Seasonal effects on performance of different types of Arabian Kuwaiti chickens

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In current years there is a moving trend toward raising chickens in an open field and away from the intensive system that is used by most of the poultry industry. This move requires the utilization of a special kind of chicken that is adapted and/or acclimatized to the environmental conditions where it is raised. In Kuwait, the weather is extremely harsh during many months of the year. Therefore, in order to move toward raising chickens in the open field in Kuwait, the type of birds to be used must be adapted to the local environmental conditions. In the present study, the performance of six types of Arabian Kuwaiti chickens available in Kuwait and acclimatized to the local environment were compared during the summer and winter seasons. These types are dual purpose where they are used for both meat and egg production. They are highly resistant to diseases. In addition, all the types have common criteria which include V comb shape, crested head, raised-up tail, short shank, yellow skin, and medium size body, however, the feather color is different. These feather colors are: solid black, dark brown, reddish black, white, spotted black, and yellow. Percent egg production as well as production index (# of chicks produced/hen/week) were compared among the six types during the winter and summer months.
It was found that in all the six types, percent egg production in the winter was higher than that in the summer months. Overall average for all the types during the winter and summer months was 39.8 and 25.4%, respectively. The same was true for the production index where in the winter it was 7.71 and in the summer months was 4.24. There was a wide range in both percent egg production and production index among the six types. The yellow feather type had the highest of both percent egg production and production index during both the winter and summer months. Average egg production was 53.5% and 35.7% in the winter and the summer months, respectively. Production index was 11.26 and 6.06 in the winter and the summer months, respectively. These results indicate that the yellow feather type is more acclimatized to the local Kuwaiti environmental conditions than the other five types.

Keywords: Arabian Kuwaiti chickens; acclimatization; egg production; production index.

Introduction

Poultry meat is considered one of the major food items in Kuwait. Per capita consumption of poultry meat in Kuwait reached 61.2 Kg per person in 2005 (USDA, 2005); due to increase the consumer's health awareness and the shift from red meat consumption to poultry meat consumption. The poultry industry in Kuwait succeeded in covering 47% of poultry meat consumption and 55% of table eggs (Ministry of Planning, 2004). Therefore, more work needed to increase local production of poultry meat and eggs.

For many years, the trend of raising poultry in the world has been using an intensive management system, using commercial chicken which has been also the case in Kuwait. This is true for both poultry meat and table egg production (Al-Nasser *et al.*, 1998a and 1998c). However, in recent years, there is a shift in the trend of raising poultry towards using more natural conditions such as using the open-side housing systems. Diab *et al*., 1989, studied effects of season and diet on performance of pullets and layers raised in Kuwait. In the study, three different housing systems were used. One of which was the open-side

housing system. It was found that using this type of housing resulted in an adequate performance relative to the environmentally controlled housing. In the above mentioned study, commercial laying hens were used; however, since the worldwide trend is to use natural resources in poultry production, local breeds / locally acclimatized chickens might perform better under these conditions. Therefore, it is suggested to use Arabian Chickens (Locally acclimatized) in open-sided housing system to improve its performance.

Little is known about the performance of the local Arabian chickens. Fayoumi breed which is one of the Arabian chickens and local to Egypt has been studied in many countries such as Egypt, Kuwait, Bangladesh, Pakistan, and United Arab Emirates. In was shown that the group size of Fayoumi had no effect on the feed intake. However, egg production was found to be significantly increased with the increase in the flock size (Rajbot *et al*, 2005; Hafiz and Balander, 2004).

The non-commercial (small-scale) poultry farming systems of the local birds were traditionally present in Kuwait society, like in any other developing society. These Arabian chickens were also used in small scale production systems to improve livelihood and income generation especially that these local chickens are highly resistant to the adverse conditions of Kuwait's environment. The Arabian chickens are considered to be dual-purpose birds that can be used for both meat and egg production. They are characterized of producing high quality eggs with different milky colors. However, the average egg production is only 150 eggs /hen/year); As compared with commercial chicken production that reach 325 eggs /hen/year.

Unfortunately, the main problem is the unavailability of scientific research data that reflects the status of the Arabian chicken breeds present in Kuwait in terms of management and performance. Therefore, it is very important to start conducting scientific studies on improving the performance and production of the Arabian chickens under Kuwait's environmental conditions that are characterized by harsh climate and scarcity of water. These data will be the base line for conducting further research on the Arabian chickens in the future. Also, this will provide Kuwait society with high quality domestic chickens that would increase Kuwait's biodiversity.

Therefore, the main objective of the current study was to investigate the performance of the Arabian chickens raised under Kuwait environmental conditions.

Materials and Methods

The duration of the study was 2 years. Approximately 700 fertile eggs were collected from three major Arabian chicken farms in Kuwait. These farms used different management systems in raising their chickens. These fertile eggs were incubated and hatched at KISR poultry farm facilities. The hatched chicks were raised in wooden boxes until six weeks of age in closed environmentally controlled rooms. At six weeks of age, these chicks were moved to outside shaded pens. The chicks stayed in these pens until the end of the experiment. Just before the start of egg production only six groups of different colors were chosen and were kept for collection of egg production data. These groups were selected on the bases of having specific criteria for the Arabian chickens. These criteria include having V-shape comb, crested head, short and bare shanks, yellow skin and approximately 90^{o} tail angle. The colors of the six groups were solid black, brown, blackish, solid white, spotted and yellow. These groups were raised in separate pens. The period from six weeks of age until 19 weeks was considered as preliminary period and a stage for the chickens to get used to the housing conditions at the farm.

Feed rations used were similar to layer breeder rations. Natural lighting system was used. Data collection started from 20 weeks of age. Eggs were collected daily, body weight was measured on monthly bases, eggs were kept in a holding room for one week, fertility, hatchability and production index were measured weekly.

Vaccination programs were followed according to Kuwait system.

Results and Discussion

Percent egg production of the six colored groups is shown in Fig.1. The results indicated that the yellow group had the highest egg production (46%), and the brown group had the lowest egg production (25%).

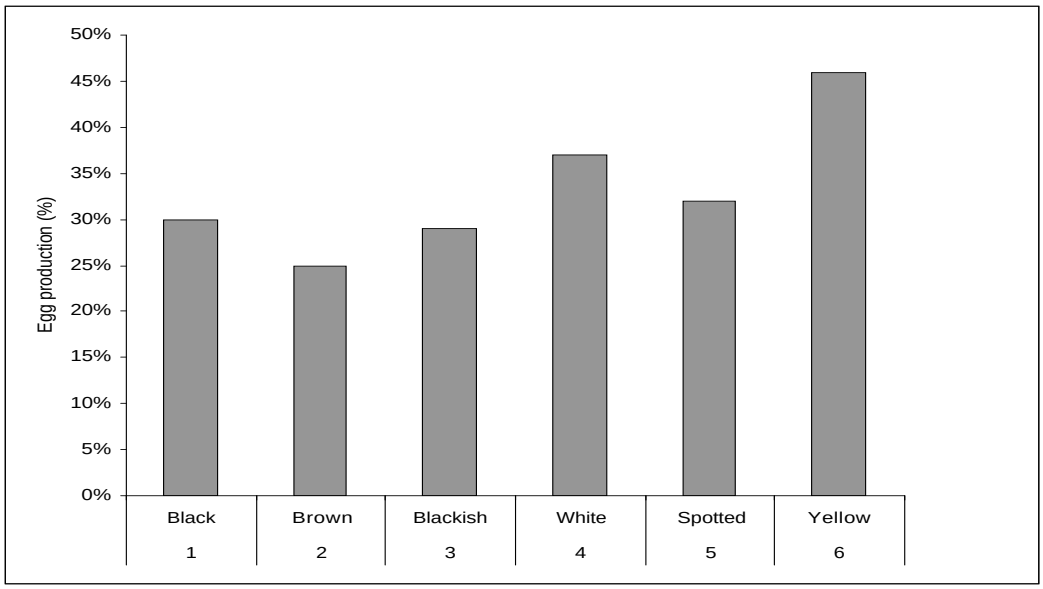

Fig. 1: Percent egg production of the six colored groups.

Effect of temperature on egg production for the different groups is shown in Fig. 2. The results indicated that egg production was reduced in the summer time for all the groups. In addition, the yellow group had the highest egg production throughout the year except for the months of November and December. This indicates that the yellow group is the most adapted strain to the hot environment in Kuwait.

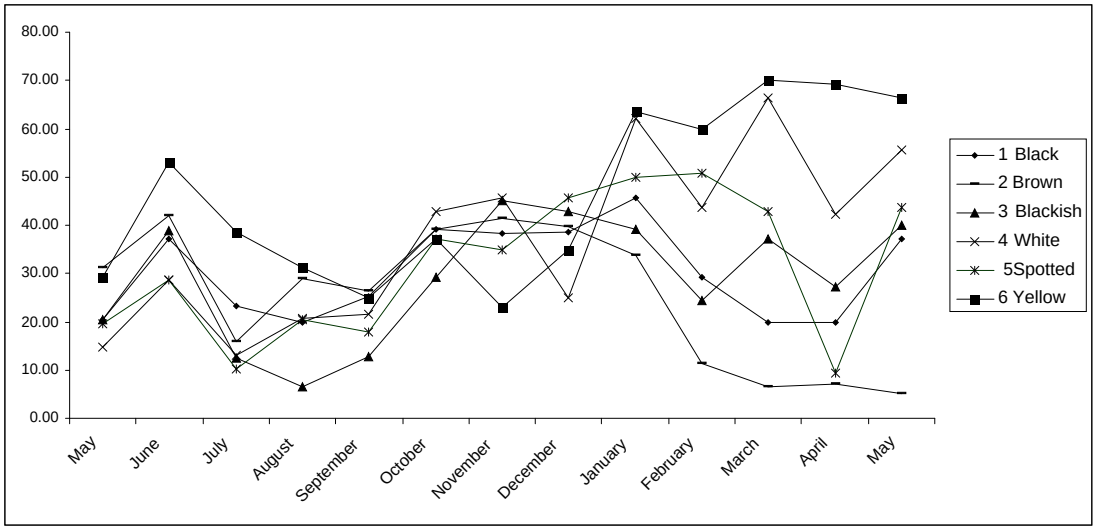

Fig 2: Effect of temperature on egg production for the different groups.

Results on production index are shown Fig. 3. It was also clear that the yellow group had the highest production index than any of the other groups indicating their superiority in production during the harsh weather of Kuwait.

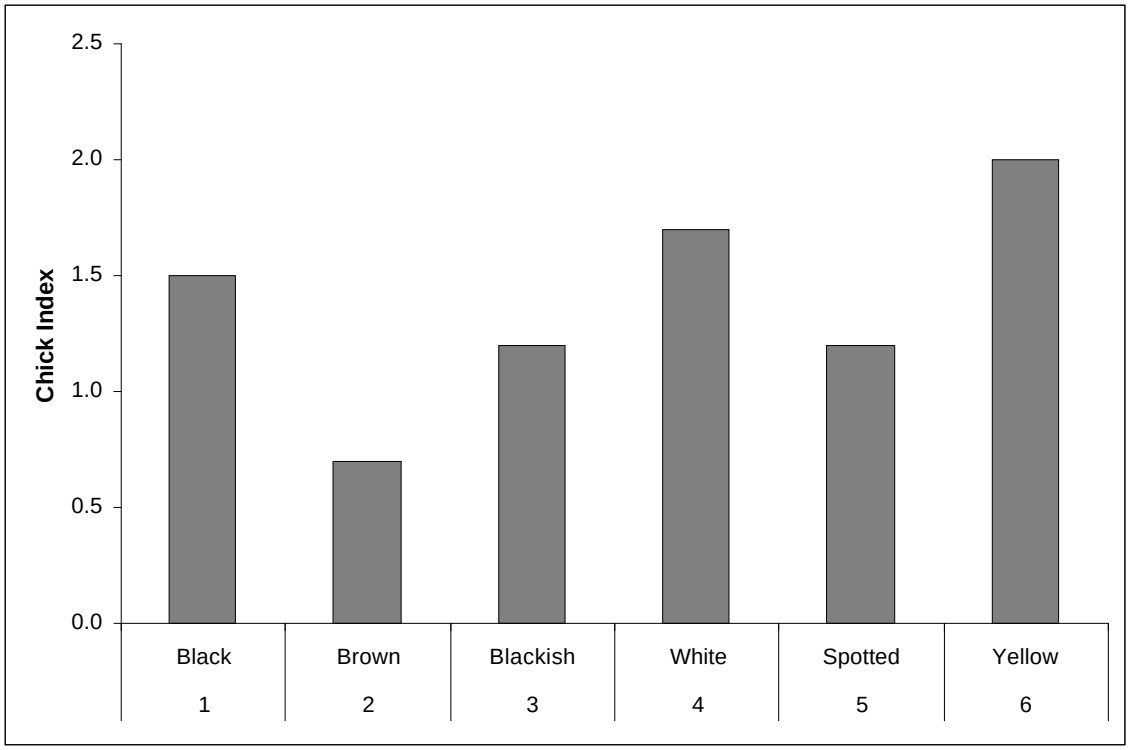

Fig 3: Production Index (number of chicks/ hen/ week) for all the six colored groups.

Conclusion

It could be concluded that Arabian chickens have specific characteristics that include different feather colors. It was clear from the results that the yellow chickens had the best egg production performance indicating that they are the most adapted strain of Arabian chickens to the hot environment of Kuwait.

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