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Bird reactivity and semen production in the Pepoi and Robusta Maculata Italian chicken (*Gallus gallus domesticus*) breeds

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Introduction

Chicken breeds biodiversity conservation strategies:

- ***Characterization (pheno & geno)***
- ***Ex situ conservation (cryobanks)***
- ***In situ conservation***
- ***Niche market production***

Aim

To investigate birds' individual reactivity and quantitative semen production in Pepoi (PEP) and Robusta Maculata (RMA) roosters.

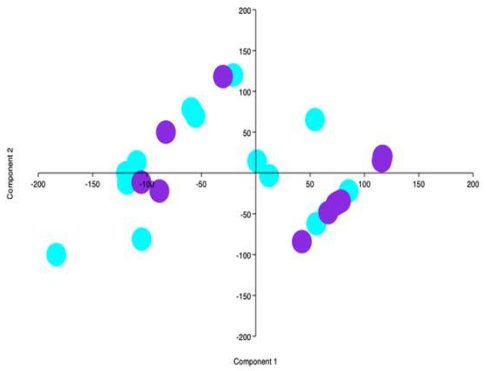
Materials & Methods

Tonic Immobility (TI) and Emergence (ET) behavioural tests (fear response) were used.

Twenty-seven roosters, 15 PEP and 12 RMA, were housed in single cages in controlled environment. Semen collection was performed twice weekly on 20-24 months of age. Tested parameters: body weight (Kg; LW), semen volume (ml; VOL), semen concentration (n sperm/mL semen volume; CON); total sperm output (n sperm.; VOL*CON; TSO), ratio semen volume/live weight (mL/kg; VOL/LW; VWR). In TI: number of induction (N, max 3; TINI), TI duration (s, max 180 s, TIDU), number of vocalization (n, TIVO). In ET (max latency time 180s): head emergence out of the box latency (s, ETHE), first step out of the box latency (s, ETFS), bird's complete emergence out of the box latency (s, ETCE), number of vocalization (n, ETVO), defecation (n, ETDE).

GLM and Bivariate Correlate procedures of SPSS® were applied; breed was the source of variation in GLM (Bonferroni test; P≤0,05). PCA was performed using Past®4.05 software.

Fig. 1 – PCA, every Turquoise spot is a PE rooster, every Purple spot is a RM rooster



Conclusions

- Semen quantitative parameters and roosters reactivity were analysed and correlated.
- Significant differences in behavioural and quantitative semen characteristics have been described.
- Breed based behavioural characterization could be effective in optimizing semen collection procedures both for productive and conservative purposes and to improve birds' welfare.

Robusta Maculata rooster

Pepoi rooster

Results & Discussion

Significant differences were found in LW, ETVO and semen quantity parameters (Tab.1). Lower LW was recorded in PEP birds (1.957 kg *vs* 4.303 Kg). Higher ETVO frequency was recorded in RMA birds (17.25 *vs* 2.0). Significant Inverse correlations between LW and VOL, CONC, TSO and VWR were found. PC1 and PC2 described the 60.27% and 24.5% of the variance respectively, and they were both influenced by TIDU and ETHE. PC3 described the 14.16% of variance based on ETEM and ETFS. PCA reveals the effects of birds' reactivity on roosters' distribution (Fig.1).

Tab 1. GLM results, Breed based differences, Bonferroni test.

Dependent variable	BREED	LS Mean	Std err	P
WEIGHT (kg)	PE	1,957	0,078	P≤0,05
	RM	4,303	0,087	
TI_INDUCTION (N)	PE	1,667	0,207	
	RM	1,667	0,231	
TI_DURATION (s)	PE	83,099	17,136	
	RM	100,335	19,159	
TI_VOCALIZATION (N)	PE	0,533	0,464	
	RM	0,583	0,518	
ET_HEAD (s)	PE	75,200	20,166	
	RM	125,250	22,546	
ET_FOOT (s)	PE	161,400	9,266	
	RM	180,000	10,360	
ET_EMERGENCE (s)	PE	163,067	9,215	
	RM	180,000	10,303	
ET_VOCALIZATION (N)	PE	2,000	3,260	P≤0,05
	RM	17,250	3,645	
ET_DEFECATION (N)	PE	0,267	0,111	
	RM	0,167	0,124	
VOLUME mL	PE	0,330	0,026	P≤0,05
	RM	0,157	0,029	
CONCENTRATION N*10^9/mL	PE	4,923	0,173	P≤0,05
	RM	2,004	0,193	
TSO N*10^9	PE	1,655	0,136	P≤0,05
	RM	0,289	0,152	
VOL/WEIGHT	PE	0,167	0,011	P≤0,05
	RM	0,037	0,012	

"Natural selection favours different behaviours in different populations, with the result that populations differ in behaviour as well as other characteristics"

Appleby, M. C., Mench, J. A., & Hughes, B. O. (2004). Poultry behaviour and welfare. CABI Publishing, Wallingford Oxfordshire, UK.

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