T4	7.24	3.45	3.79	22.41 [cd]	33.68[bc]	1.94[ab]
T5	7.32	3.44	3.88	21.29 [de]	32.66 [cd]	1.88[bc]
T6	7.36	3.43	3.93	22.48 [cd]	31.59 [de]	1.95[ab]
T7	7.67	3.55	4.12	20.55 [e]	30.14[ef]	2.18[ab]
T8	7.48	3.68	3.80	19.30 [f]	29.88 [f]	2.20[ab]
T9	7.54	3.84	3.70	19.05 [f]	29.44 [f]	2.33 [a]
Sig	NS	NS	NS	**	**	**
SEM	±0.073	±0.062	±0.056	±0.354	±0.459	±0.065

1Data expressed as LSM ± S.E

2 a, b…. Means with different superscripts within column are significantly different (P≤0.05).

Plasma total protein (PTP), plasma albumin (PA), plasma globulin (PG), ALT,alanine aminotransferase, AST, aspartate-aminotransferase and plasma testosterone hormone (PTH)

Table (5): Effect of dietary organic elements supplementation on semen quality of Golden Montazah male at 40 weeks of age [1].

Treatment	Ejaculate volume (ml)	Alive sperm%	sperm concentration ($10^6/mm^3$)
T1	0.410 ^{d}	70.3 ^{e}	1.59^c
T2	0.443 ^{cd}	80.7 ^{cd}	2.03^b
T3	0.517^{ab}	83.3^{bc}	2.35^a
T4	0.450 ^{cd}	79.3 ^{d}	2.06^b
T5	0.517^{ab}	83.7^{bc}	2.38^a
T6	0.477^{bc}	81.0 ^{cd}	2.09^b
T7	0.523^{ab}	83.7^{bc}	2.42^a
T8	0.527^{ab}	84.3^{ab}	2.43^a
T9	0.540^{ab}	87.0 ^{a}	2.44^a
Sig	**	**	**
SEM	±0.010	±0.1.158	±0.044

1Data expressed as LSM ± S.E
2 a, b…. Means with different superscripts within column are significantly different (P≤0.05).

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الملخص العربى

تأثير أضافة السيلينيوم والزنك فى العلف على بعض الهرمونات الجنسية والآداء الآنتاجى لسلالة دجاج المنتزة الذهبى فى فصل الصيف.

٢- التأثير على الذكور

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***قسم بحوث تربية الدواجن. **قسم بحوث تغذية الدواجن**

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- تم أجراء البحث بمحطة بحوث الدواجن بالعزب- معهد بحوث الأنتاج الحيوانى- مركز البحوث الزراعية- وزارة الزراعة وذلك بهدف دراسة تأثير أضافة السيلينيوم والزنك منفردا أو معا فى العلف على الأداء الأنتاجي والفسيولوجي وهرمون الدستستيرون وبعض صفات جودة السائل المنوى فى الظروف الطبيعية خلال فصل الصيف فى مصر (من يوليو الى أغسطس) .تم التقسيم العشوائى لعدد ١٦٢ ديك من سلالة المنتزة الذهبى الى ٩ معاملات ، أحتوت كل معاملة على١٨ ديك وكل معاملة بها ٣ مكررات وكل مكررة بها ٦ ديوك . المعاملة الأولى كنترول وغذيت على الغذاء الاساسى و ٨ معاملات تحتوى على الكنترول مضاف اليها ٢و.ملليجرام سيلينيوم ميثونين و٣و. ملليجرام سيلينيوم ميثونين و ١٠٠ ملليجرام زنك جليسين و١٢٥ ملليجرام زنك جليسين و٢و. مللجرام سيلينيوم ميثونين + ١٠٠ ملليجرام و٢و. مللجرام سيلينيوم ميثونين + ١٢٥ ملليجرام و٣و. مللجرام سيلينيوم ميثونين + ١٠٠ ملليجرام و٣و. مللجرام سيلينيوم ميثونين + ١٢٥ ملليجرام على الترتيب.

ويمكن تلخيص النتائج المتحصل عليها على النحو التالى:

- سجلت المعاملات المضاف اليها السيلينيوم والزنك منفردا أو معا (٩، ٨، ٧، ٥ ، ٣على التوالى) زيادة معنوية فى قيم صفات وزن الجسم الحى والتغير فى وزن الجسم وALT, AST وحجم القذفة والنسبة المئوية للحيوانات المنوية الحية وتركيزالحيوانات المنوية الحية وكذلك زيادة معنوية فى هرمون الدستستيرونلمعاملات (٩، ٨، ٧، ٦ ، ٤على التوالى) بالمقارنة بالكنترولفى ديوك سلالة المنتزة الذهبى.
- لم يكن هناك تأثير معنوبين المعاملات فى صفات أستهلاك العلف والبروتين الكلىوالألبيومين والجلوبيولين مقارنة بالكنترول.
- عموما يمكن القول أن أضافة السيلينيوم والزنك منفردا أو معا فى العلف ممكن أن يكون أداة فعالة للحفاظ على فعالية عالية لذكور سلالة المنتزة الذهبى تحت ظروف الجو الحار.