



Faculty of Agriculture

Department of Animal Production

Moshtohor, 13736 – Toukh - Qalyoubia, Egypt

FINAL REPORT OF RABBIT PROJECTS

1- Title of the projects:

- 1) **The first: Production of purebred and crossbred parents of rabbits to be distributed to the small breeders in the middle and east of Delta.**
- 2) **The second: Evaluation and genetic improvement of the Spanish and Egyptian strains.**

2- Location of experimental work:

Rabbit's Farm of the Department of Animal Production, Faculty of Agriculture at Moshtohor, Benha University, Egypt.

3- Principle Investigator:

Prof. Dr./ Mahmoud M. Iraqi Amer	Professor of Poultry Breeding and Genetics
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4- Name of others Co-operators:

Prof. Dr. Manual Baselga	Professor of Animal Breeding and Genetics
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5- Nature of co-operation:

Department of Animal Production (Faculty of Agriculture at Moshtohor, Benha University), Spanish Agency of International Co-operation (A.E.C.I.) and the Center of Co-operation for Development of the Universidad Politecnica de Valencia.

6- Date of start:

- 1) The first project started in March 2003.
- 2) The second project started in November 2006



Faculty of Agriculture

Department of Animal Production

Moshtohor, 13736 – Toukh - Qalyoubia, Egypt

7- Date of termination:

- 1) The first project terminated in March, 2006.
- 2) The second project terminated in October 2009

8- Objectives of the projects:

- 1) To produce purebred and crossbred parents of rabbits selected according to their breeding values for litter weight at weaning as parents in the next generation of the project.
- 2) To estimate some of genetic parameters and crossbreeding effects for litter and growth traits in genetic groups produced.
- 3) The superior genetic group (line, breed or crosses) will be reproduced in Moshtohor which would represent to participate in producing and distributing parental stocks as baby rabbits in the middle and east of Delta.
- 4) To improve genetic and phenotypic performance of Egyptian (Sinai Gabali and Moshtohor line) and Spanish (V-line) rabbits.

9- Economic implication:

- a- New lines of rabbits with uniform phenotypic characteristics and, with comparatively, high level of production will be introduced to the middle and east of Delta. Also, the produced rabbits will have the advantages of adaptability and resistance to diseases.
- b- Income of the farmer might be increased and consequently will be encouraged to raise rabbits.

10- Technical programme:

- a- Sinai Gabali breed (G) and V-line (V) of rabbits were used in this study.
- b- The V-line (140 does and 35 bucks at 2 months) and Gabali breed (23 does and 7 bucks at 4 months) were bought from the Faculty of Agriculture, Alexandria University and from Bedouins of Sinai, respectively.
- c- At September 2003, does of V-line were randomly divided into two groups equals in numbers (60 does), the first group was mated to bucks from the same group (to produce purebred of V-line) and the second group was mated



Faculty of Agriculture

Department of Animal Production

Moshtohor, 13736 – Toukh - Qalyoubia, Egypt

to bucks from the Gabali breed (to produce crossbred line). One buck is to be assigned randomly to mate 3 does determined at random.

- d- The procedure began getting the F1 and continued with the production of F2, F3 and successive generations. The rabbits pertaining to a generation posterior to F3 were considered as rabbits of the new synthetic line, hereafter called Moshtohor (M) line. The lines are being selected by a BLUP methodology based on criteria of selection, depending on the litter weight at weaning for does and post-weaning body weight at 56 days for growth to develop maternal lines, giving special consideration to milk production, and growth after weaning, in addition to litter size.
- e- The following traits are to be taken into consideration in this study:
- 1) Litter traits: litter size and weight at birth, 21-day and at weaning.
 - 2) Milk yield at 7, 14, 21 and 28-day after kindling are to be recorded.
 - 3) Body weight at weaning, as well as 8 and 12 weeks.
 - 4) Chemical analysis of rabbit's milk: protein (%), fat (%), Ash (%) and total solids as well as some minerals (phosphorus, potassium, sodium and magnesium).
 - 5) Heritability, heterosis, maternal effect and direct additive effect for the previous traits were estimated. The BLUP methodology (Boldman *et al.*, 1995) and a mixed model methodology were used to solve the model and to obtain estimable functions allowing comparisons among the genetic types and estimation of crossbreeding parameters (Groeneveld, 1990; Dickerson, 1992).

11- Some Results:

Table 1: Observed performances⁺ of Line V in Moshtohor (El-Raffa *et al.*, 2005).

Location	Litters	TB	BA	NW	KI	Young	WW	DG	AGE
Moshtohor	249	-	7.8	5.9	45	838	429	24.9	84

⁺TB= Total born; BA= Number born alive; NW= Number weaned; KI= Kindling interval; WW= Weaning weight (g); DG= Daily gain (g/d) from weaning (28d) to AGE (d).

Table 2: Actual reproductive performances⁺ of crossbreds obtained from crossing local breeds with Line V in Moshtohor (El-Raffa *et al.*, 2005).



Faculty of Agriculture

Department of Animal Production

Moshtohor, 13736 – Toukh - Qalyoubia, Egypt

Location	Breed	Crossbred	Litters	TB	BA	NW	KI
Moshtohor	Sinai Gabali	F ₁	38	-	8.2	6.6	43

⁺ TB= Total born; BA= Number born alive; NW= Number weaned; KI= Kindling interval.

Table 3: Actual growth performances⁺ of crossbreds obtained from crossing local breeds with Line V in Moshtohor (El-Raffa et al., 2005).

Location	Crossbred	No. of young	WW(g)	DG1(g/d)	DG2(g/d)
Moshtohor	F ₂	260	547	23.8	23.0

⁺WW= Weaning weight (g); DG1(2)= Daily gain (g/d) from weaning (28d) to 56 (84) d.

Iraqi *et al.* (2007) found that genetic group effect was significant for litter size born alive, LSBA, [V (7.3) and F1(7.3) were superior to G (6.6)]; litter weight born alive, LWBA, (higher values for V (416 g) and F1 (405 g) than for G (382 g)]; total milk yield [G (3497g) and F1 (3486 g) higher than V (3042 g)]; milk fat [F1 (26%) and G (25%) superior to V (23%)] and milk total solids, TS, [F1(42%) superior to G (40%) and V (39%)]. The estimates of heterosis effect ranged between 1.6% and 12.8% for production and milk gross chemical traits, being significant only for milk fat content (9.1%). The positive values of the heterosis estimates for those traits and the complementarity between the G breed and the V line, the G superior in milk related traits but the V superior in prolificacy, show the interest of their cross and of the synthetic lines derived from them. The heterosis was non-significant for milk mineral content traits.

The parity effects were significant for LSBA, fat, TS, ash and potassium, K, (the maxima were reached at 6th or 5th parity). The effect of week of lactation was significant for fat, ash and TS, corresponding the maximum values of fat and TS to the 3rd and 4th week. The year-season or the year-month effects were significant for all traits showing the importance of including these time-period factors into the statistical models proposed for the traits (Iraqi *et al.*, 2007).

For Sinai Gabali Breed, estimates of heritability were 0.05, 0.38 and 0.20 for BW4, BW8 and BW12, respectively, while these estimates were 0.23 and 0.19 for DG4-8 and DG8-12, respectively. The estimate of common litter effects for body weight at weaning was higher (77%) compared to that at later ages (36% at 8 weeks and 47% at 12 weeks).



Faculty of Agriculture

Department of Animal Production

Moshtohor, 13736 – Toukh - Qalyoubia, Egypt

Estimates of direct genetic correlation ranged from 0.08 to 0.89 among body weight traits, while, the estimates of common litter correlations were low among the same traits (ranged from -0.1 to 0.02). Most estimates of environmental correlations were positive and higher than those of additive genetic and common environmental correlations. In practice, it is safely to give an attention for Sinai Gabali breed to save these animals from extinction since these animals have great genetic diversity for post-weaning growth (Iraqi 2008).

Iraqi *et al.* (2008) showed that the differences between G breed and V line were significant for almost all post-weaning growth traits, in favor of G breed. Means of F1 rabbits for most traits were significantly higher than the two purebreds. The trend for the average of F2, F3 and M line was to be intermediate between the purebreds and the F1, excepting BW4 and BW8. Positive values of D_{G-V} , the majority of them significant, were obtained on all post-weaning growth traits, confirming the superiority of G over V for growth traits. Percentages of these estimates to the means of the two purebred parents were 5.2, 6.6, 5.3, 11.1 and 21.3% for BW4, BW8, BW12, DG4-8 and DG8-12, respectively, showing an increasing trend as the trait is recorded later. Estimates of direct heterosis (H^I) were always positive and significant for several of the studied traits. Percentages of H^I were 6.9, 3.6, 5.4, 9.7 and 6.1% for BW4, BW8, BW12 (significant), DG4-8 (significant) and DG8-12, respectively. Percentages of maternal heterosis (H^M) for the same traits are 7.9, 4.8, -0.0, -8.0 and 2.6%, significant for BW4 and DG4-8. The estimates of the direct additive effects; the values and sign of the average of H^I and H^M estimated in this experiment; and the complementarity between G (better in growth) and the V line (better in prolificacy) all of them are indicators of the interest of the cross between Gabali and V line and of their synthetic, the Moshtohor line.

Iraqi *et al.* (2009) reported that a description of the the main features of the line Moshtohor (M) is carried out. This line is an Egyptian synthetic line coming from a first cross between the Egyptian Sinai Gabali (50%) and the V-Line (50%), followed by three consecutive generations of “inter-se” mating.

12- Suggestions for future of project:

To get more benefits from this project, the programs of selection must be continued in different locations (Alexandria University, Animal Production Institute, Saudi Arabian and Moshtohor) to identify the adaptation aspects for doe of pure lines and does of simple crosses in different areas and systems of production. For optimizing the efficiency of crossbred does, it would be necessary to diffuse the crossbred does for small scale rabbit producers by economic, simple, efficient and safe ways Youssef *et al.* (2008).



Faculty of Agriculture

Department of Animal Production

Moshtohor, 13736 – Toukh - Qalyoubia, Egypt

12- Some activities in project:

- 1) Now, we have nucleus to produce purebreds and crossbreds parents of Gabali, V-line and Moshtohor line to be distributed on rabbitry farm for breeding centers of rabbits and small holders in the Middle and East of Delta, as well as in Upper Egypt.
- 2) We organized five practical training courses for small holders, the students and public in rabbits' breeding farm, Faculty of Agriculture, Benha University (two courses in March 2005, one course in March 2008 and two courses in March 2009).
- 3) We are solving some problems in rabbitry farms spread in Qalyoubia Government, Egypt.
- 4) We are partially contributed in solving the shortage of meat production in Egypt.
- 5) We participated with **two papers** in the 9th World Rabbit congress in Verona, Italy 2008.
- 6) We are published technical report of project (in Arabic) for the small holders and trainers. There are some Egyptian newspapers (El-Masry Elyoum, El-Qalyoubia and Sound of Benha University) are published upon our activities in this project.
- 7) We renewed the rabbitry farm and bought many Batteries for does and bunnies.
- 8) We supplied the College in rabbitry farm with feeding unit (Mixer and Pelleting Machine).

13- Publications:

- 1) El-Raffa, A.M., Youssef, Y.M.K., Iraqi M. M., Khalil, M.H., Garcia, M.L. and Baselga, M. (2005). Developing rabbit lines for meat production in Egypt and Saudi Arabia: Overview, synthesizing plan, descriptive performance and future prospective. The 4th Inter. Con. On Rabbit Prod. In Hot Clim., Sharm El-Sheikh, Egypt, 47-53.
- 2) Iraqi M.M., Shenana M.E., Baselga M. (2007). Some factors affecting production and milk composition characters in a crossbreeding experiment involving Gabali and V-line rabbits in Egypt. Wold Rabbit Sci., 15:151-159.



Faculty of Agriculture

Department of Animal Production

Moshtohor, 13736 – Toukh - Qalyoubia, Egypt

- 3) **M M Iraqi** (2008). Estimation of Genetic parameters for post-weaning growth traits of Gabali rabbits in Egypt. *Livestock Research for Rural Development* 20 (5) 2008. (<http://www.lrrd.org/lrrd20/5/iraq20069.htm>).
- 4) **Iraqi M. M.**, Afifi E.A., Baselga M., Khalil M.H., García, M.L. (2008) Additive and heterotic components for post-weaning growth traits in a crossing project of V-line with Gabali rabbits in Egypt. 9th World Rabbit Congress, June 10-13, 2008 – Verona – Italy: 131-135.
- 5) Youssef Y.K., **Iraqi M. M.**, El-Raffa A.M., Afifi E. A., Khalil M.H., Garcia M.L., Baselga M. (2008). A joint project to synthesize new lines of rabbits in Egypt and Saudi Arabia: Emphasis for results and prospects. 9th World Rabbit Congress, June 10-13, 2008 – Verona – Italy: 1637-1641.
- 6) El-Nagar, A.G.F. (2008). Estimation of genetic and environmental parameters for some productive traits in rabbits. M.Sc. Thesis, Faculty of Agriculture, Moshtohor, Benha University, Egypt.
- 7) **Iraqi M.M.**, Baselga M., Khalil M.H., Afifi E.A., García M.L. (2009). Line Mostohor (Egypt). <http://www.iamz.ciheam.org/medrabbbit/> (<http://www.iamz.ciheam.org/medrabbbit/NewLines/Egypt/moshtohor/moshtohor.htm>).
- 8) **Iraqi M.M.**, García M.L., Khalil M.H., Baselga M. (2009). Evaluation of milk yield and some related traits in crossbreeding project of Gabali breed with V-line rabbits in Egypt. *Journal of Animal Breeding and Genetics* (in press).
- 9) We have **two Master Degrees** are studied on rabbits' project and **one of Ph. Degree** still now is progress on Moshtohor line (as contribution for the Administrators working in our Department).

14- Acknowledgments:

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13:09



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Moshtohor, 13736 – Toukh - Qalyoubia, Egypt

work in rabbitry Farm, Faculty of Agriculture at Moshtohor for extending all possible help.

15- Signature with date:

Principal Investigator

(Prof. Dr. Mahmoud M. Iraqi)

November 4, 2009