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Estimation of Heterosis and Combining Abilities for some Carcass Traits in Chickens

M . H . Khalil [1] , M . S . Hanafi [1] , Z . A . Ezzeldin [2] , and Z . A. Sabra [2] .

(1)*Department of Animal Production , Faculty of Agriculture at Moshtohor , Zagazig University , Banha Branch , Qalyoubia Governorate , Egypt* ; (2) *Animal Production Research Institute , Agricultural Research Centre , Ministry of Agriculture , Dokki , Cairo , Egypt* .

TWO exotic breeds of chickens namely New Hampshire (NH) and white plymouth (WP) and two native breeds namely Dandarawi (DN) and Silver Montazah (SM) were used in diallel crossing experiment . This experiment was carried out at the poultry researchstation in El-qanater , Animal production research Institute , Ministry Agriculture , egypt . Carcass traits for 524 chicks were included in the present study to estimate heterosis , general (GCA) and specific (SCA) combining abilities , maternal ability (MA) and reciprocal or sex - linked effects (SL) .

Breed group was found to have a significant (p< 0 .001) Source of variation on carcass traites . Averages of carcass traits of crossbred chicks were generally higher than those of purebreds significant differences were obtained among each crossbred and its reciprocal for most traits studied The DNxSM crossbred chicks had the highest percent of heterosis while the WPxNH crossbreds recorded the lowest percent of heterosis for carcass traits . Crossing betwin local breeds gave the highest magnitude of heterosis for most traits followed by crossing between local breeds gave the the highest manitude of heterosis for most traits followed by crossing between exotic breeds and finally by crossing of exotic breeds with local ones for mosttraits sudied , Dn sires were the the best performingb as sire - breed folllowed by SM ,. While WP dams were the best as adam-breed followed by SM .

General (GCA) and specific (SCA) combining abilities and maternal ability (MA) affected (p<0 . 01) most traits studied , wile non-significant differences due to reciprocal or sex-linked effects (SL) Were obtained The DN breed had the highest estimates of GCA for most traits studied , followed by SM , While WP breed had the highest estimates of MA Crossbreds of NHxDN and SMxWP had the highest estimates of SCA for all traits . Crossbreds of NHxSH , DNxNH , WPxxSH , NHxWP and DNxWP had positive estimates of SL for most traits .

Key Words : Chickens , Heterosis , Combining ability , Carcass traits

Many attempts had been made to improve the quantity and quality of carcass for native breeds of chickens under the egyptian conditions. Most of htese attempts (e . g . Abdou , 1984 ; Ali , 1979 ; Abdel - Hamid *et al* . , 1981 ; El - Turky , 1981) did not determined the best sire and dam breeds which are suitble for crossbreeding programmes with other exotic breeds. Also a complete genetic analyses for such crossbreeding experiments were not carried out. Therefore , the objectives of the present study were : (1) to evaluate genetically some carcass traits in 4x4 diallel crossing experiment involving two local breeds (Dandarawi and silver Montazah) and other two exotic ones (New Hampshire and white plymouth) , (2) to estimate heterosis resulting from crossing between these four breeds , and (3) to estimate general and specific combining abilities , maternal ability and reciprocal or sex-linked effects for such traits .

Material and Methods

This experiment was carried out the poultry research station in El-qanater , Animal production research institute , ministry of Agriculture , Egypt . The experimental work was carried out for two hatches in the period from november 1985 to june 1986 Two exotic breeds namely new Hampshire (NH) and white plymouth roch (WP) as well as two native breeds namely Dandarawi (DW) and silver Montazah (SM) were used in this study. The mating design of the experiment was planned in complete mating 4x4 to get purebred and crossbred progenies. Detailed description of the material , management , breeding plan and statistical and geneticanalyses such experiment was reported by HANAFI *et al* . (1991). Data on 524 birds (males and females at 20 weeks of age) representing all the breed-groups were slaughtered by cutting the guilet and the jugular veins between the first and the scond cervical vertebra without separating the head from the body. The birds were reweighed after complete bleeding to obtain the blood weight. Feathers were removed using a mechanical picking after scalding the birds. The birds then weighed to obtain the feather weight The head , Shank , crop and viscera (excluding giblets) were removed and the eviscerated carcass (excluding giblets) were weighed. Edible giblets (including heart , liver and gizzard) for every bird were weighed together. The weight of eviscerated carcass and giblets represented the dressing carcass. The percentages of dressing , eviscerated and giblets were subjected to arcsin transformation before being analyzed in order to approximate normal distribution. After analyzing such transformed percentages , means were retransformed to the original scale .

Results and Discussion

Variation of Uncorrected Records

Abbreviations and coefficients of variation (CV) for carcass and non-edible carcass traits are presented in Table 1. Estimates of CV for carcass traits averaged 14. 8% , while those of non-edible carcass traits averaged 23.9% (Table 1). results of CV for carcass traits are similar to that average of 27.3% reported by SINGH *et al* . (1983). on the contrary , CHHABRA *et al* (1972) and WAHID *et al* (1974) reported low estimates of CV for some carcass traits (4.1%) .

TABLE 1. Abbreviations and coefficients of variation (CV%) for carcass and non-edible carcass traits at 20 weeks of age.

Trait	Abbreviation	CV%+
Carcass traits :		
Dressed weight (g)	DW	14.8
Eviscerated weight (g)	EW	15.3
Giblets weight (g)	GW	14.4
Dressed (%)	D%	3.0
Eviscerated (%)	E%	3.2
Giblets (%)	G%	11.5
Non-edible carcass traits :		
Head + shanks + feet (g)	HSF	20.8
Viscera weight (g)	VW	30.5
Blood weight (g)	BW	20.1
Feather weight (g)	FW	24.2
Head + shanks + feet (%)	HSF%	15.0
Viscera (%)	V%	24.5
Blood (%)	B%	13.5
Feather (%)	F%	19.0
Offal (%)	OFF%	7.7

Number of chickens slaughtered were 524.

+ Coefficient of variation computed as the remainder standard deviation by the overall mean of a given trait.

Breed group

Considering the purebreds , results presented in Table 2 showed that averages of weight of carcass traits were higher for SM and WP than those of NH and DN breeds. This is true since SM and WP had the highest alive body weights. However , DN breed showed the highest percentages of carcass traits (76.3% for D%and 71.0% for E%) and the percentages of non-edible carcass traits (23.3%) , followed by WP , while SM breed was nearly equal to NH for D% (74.6%) , E% (68.4%) and non-edible carcass traits (25.6%). Dealing with crossbreds , it is shown that each of DN and WP breeds when

TABLE.2. Least squares means of purebreds and crossbreds for carcass and non-edible carcass traits at 20 weeks of age.

Breed group	Carcass traits						Non edible carcass traits								
	DW	D%	EW	E%	GW	G%	HSF	HSF%	VW	V%	BW	B%	FW	F%	OFF%
Pure-breds:															
NH	922±26	74.8	849±24	68.8	72±2.0	5.8	121±4	9.7	85±5	6.8	48±2	3.8	74±3	6.5	26.3
WP	1036±27	75.5	958±26	69.5	78±2.0	5.7	121±5	8.8	85±5	6.2	49±2	3.2	82±4	5.9	24.4
DN	890±29	76.3	831±27	71.0	64±2.0	5.5	107±5	9.0	54±5	4.6	45±2	3.8	68±4	5.8	23.3
SM	952±25	74.4	883±24	67.9	68±2.0	5.4	105±4	8.2	91±5	7.1	48±2	3.7	78±3	6.0	25.0
Crossbreds:															
NHXSM	938±23	74.9	870±22	69.4	68±2.0	5.4	115±4	9.5	85±4	7.0	44±2	3.5	71±3	5.6	25.1
SMXNH	960±26	74.9	888±25	67.9	72±2.0	5.6	116±4	9.4	79±5	6.4	49±2	3.8	80±3	6.2	25.0
NHXDN	1033±25	73.3	962±24	68.3	71±2.0	5.0	124±4	9.2	110±4	8.1	53±2	3.8	88±3	6.0	25.1
DNXNH	1040±27	74.3	9680±26	68.9	72±2.0	5.2	123±5	9.1	104±5	7.7	50±2	3.6	83±4	5.8	25.8
NHXWP	1026±25	73.9	951±24	68.4	75±2.0	5.5	117±4	9.3	102±4	7.6	55±2	3.9	88±3	6.3	26.6
WPXNH	964±24	76.0	898±23	70.7	69±2.0	5.2	123±4	10.0	63±4	5.1	46±2	3.6	77±3	6.0	24.0
SMXDN	992±29	75.8	923±28	70.5	69±2.0	5.4	119±5	9.4	86±5	6.8	48±2	3.6	74±4	5.5	24.5
DNXSM	1125±26	75.6	1055±25	70.7	75±2.0	5.0	138±4	9.7	89±5	6.2	59±2	3.9	80±3	5.3	24.4
SMXWP	1113±24	74.4	1041±23	69.3	77±2.0	5.1	130±4	9.1	114±4	7.9	57±2	3.8	83±3	5.5	25.5
WPXSM	1156±37	74.9	1086±35	70.0	77±2.0	5.0	144±6	10.0	63±4	5.1	46±2	3.6	77±3	6.0	25.0
DNXWP	996±30	78.2	928±29	72.8	68±2.0	5.4	104±5	8.5	69±5	5.6	51±2	4.0	73±4	5.7	23.1
WPXDN	1070±27	76.4	1000±25	71.2	73±2.0	5.3	122±4	9.0	82±5	6.1	50±2	3.6	82±3	5.8	23.6

crossed with the other breeds gave the highest percentages of D% (75.6%) and E% (70.4%) and the lowest percentages of non-edible carcass traits (24.0%). However,crosses of each of NH and SM were relatively lower and nearly equal to each other for D% (74.9%) , E% (69.3%) and non-ediblecarcass traits(25.0%) . From these results it is evident that DN breed and its croosses had the highest percentages of carcasstraits and the lowest percentages of non-edible carcass traits.Thus , it is recommended to use DN breed in crossbreeding programmes of meat production.In general , least squares means of carcass traits crossbred chicks were generally higher than those of purebreds (Table 2) .

Significant differences ($p<0.001$) due to breed-group effects for carcass and non-edible carcass traits were observed (Table 3).Similarly many studies (e. g . CHHABRA *et al* ., 1972 ; WAHID *et al* ., 1974 ; KUMAR and ACHARYA , 1980 ; VERMA and CHOUDHARY , 1980 ; SINGH *et al* ., 1983) reported that differences among different genetic groups for carcass traits were significant.On the contrary , results of EL-TURKY (1981) and ABDEL-HAMID *et al* . (1981) inicated that differences in D% between different breed breed groups were not significant .

TABLE 3. F-ratios of Least-squares analysis of variance of factors affecting carcass and non -edible carcass traits.

Source of variation	df	Carcass traits			Non edible carcass traits			
		DW	EW	GW	HSFW	VW	BW	FW
Breed group	15	7.6***	7.7***	4.4***	4.6***	12.1***	6.1***	4.0***
Hatch (H)	1	0.3 ns	0.1 ns	9.6***	5.5***	10.2***	23.3***	0.0 ns
Sex (S)	1	141.6***	138.2***	91.3***	29.8***	9.9***	66.1***	22.7 ***
Breeding pen (P)	1	0.1 ns	0.1 ns	1.8 ns	0.0 ns	0.5 ns	0.0 ns	0.6 ns
HXS	1	3.7*	3.3 ns	6.8**	4.4*	13.8***	0.6 ns	2.9ns
Ramainder df	504							
Remainder mean squares		22564.6	20623.3	106.6	634.5	720.9	101.9	370.3

ns = non-significant; * = ($P<0.05$); ** = ($P<0.01$); *** = ($P<0.001$).

Crossbreeding and heterotic effects

Estimates of heterosis of different breed groups for carcass (DW , EW and GW) and non-edible carcass traits (HSF , VW , BW and FW) are given in Table 4 . For more informatioin , estimates of heterosis based on each single cross and its reciprocal are given in Table 5. Heterosis percentage of different breed groups showed that crossbreds of DNxSM , WPxSM , DNxNH , NHxDN , SMx WP and WPxDN recorded an average heterosis of about 12.0% and consequently ,they surpassed significantly those of other crossbreds for carcass traits.Moreover , the same crossbreds recorded an average heterosis of about 21.0% ($p<0.05$) for non-edible carcass traits .

TABLE 4. Estimates of heterosis + for carcass and non-edible carcass traits.

Traits	Breed group					
	NH-SM	NH-DN	NH-WP	SM-DN	SM-WP	DN-WP
Carcass - traits :						
DW	1.6	14.0	1.7	15.0	14.6	5.2
EW	1.5	15.2	2.2	15.4	14.9	7.9
GW	-0.4	5.3	-4.7	9.1	4.1	-0.8
Average	0.9	11.5	-0.8	13.2	11.2	4.1
Non edible carcass traits						
HSF	2.0	8.4	-1.2	21.2	20.3	-1.2
VW	-6.9	55.8	-3.3	19.3	13.6	8.3
BW	-2.7	12.1	3.7	14.4	16.0	7.7
FW	20.6	49.0	27.0	5.4	12.4	3.5
Average	3.2	31.3	6.6	15.1	15.6	4.6

\+ Heterosis percentage = (cross- midparent) / midparent.

Estimates of heterosis for carcass traits ranged from -4.7% to 15.4% with an average of 6.7% , while the non-edible carcasstraits ranged from -6.9% to 55.8% with an average of 12.7% Theseresults showed that crossbreeding was generally associated withan increase in most carcass and non-edible carcass traitsconsequently , heterotic effects on carcass and non-edible carcassmany studies (e.g. CHHABRA *et al* ., 1972 ; NICKOLAS , 1976 ; EL- SOURADY , 1978 ; MERKLEY et al ., 1979 ; CANTOR , 180 ; ULAGANTHAN *et al* ., 1980) revealed that crossbreds were superior in carcasstraits than those of purebreds On the contrary , most of the Egyptian studies reported that crossbreeding did not improvethese traits (e. g . El-Turky , 1981)

Crossbred resulting from corossing between local breeds (DNxSm or SMxDN) were found to have positive and high magnitude of heterosis for carcass and non-edible carcass traits (Table 5) In addition , DN breed when used as a sire with dams of SM breed gave the highest estimates of heterosis for carcass traits(22.7%) followed by using DN breed as a sire with dams of NH (15.0%) and WP (3.8%) Also , DN breed when used as a dam gaveagain the estimates of heterosis (14. 2%) followed by NH (9.0%) and WP (7.8%) Moreover , SM breed when used as a sire gave the highest esimates of heterosis with WP (12.4%) followed by DN (7.8%) and NH (2.7%) However , When SM used as a dam-breed gave the highest estimates of heterosis with DN sires (22.7%) followedby WP sires (17.0%) and NH sires (0.4%) It is clear then that DN should be used as asire-breed and SM should be used as adambreed when crossed with each other since their crosses gave the highest percentage of heterosis (22.7%) compared to the other crosses This superiority of heterosis obtained from crossing between these two native breeds (DN and SM) may be due to high additive and non-additive genetic

TABLE 5. Estimates of heterosis +of single crosses for carcass and non-edible carcass traits.

Trait	Breed group											
	NHxSM	SMxNH	NHxDN	DNxNH	NHxWP	WPxNH	SMxDN	DNxSM	SMxWP	WPxSM	DNxWP	WPxDN
Carcass - traits :												
DW	0.4	2.8	13.6	14.3	4.8a	-1.4b	7.6a	22.5b	12.4	16.8	3.2a	7.3b
EW	0.4	2.5	14.7	15.6	5.2	-0.9	7.9a	22.8b	12.5	17.2	4.1	11.7
GW	-3.6	2.7	4.4	6.0	-0.5a	-8.9b	5.3	12.9	4.5	3.7	-4.4	2.7
Average	-0.9	2.7	10.9	12.0	3.2	-3.7	1.8	19.4	9.8	12.6	0.9	7.2
Non edible carcass traits												
HSF	1.9	2.1	8.5	8.3	-3.5	1.2	12.8a	29.6b	14.0	26.5	-8.9a	6.4b
VW	-3.4	-10.4	59.5	51.6	20.2a	-26.8b	18.1	20.4	27.1a	0.1b	0.0	16.4
BW	-7.7	2.3	15.3	8.6	13.4a	-6.0b	3.2a	25.9b	16.0	16.0	8.5	6.6
FW	14.2	27.2	53.7	44.3	36.3a	17.7b	1.5	9.2	3.0a	21.7b	-2.4	9.4
Average	1.3	5.3	34.4	28.2	16.6	-13.9	8.9	21.3	15.0	6.1	-2.8	9.7

+ Heterosis percent = (single cross- midparent) / midparent.

Estimates of heterosis (single cross and its reciprocal) in the same row with different letters are significantly different (P<0.05), otherwise they do variations.Estimates of heterosis of carcass and non-edible carcass traits for DNxSM crosswere superior than those of its reciprocal cross. results of EL-TURKY (1981) showed that crossbreeding among the native breedswas associated with a slight positive heterotic effects on DW at 12 and 14 weeks of age with an average heterosis of 1. 5% and1.2% , respectively. She attributed this slight heterosis to that the native breeds have less non-additive genetic variation in carcass traits .

Estimates of heterosis obtained from crossing of exotic breeds (i . e . NH and Wp) with other local ones were usually associated with an existence of heterosis with an average of 9 .4% for carcass traits and an average of 6 .9% for non-edible carcass traits. Results of other Egyption studies (e . g . ALI , 1979 ; GOHER , 1987) gave evidence that crossbreeding among exotic and local breeds was accompanied by positve heterotic effects on EW and DW of chickens.In practice and from heterosis percentages obtained for body weights and measurements (HANAFI *et al* ., 1991) , it is safely to conclude that crossing of SM and DN (as local breeds) with NH and WP (as exotic breeds) will encourage poultry breeders in Egypt to produce broilers with heavy weight and long measurement of body along with good quality and quantity of carcass for such broilers produced.This carcass will be acceptable from the taste point of view for the Egyptian consumer .

In practice , it was found that crossing between local breeds gave the highest magnitude of heterosis with an average of 15.2% for DW and EW followed by crossing between local by exotic breeds (9.4%) , while crosses of exotic gave the lowest estimatesof heterosis (2.0%) .

Genetic Parameters

Significant differences (p<0 . 01) in general combining ability (GCA) among the four pure breeds were obtained for carcassand non-edible carcass traits which were attributed to the existence of high additive genetic variation (Table 6).Some Studies (e . g . SINGH *et al* ., 1983) revealed that differences in GCA among white cornish , Australorp , Columbian and white plymouth breeds contributed significant source of variation in EW at 10 weeks of age . Similarly , MUKHERJEE *et al* . (1984) with four commercial strians of chickens found that differences in DW and EW due to GCA at 8 weeks of age were significant.Least squares constants (Table 7) showed that DN had the highest estimates of GCA for all carcass (57.1 , 52.3 and 2.0 grams for DW , EW and GW ,respectively) and non-edible carcass traits , followed by WP.This leads to the possibility of genetic improvement of such carcass traits of DN breed by selection .

The material abilities (MA) affected significantly (p<0 .01) most carcass and non-edible carcass traits (Table 6).The SM breed had the best constants of MA for DW (64.4 grams) and EW(52.3 grams) and for non-edible carcass traits (Table 7) , While DN had the lowest constants of MA (-42.8 grams for DW and -39.1 grams for EW).

Such findings refer to the possibility of utilizing SM breed as a breed of dam and DN as abreed of sire in crossbreeding programmes for producing broilers with good quality carcass .

TABLE 6. F-ratios of Least-squares analysis of variance for general combining ability (GCA), maternal ability (MA), specific combining ability (SCA) and reciprocal or sex-linked effects (SL) for carcass and noon-edible carcass traits.

Source of variation	df +	Carcass traits			Non- edible carcass traits			
		DW	EW	GW	HSFW	VW	BW	FW
GCA	3	11.2**	16.5**	5.0**	4.5**	3.1*	6.4**	2.6*
MA	3	4.1 **	4.7 **	1.9 ns	6.1**	6.7**	5.5**	0.9 ns
SCA	2	16.7**	11.5**	3.1*	11.0**	27.1**	7.9**	7.6**
SL	3	6.2 **	4.9**	5.1 **	2.2 ns	6.0**	8.3**	4.9**
Remainder mean square		33339	20221	108	682	813	105	422

+ Remainder degrees of freedom = 383

ns = non-significant; * =P<0.05; ** =P<0.01 .

The significant effects (p<0 .01) of specific combining ability (SCA) on carcass and non-edible carcass traits (Table 6) refer to the presence of high non-additive gene effects. Thus , production of commercial broilers with good quality carcass is quit possible. Similarly , SINGH *et al* . (1983) found that differences due to SCA among white Cornish , Australorp , columbian and white plymouth breeds were significant (P<0 .05) for EW at 10weeks of age . Also , MUKHERJEE *et al* . (1984) with four commercial strains of chickens found that effects of SCA on DW and EW at 8 weeks of age were significant (P< 0 .05).Crosses of NHxDN and SMxWP had the highest estimates of SCA for carcass and non-edible carcass traits , while the lowest estimates were reported for NHxSM and DNxWP (Table 7).The same trend was obtained for body weights and measurements in the present study (HANAFI *et al* ., 1991) .

Highly significant differences (P<0.01) due to reciprocal or sex -linked effects (SL) for carcass and non-edible carcass traits were obtained (Table 6).An advantage may be obtained , therefore, by using certain breeds as either male or female parents in the crossbreeding programmes . Similarly , SINGH *et al* . (1983) with four breeds and their crosses found that SL effects on EW at 10 weeks of age were significant (P<0.05) . Also, MUKHERJEE *et al* .(1984) reported that reciprocal differences among four commercial strains were significant (P<0.05) for EW at 8 weeks of age .

TABLE 7. Least squars constants (grams) for effects of general combining ability (GCA), maternal ability (MA), specific combining ability (SCA) and reciprocal or sex-linked genes (SL) on carcass and non-edible carcass traits.

Item	Carcass traits			Non- edible carcass traits			
	DW	EW	GW	HSF	VW	BW	FW
μ:	1035..2	966.1	72.3	123.2	89.8	51.7	81.6
GCA:							
NH	-66.1	-62.9	-2.6	-6.6	4.3	-2.5	-0.9
WP	34.5	34.3	1.4	4.3	-6.9	0.5	3.8
DN	57.1	52.3	2.0	3.2	2.2	3.1	0.8
SM	-25.5	-23.7	-0.8	-1.5	0.4	-1.1	-3.6
MA:							
NH	-11.1	-3.6	0.6	2.3	-10.5	-1.6	-0.9
WP	-10.5	-9.6	0.6	-8.7	10.4	2.6	-2.1
DN	-42.8	-39.1	-2.6	-3.7	1.1	-3.3	-0.6
SM	64.4	52.3	1.4	10.1	-0.9	2.3	3.7
SCA:							
NH-SM	-60.8	-38.9	-1.5	-8.3	-10.0	-2.7	-4.2
NH-DN	73.2	47.4	1.8	7.1	15.4	2.4	5.7
NH-WP	-12.3	-8.5	-0.3	1.2	-5.3	0.3	-1.6
SM-DN	-12.3	-8.5	-0.3	1.2	-5.3	0.3	-1.6
SM-WP	73.2	47.4	1.8	7.1	15.4	2.4	5.7
DN-WP	-60.8	-38.9	-1.5	-8.3	-10.0	-2.7	-4.2
SL:							
NH-SM	-33.0	-26.9	-2.1	-2.7	-0.6	-3.8	-6.1
SM-NH	33.0	26.9	2.1	2.7	0.6	3.8	6.1
NH-DN	-3.1	2.8	-0.4	1.2	-5.1	1.8	0.7
DN-NH	3.1	-2.8	0.4	-1.2	5.1	-1.8	-0.7
NH-WP	-36.1	-24.3	-2.5	-1.5	-5.7	-2.1	-5.4
WP-NH	36.1	24.3	2.5	1.5	5.7	2.1	5.4
SM-DN	-58.0	-41.4	-2.7	-5.8	-5.9	-3.7	-2.9
DN-SM	58.0	41.4	2.7	5.8	5.9	3.7	2.9
SM-WP	-24.9	-14.4	-0.5	-3.1	-5.4	0.2	3.2
WP-SM	24.9	14.4	0.5	3.1	5.4	-0.2	-3.2
DN-WP	61.1	38.7	3.0	4.5	11.1	1.9	2.2
WP-DN	-61.1	-38.7	-3.0	-4.5	-11.1	-1.9	-2.2

Conclusion

High additive and non -additive genetic variabilities appeared here for local breeds lead to conclude that selection and crossbreeding were generally associated with an improvement in carcass traits Accordingly , Crossing between the two local breeds of Dandarawi and silver Montazsh with each others or with other exotic ones will be associated with an existence of heterotic effects Therefore , it is worthy to recommend the chicken breeders in Egypt to give more effort in carrying out selection and crossbreeding programmes on local breeds in order to en hance growth rate and to produce heavy chicks with good quality and quantity of carcass These chicks will be acceptable from the taste point of view for the Egyptian consumer .

The superiority of crosses resulted from crossing of Dandar awi (DW) sires with each of white plymouth (WP) and Silver montazah (SM) dams in most traits leads to the conclusion that selection of sires from DN breed and dams from WP or SM breeds could be more effective in crossbreeding stratification system for producing local commercial broilers .

High estimates of GCA for DN and SM breeds (as local breeds) compared to NH and WP breeds (as exotic ones) may encourage the poultry breeders in Egypt to use DN and SM breeds as a sire-breedin any crossbreeding programme coupled with this fact and due to high maternal ability for WP and SM breeds , it could berecommended to use WP or SM as a dam-breed in crossbreeding programmes in Egypt On the basis of high SCA , it may be fairly to conclude that NH or SM breeds can be crossed advantageously with WP and DN to utilize the high non-additive gene effects in the production of local commercial broilers .

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تقدير الخلط وقدرة التوافق لبعض صفات الذبيحة في الدجاج

(١) ماهر حسب النبى خليل (١) محمد حنفى سيد محمود
(٢) زينب عز الدين ى (٢) زين العابدين محمد صبرة

(١) قسم الانتاج الحيوانى - كلية الزراعة بمشتهر - جامعة الزقازيق و (٢) معهد بحوث الانتاج الحيوانى - وزارة الزراعة - الدقى - القاهرة .

تم ذبح عدد ٥٢٤ كتكوتا عند عمر ٢٠ أسبوع لتجربة خلط متبادل ٤x٤ لسلالتين من الدجاج الأجنبى { النيوهامشير والبليموث روك الأبيض } واثنين من السلالات المحلية [الدندراوى والمنتزة الفضى] وذلك لدراسة قوة الهجين وقدرة التوافق العامة والخاصة والمقدرة الامية وكذا تاثير العوامل المرتبطة بالجنس على بعض صفات الذبيحة.أجريت هذه التجربة فى محطة بحوث الدواجن بالقناطر الخيرية التابعة لمعهد بحوث الانتاج الحيوانى بوزارة الزراعة . أوضحت نتائج تلك التجربة ما يلى :

١ - أظهرت المجاميع الوراثية اختلافا معنويا [عند مستوى ١..ر.] لكل صفات الذبيحة كما وجد أن متوسطات صفات الذبيحة للخلطان أعلى من متوسطات الأفراد النقية .

٢ - كان الخلط بين السلالات مصحوبا بقوة هجين فى معظم صفات الذبيحة ، كما أعطى خلط السلالات المحلية فيما بينها أعلى قوة لهجين ، يليها الخلطان الناتجة من خلط السلالات الأجنبية وهذا يشير الى وجود تاثيرات غير تجمعية للجينات بدرجة كبيرة يمكن استغلالها فى انتاج هجن تجاربة محلية ذو ذبائح عالية الجودة .

٣ - اتضح ان هناك فروق معنوية لتأثير كل من ميعاد الفقس والجنس وكذا التفاعل بينهم على معظم صفات الذبيحة .

٤ - كان لقدرة التوافق العامة والخاصة وكذا المقدرة الأمية تأثيرا ملحوظا على معظم صفات الذبيحة مما يوضح أهمية التأثيرات التجمعية والغير تجمعية للجينات فى تباين تلك الصفات .

٥ - أظهرت سلالة الدندراوى تفوقا ملحوظا فى قدرة التوافق العامة لمعظم صفات الذبيحة ، يليها سلالة المنتزة الفضى ، بينما أظهر سلالة البليموث روك الأبيض تفوقا ملموسا فى المقدرة الأمية مما يقودنا الى استخدام سلالتى الدندراوى والمنتزة الفضى كسلالة للأب والبليموث روك الأبيض كسلالة للأم فى تخطيط استراتجيات برامج الخلط لانتاج بدارى اللحم (ذو جودة عالية فى صفات الذبيحة) .

٦ - كان لخليط كل من النيوهامبشير مع الدندراوى ، المنتزة الفضى مع البليموث روك الأبيض أعلى قدرة الخاصة .

٧ - كان لتأثير العوامل المرتبطة بالجنس تأثيرا معنويا على معظم صفات الذبيحة ومن ثم امكانية انتاج اللحم من السلالات المحلية بمواصفات ذبيحة جيدة .