Research Journal of Animal Sciences 8 (3-6): 35-37, 2014
ISSN: 1993-5269

Analysis of Genetic Diversity Among Three Rabbit Genotypes Using Protein Genetic Markers

[1]K. El-Sabrout, [2]A. El-Seedy, [1]M.K. Shebl, [1]F.N.K. Soliman and [1]Azza El-Sebai
[1]Department of Poultry, [2]Department of Genetics,
Faculty of Agriculture, Alexandria University, Aflaton St.,
El-Shatby, P.O. Box 21545, Alexandria, Egypt

Abstract: Protein electrophoresis has been an effective technique for the detection of genetic polymorphism and further genetic improvement. Protein electrophoresis is informative for understanding genetic relationship among three rabbit genotypes namely Alexandria, V-line and Baladi Black. Applications of protein electrophoresis include sample comparison, purity evaluation, determination of physical characteristics and subunit composition. It also help identifying some of the genetic differences and similarities among the breeds presently bred in Egypt during productive season and it can be used protein molecular markers linked to quantitative traits.

Key words: Rabbit, season, protein electrophoresis, traits, V-line

INTRODUCTION

Domestic rabbit (*Oryctolagus cuniculus*) has its importance as supplier of meat and it is widely accepted thought out the world for human consumption (Colin and Lebas, 1996). V-line is a breed, recently bring to Egypt and yet no sufficient knowledge is available. Also, a synthetic paternal rabbit line, named Alexandria was originated by crossing a V-line with a local breed Baladi Black rabbits will be used as a selection criterion of genetic improvement for this line (El-Raffa, 2005, 2007). Youssef (1992), seasonal variation on litter traits due to kindling season is a reflection of differences in seasonal climate conditions in geographical location of the rabbitry.

In this study, an attempt has been made to characterize the selected rabbit genotypes for identifying markers for these genotypes. Researchers used therefore two approaches to carry out this objective as follow: the alteration in productive traits under two different seasons, biochemical genetic analysis for plasma proteins. Consequently, this study provides comprehensive approaches for studying the biochemical differences among different rabbit genotypes and carried out to investigate and evaluate the different relationships between productive traits and molecular markers in three strains of rabbits during production season.

MATERIALS AND METHODS

The experimental research of the present study was conducted at rabbitry of the Poultry Research Center of the Poultry Production Department, Faculty of Agriculture, Egypt. The present research aimed to evaluate the productive and molecular traits in Alexandria, V-line and Baladi Black rabbits during the production season.

Biochemical genetic analysis

Blood collection: Blood samples were taken from central artery vein of the ear under vacuum in centrifuge tubes containing heparin sodium as anticoagulant for biochemical analysis and in centrifuge tubes containing EDTA as anticoagulant for molecular genetic analysis from each individual of V-line, Alexandria and Baladi Black rabbits. All rabbits used were phenotypically normal, healthy and sexually fertile.

Protein electrophoresis: Protein profile was analyzed by procedure published by Pan *et al.* (1991). PAGE polyacrylamide resolving gels (7.5%, 1.5 mm thick) were prepared according to Nadolny and Sequeira (1980).

Scoring and analysis of RAPD patterns: The resolved DNA and protein bands were documented and processed for data analysis. The clear, unambiguous and reproducible band represent across the protein samples were scored as 1 and absence of bands were recorded as 0 in the protein profile of different genotypes of rabbits.

RESULTS AND DISCUSSION

Protein molecular markers were used in the present study to analysis genetic diversity within and among three rabbit genotypes and to characterize genetically the

Corresponding Author: Karim El-Sabrout, Department of Poultry, Faculty of Agriculture, Alexandria University, Aflaton St., El-Shatby, P.O. Box 21545, Alexandria, Egypt

selected rabbit genotypes in relation with productive traits under study. The variations in some blood components may be due to the genetic variations which play an important part in the productive and reproductive traits as well as colored fur of the progeny are advantages, under Middle Egypt conditions (Abdel-Azeem *et al*., 2007).

Protein banding patterns: The polymorphism of blood protein markers gives some useful information in studies of animal breeding such as the relationships among breeds and their evolution. Variation in protein profile reflects changes in the genes that code for them. Figure 1 shows photograph of electrophoretic patterns developed by Alexandria, line V and Baladi Black, respectively. Scans of PAGE-electrophoretic patterns of proteins of Ba, Va and Al shown in Fig. 2-4. Native polyacrylamide gel electrophoresis provides an accurate method for assaying variation in plasma proteins. The protein banding pattern of each genotype reveals a biochemical genetic fingerprint

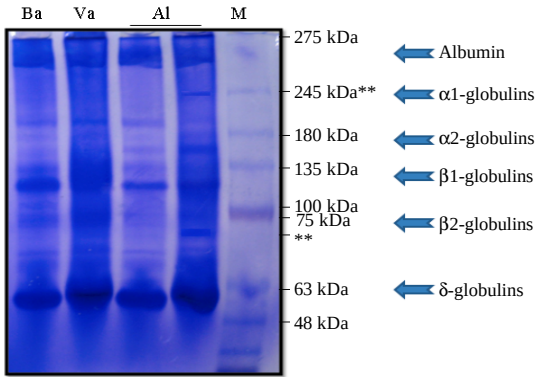

Fig. 1: Plasma proteins are separated into six groups; Alex: Alexandria, V: V-line; BB: Baladi Black; M: Marker

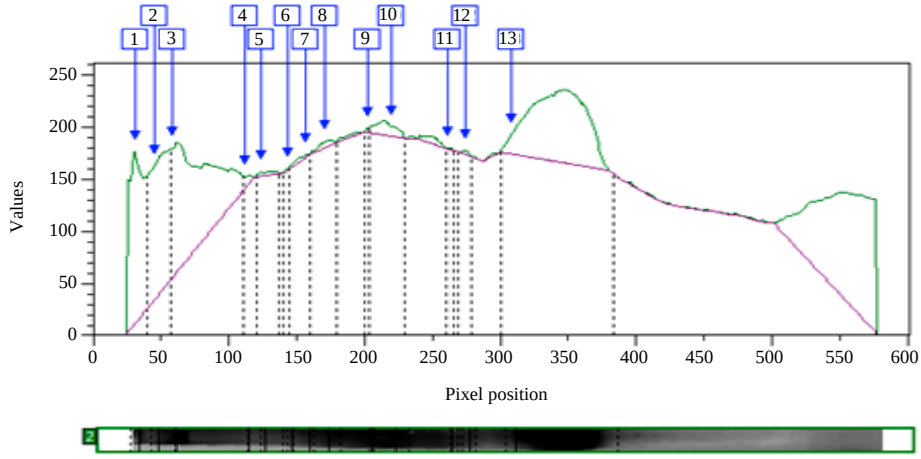

Fig. 2: Scans of PAGE-electrophoretic patterns of proteins of Ba

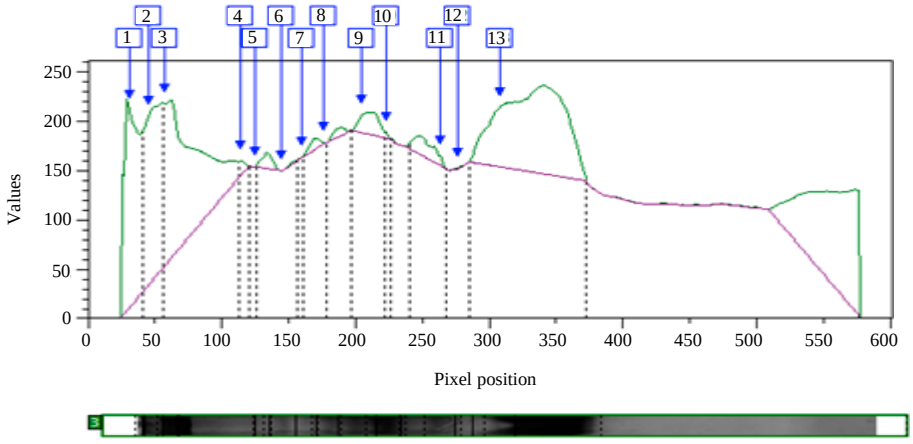

Fig. 3: Scans of PAGE-electrophoretic patterns of proteins of Va

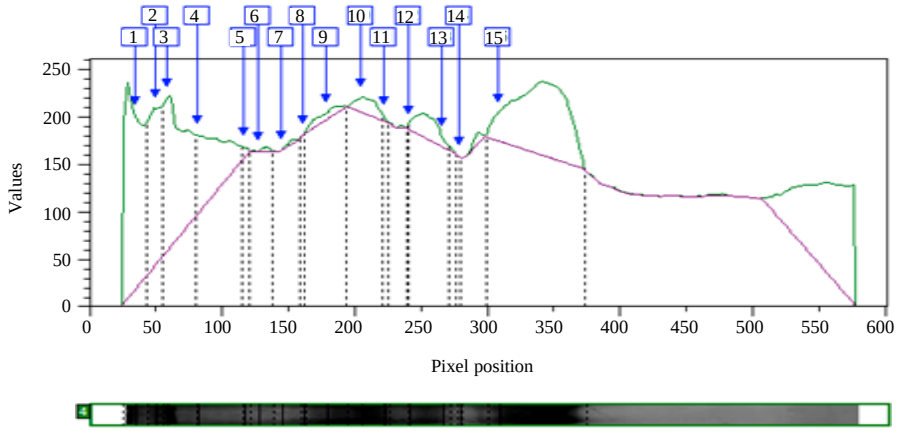

Fig. 4: Scans of PAGE-electrophoretic patterns of proteins of Al

to that genotype and each band in the pattern reflects a separate transcriptional level. The results revealed two specific bands which could be used as specific protein markers to characterize Alexandria rabbits. These specific protein markers are expression genes and these genes may be responsible for the superiority of Alexandria line at weight.

Protein electrophoresis also is a screening test that measures the major blood proteins by separating them. The major plasma proteins of rabbit blood can be classified as follows: albumin and globulin proteins. Globulin protein is divided into: α1, 2-globulins, transferrins (β1, 2-globulins) and immunoglobulins (δ-globulins) (Fig. 1). This profile of proteins classification can used to evaluate, diagnose and monitor a variety of diseases and conditions. It can be used for these purposes because the levels of different blood proteins rise or fall in response to such disorders at intestinal or kidney protein-wasting syndromes, disorders of the immune system, liver dysfunction, impaired nutrition and chronic fluid-retaining conditions (Pagana, 1998).

CONCLUSION

Analysis of the genetic diversity among rabbit breeds through protein electrophoresis still can be used as a tool to understand the genetic variability in some productive traits in rabbits and used to detect genotype specific markers for each line to descript and identificat this line.

REFERENCES

Abdel-Azeem, A.S., A.M. Abdel-Azim, A.A. Darwish and E.M. Omar, 2007. Hematology and biochemistry of pure and crossed rabbits. Proceeding of the 5th International Conference on Rabbit Production in Hot Climates, December 4-7, 2007, Hurghada, Egypt, pp: 391-401.

Colin, M. and F. Lebas, 1996. Rabbit meat production in the world: Aproposal for every country. Proceedings of the 6th World Rabbit Congress Toulouse, July 9-12, 1996, France, pp: 323-330.

El-Raffa, A.M., 2005. Genetic analysis for productive and reproductive traits of V line rabbits raised under Egyptian conditions. Egyptian J. Poult. Sci., 25: 1217-1231.

El-Raffa, A.M., 2007. Formation of a rabbit synthetic line (*Alexandria line*) and primary analysis of its productive and reproductive performance. Egypt Poult. Sci., 27: 321-334.

Nadolny, L. and L. Sequeira, 1980. Increases in peroxidase activities are not directly involved in induced resistance in tobacco. Physiol. Plant Pathol., 16: 1-8.

Pagana, K.D., 1998. Mosby's Manual of Diagnosticand Laboratory Tests. Mosby Inc., St. Louis.

Pan, Q., Y.S. Te and J. Kuc, 1991. A technique for detection of chitinases, β-1,3-glucanases and protein pattern, after single separation using PAGE or isoelectric focusing. Phytopathology, 81: 970-974.

Youssef, M.K., 1992. The productive performance of purebred and crossbred rabbits. M.Sc. Thesis, Zagazig University, Banha Branch, Egypt.