ABSTRACT

The main criterion which led us to choose the PhD theme was that the scientific literature is quite poor in data related to exotic companion birds.

Thus, there are no complete standards to describe the exotic birds, while the description of their external appearance differ from author to author; moreover, there are no data concerning live weight dynamics or the timeline of the body size and indexes evolution. Also, there are few communications on laying and hatching of the eggs at the studied species, especially on the quality traits of incubation eggs.

Besides these, we proposed to elucidate part of these unknown aspects, mainly related to some of the most appreciated exotic fowl species: ***Standard undulated budgerigar*** (*Melopsittacus undulatus*) and ***Great Alexander parrot*** (*Psittacula Eupatria*).

Three different aviaries were used in our investigations (L1, L2 and L3); they supposed the establishing of certain specific indexes, such as:

- external morphological traits (body regions; feathering);
- body size and body indexes;
- sexual maturity and laying particularities;
- anatomic peculiarities of the reproductive system;
- incubation traits if the laid eggs (morphological, physical and chemical indexes);
- performances during hatching and quality of new hatched chicks.

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In order to achieve the goal, 30 specimens were studied from each aviary, therefore 90 individuals (45 males and 45 females).

The anatomy of the reproductive system was described throughout the slaughter of three families used in reproduction, one couple per aviary, which meant a female and a male per family.

Relatively to the ***color and drawing varieties*** of ***feathering*** in standard undulated budgerigars, there was observed that the most common color was "dark green". The pigments were distributed on the body as follows: green on the trunk, yellow on the face and crown, blue or violet on the cheek patches. Small black colored spots chain was noticed on the neck. On the head and neck, particularly on the nape, there were found dark stripes. The wings were spiked (black and yellow stripes), while the tail presented a green-blue tint.

Other 3 colors we found in the 3 aviaries were: light green; lutino; light blue (cyan); dark blue (cobalt); blue-violet and blue-grey.

Concerning the ***external appearance peculiarities,*** it was found that the budgerigars head is quite big, compared to the rest of the body development, round shaped and symmetrical built; the cere was identified at this level and its color differed among genders. The eyes, perfectly round shaped and small, were positioned slightly upper and behind the cere.

The neck was conical, slightly curved and average elongated.

The trunk was compact, with straight backline and descending antero-posterior. The chest was wide between shoulders and well rounded; the abdomen was relatively short and tight, while the thorax was average as width and depth. The tail had an average length, structured of two big rectrices, many middle size and small rectrices and also tectrices.

The wings, strong and long, are kept well joined to the trunk, with the tips crossing over the tail. The legs were thin, while the fingers presented strong claws.

Speaking of ***body weight,*** quite high differences were found in females, between the groups (minimum 45.79±0.85 g and maximum 48.27±0.31 g), hence the distinguished significant differences between them. In males, the body weight was somewhat more homogenous, with oscillation limits of 50.29±0.63 g - L1 group and of 51.59±0.25 g - L3 group.

Data cumulated for both genders revealed that highest body weights, of 49.56±0.39g were found in L2 group specimens, while the lowest, of 48.04±0.66g, in L1 group. No statistical significant differences were found between the 3 groups.

Body sizes of the budgerigars in the 3 groups were also investigated.

It was observed that trunk length did not significantly varied between groups, oscillating thus between 4.49±0.10 cm and 4.56±0.09 cm; studied trait was less homogenous, the values of variation coefficient revealing middle variability.

Whole length, measured for both genders, indicated values comprised within 19.43±0.40 cm (L1 group) – 20.58±0.28 cm (L3 group) interval, hence the significant statistical differences between the groups; the trait presented low toward average variability.

The wingspan was calculated as an average of both genders and revealed the superiority of the birds in L3 group (29.65±0.20 cm), followed by the individuals in L2 group (28.94±0.30 cm) respectively by those in L1 group (28.23±0.33 cm); distinguished significant differences occurred between groups L1 and L3.

Thorax circumference, assessed for both genders, reached 9.58±0.11 cm in the birds from L1 group, 9.55±0.15 cm in L2 group and 10.13±0.17 cm in L3 group, leading thus to the occurrence of significant and distinguished significant differences between groups, while the analyzed trait presented good homogeneity.

Sternum keel length, also measured in both genders, recorded values comprised between 4.12±0.10 cm (L2 group) and 4.25±0.08 cm (L1 group). Despite the fact that no significant differences were involved, the trait presented less homogeneity.

Pelvic limbs length was a homogenous trait, without statistical differences between groups, with variation limits of 3.01±0.03 cm in L2 aviary and 3.07±0.04 cm in L3 one.

Cannon perimeter, assessed for the entire aviary, was found of 9.96±0.05 mm in L1 group, of 9.10±0.20 mm la L2 group and of 9.15±0.12 mm in L3 group, leading thus to high significant statistical differences between groups means.

Tail length, also measured for both genders, was higher in the budgerigars from L3 group (12.60±0.38 cm) and smaller in L2 group (10.15±0.27cm). Very significant statistical differences were identified between groups, as well as an average variability of the analyzed trait.

Beck length (males and females) presented close values among aviaries, ranging between 1.12±0.01 cm (L1 group) and 1.16±0.02 cm (L3 group); the trait was homogenous, no statistical significance occurring.

Relatively to the ***body indexes***, it was found that pectoral muscles development index was higher in both genders in L1 group (93.66±1.45), values followed by those in L2 group (91.66±0.51) and by those from L3 group (91.01±0.53). the rait was homogenous, without statistical differences between aviaries.

Compactness index was found, for both genders, within the interval of 212.83±3.62 - L1 group and 222.92±3.16 - L3 group; significant differences occurred between groups. Studied trait presented significant statistic differences but low or average variability.

Skeleton index (females+males) presented a minimal value of 90.83±1.56 (L3 group) and a maximal one of 104.45±1.35 (L1 group), therefore distinguished and high statistical significant differences between experimental groups.

Examination of ***female reproductive system*** revealed that the ovary was situated in the abdominal cavity, under the ventral side of the left kidney and appeared as a meat-like body, of dark-red color, with kernel shape, due to the projection, on its surface of the follicles under certain stages of development. Average ovaries weight reached 1.0567±0.006 g, with minimal value of 1.0415 g and a maximal one of 1.0826 g; calculated variation coefficient was very high, indicating this lack of homogeneity.

Oviduct weight reached an average of 0.312±0.002 g; the difference between the minimal and maximal values was of 0.118 g, hence the average variability of the trait. The length of this reproductive system segment was, in average, of 30.64±0.630 mm, with limits between 28.26 mm and 32.38 mm; variation coefficient calculation indicated good homogeneity.

Exploring the ***male reproductive system*** of budgerigars, the testicles were found in the abdominal cavity, at the level of the last 3 ribd, in straight contact eith the cranial lobe of the kidneys, they were ovoid shaped and white-yellowish colored. In all situations, the weight of the right testicle was higher than the left one (1.133±0.003 g vs. 1.111±0.008 g); average weight of both testes reached 1.122±0.010 g, with a minimal of 1.082 g and a maximal of 1.142 g, while trait variability was very low.

Speaking of the deferent tract size, its length reached 19.858±0.727 mm on the right side, while the left one measured 19.715±0.803 mm, resulting thus an average of 19.786±0.765 mm. weighting of both deferent tracts gave a value of 0.189±0.0012 g for the right one and of 0.166±0.0021g for the left one, with an average of 0.178±0.0016 g. The copulatory papilla of budgerigars presented as a differentiated of the cloacae wall, built of erectile tissue.

Another studied element consisted in the ***eggs production and laying peculiarities*** for the standard undulated budgerigars. The age of the first egg deposition reached 189.7±0.83 days in L1 group females, 191.4±0.88 days in L2 group and 190.8±0.92 days L3 group. No statistical differences occurred.

Eggs yield per group presented relatively close values, best production being found in L3 group, with 69 laid eggs, while the poorest in L1 group, with 62 eggs; L2 group presented an intermediary value, of 66 eggs per group.

Eggs yield per female was best in L3 group, with 6.9 eggs/female, followed by L2 group, with 6.6 eggs/female and by L1 group with only 6.2 eggs/female.

Then, there were performed investigations on the ***morphological and physical quality*** indexes of the eggs**.** Thus, eggs weight oscillated between 2.48±0.03g (L2 group) and 2.54±0.03 g (L3 group), hence the lack of statistical differences between groups.

Volume of the eggs presented higher values in L1 group (2.47±0.03 cm^3), compared to the levels in L3 group (2.40±0.06 cm^3) and L2 group (2.38±0.05 cm^3); same situation occurred for the shape index, which was higher in L1 group (80.66±0.33%), compared to L3 group (79.78±0.24%) and L2 (79.22±0.24%); no statistical significance was identified.

Shell thickness was similar in the eggs laid by the birds in groups L1 and L2 (0.25±0.008mm) and little bit higher (0.26±0.009 mm) in L3 group; no statistical significant differences occurred.

Shell breaking strength, was, in average, of 0.17±0.002 kgf/cm^2 in L1 group eggs, of 0.18±0.005 kgf/cm^2 in L2 group and of 0.18±0.004 kgf/cm^2 in L3 group; no statistical significant differences were also identified.

Highest value for the specific gravity of the eggs was assessed in L2 group, of 1.00±0.02, then in L1 group, with 0.94±0.02 and also in L3 group, of 0.90±0.01. Maximal value of this quality trait was 1.08, while the minimal one reached 0.75.

Albumen index provided close values between the 3 groups, the averages reaching 0.12±0.009 in L1 group, 0.12±0.010 in L2 group and 0.11±0.007 in L3 group. For the yolk index, the values oscillated between 0.41±0.01 in L1 group and 0.40±0.01 in groups L2 and L3; the variability of these parameters was average.

The data related to the ***white chemical composition*** from the budgerigars eggs indicated the occurrence of water, between 80.219%, in L2 and 80.725% in L1 group, while the dry matter reached minimal value of 19.275% in L1 and maximal of 19.781%, in L2. From whole albumen dry compounds, the proteins represented 91.913-92.084%, lipids reached 1.589-1.602%, while minerals were found at 6.327-6.485%.

Concerning the ***yolk chemical composition***, water levels were, in average, of 52.471% in L1 group, of 52.386% in L2 group and of 52.490% in L3 group, the difference being represented of dry matter (47.529%; 47.614% and 47.510%). The chemical constituents of the dry matter were found in concentrations of 33.320-33.496%, for proteins, of 59.784-59.948% for lipids and of 6.691-6.755% for minerals.

Melange chemical composition comprised water, which oscillated from 66.303% (L2 group) to 66.598% (L1 group) and dry matter, found between 33.402% (L1 group) and 33.698% (L2 group). Proteins in melange oscillated between 62.656% (L3 group) and 62.773% (L1 group); lipids represented30.687-30.773, while the minerals, 6.541-6.589%.

The ***analysis of natural incubation process*** of the studied budgerigars eggs revealed that the highest fertility level was found in the eggs from group L2, of 93.94%, compared to 91.94% in L1 group or to 91.3% in L3 group, due the fact that lesser clear eggs were found in L2 group (6.06%), compared to those existing in the other groups (8.06% in L1 group and 8.7% in L3).

Eggs with dead embryos reached 3.22% in L1 group, 1.51% in L2 group and 4.35% in L3 group.

Hatching percentage presented a maximal value 92.67% in L2 group, respectively lower levels in L1 and L3 groups, of 88.92% and 87.16%.

Viable chicks percentage oscillated between 96.72% in L2 group and 98.33% in L3 group, while the morbid chicks level between the limits of 1.67% (L3) and 3.28% (L2).

"*Researches on the knowledge of morphologic and biologic peculiarities of Great Alexander parrots, reared in captivity*"

The investigations comprised 60 individuals of Great Alexander parakeet, equally distributed in the three aviaries, respectively 20 specimens/group (10 females and 10 males); the specimens presented the same age and proper health.

Feathering color varieties and drawings study on the Alexandrian parakeets revealed as predominant the „dark green" variety in all aviaries. Head color was green, slightly lighter around the beck, the eyes were black with yellow iris, and a collar around the neck, black colored in females and black-red in males. Body feathers were greed, with grey tints on the chest and dark green on the wings, while the tail was blue-green, with a yellow tip. The beck was red, limbs were grey, terminated with black claws.

Concerning the ***external appearance peculiarities of*** Great Alexander parrots, it was found that the head is quite big, as reported to the body development, round shaped and symmetrically built. The beck was big, with a pronounced curvature of the superior maxilla; cera color oscillated individually. The eyes were perfectly round and proportional, the color varying also individually. The neck was conical, slightly curved and with average length.

The trunk comprised the chest (massive, wide between shoulders, rounded and well covered in musculature), the abdomen (relatively short and tight) and the thorax (moderated width and depth, always bigger in males).

The wings were strong and long enough, kept well close on the trunk, with the tips crossed over the tail, while the pelvic limbs presented the thighs and shanks well covered by strong muscles and terminated with sharp and strong claws.

Overall analysis of the ***body weight*** in the Alexandrian parakeets of both genders revealed the highest values, of 281.31±14.63 g in L2 group, and the lowest ones, of 276.28±14.67 g, in L1 group; birds from L3 group presented an intermediate value, of 277.62±12.82 g. however, no statistically significant differences were found between groups, while the trait homogeneity was middle (V%=14.60-16.79).

For the main ***body dimensions*** it was concluded that the total length presented values of 55.74±0.69 cm in both genders in L1 group, of 56.31±0.69 cm in L2 group and of 56.93±0.65 cm in L3 group. No significant differences were found between groups, while the variability of the trait was reduced (V%=5.12-5.53).

Wingspan, in both genders, reached better values in L2 group, of 41.45±0.83 cm; then in L2 group with 41.12±0.79 cm and in L3 group, with 40.38±1.09 cm. no statistical significant differences were identified between the 3 groups averages.

Thorax circumference in both genders was of 21.17±0.37 cm in L1 group birds, of 21.19±0.35 cm in L2 group and of 21.18±0.35 cm in L3 group. Studied trait was homogenous, with variation coefficient values of 7.45-7.79%.

For both genders in the three studied aviaries, the average length of sternum keel reached 11.83±0.27 cm in L1 group, 11.62±0.27 cm in L2 group and 11.79±0.26 cm in L3 group; no statistical significant differences were found between groups and homogeneity was good.

Cumulating the values for pelvic limbs length in both genders revealed a homogenous trait (V%=8.71-9.40) and the absence of any statistical significance. These values reached 6.00±0.05 cm in L1, 6.01±0.06 cm in L2 and 6.16±0.06 cm in L3 birds.

The average values of the cannon perimeter, in both genders, reached 14.48±0.27 mm, in L1 group (V%=8.29), 14.66±0.25 mm in L2 group (V%=7.61) and 14.51±0.20 mm, in L3 group (V%=6.18). No statistical significant differences were found between groups.

In both genders, tail length was better in L3 group, with 29.78±1.22 cm, not significantly different from L1 group (29.37±1.54 cm) or L2 group (29.12±1.45 cm).

Beck length indicated close values between the three groups, with averages which oscillated between 2.94±0.13 cm in L1 group and 3.07±0.15 cm in L3 group; no significant differences occurred, despite the fact that the trait was heterogeneous, due to the high values of the variation coefficient (V%=20.42-21.52).

The measurements were used to calculate the ***body indexes***. Thus, pectoral muscles development index presented the highest values, of 82.54±1.53 in L1 aviary, followed by L3 aviary, with 82.44±1.12 and by L2 group, with 80.11±1.88.

The homogeneity of the trait was good (V%=4.29-7.42), hence the lack of statistic differences between groups.

The average value of compactness index oscillated, in both genders, between 148.01±2.83 in L2 group and 148.17±3.39 in L3 group with intermediate value of 148.17±3.39 in L1 group. No statistical differences occurred and the variability was low (V%=6.06-7.24).

Skeleton index oscillated, for both genders, between 68.61±1.79 in L1 group and 69.41±1.90 in L2 group. No statistical significance occurred between groups.

The reproductive system anatomy study revealed in males a testicular weight of 2.7171±0.0922 g, while the deferent conducts weighted 0.2640±0.0086 g; their length reached in average, 72.6924±0.4262 mm.

In females, the ovary presented an average weight of 3.0458±0.0616 g, while the oviduct weight reached 1.0936±0.0705 g and a length of 74.6166±1.4802 mm.

The data related to ***eggs production and laying peculiarities revealed that the age at the first egg was achieved at*** 657.4±0.23 days in L1 group, at 662.6±0.56 days in L2 birds and at 661.9±0.32zile in L3 group.

The eggs yield per group presented close values, the highest being found in L2 group, with 37 eggs laid, while the lowest ones in L1 group, with 28 eggs; L2 group produced 32 eggs.

Certain differences occurred for the ***morphological and physical eggs quality indexes*** between the studied aviaries. Thus, after eggs weighting, the average weight was of 8.64±0.18 g in L1 group, of 8.66±0.14 g in L2 group and of just 8.50±0.17 g in L3 group. No significant differences occurred between the 3 groups.

Eggs average volume presented the lowest value in L3 group, of 9.95±0.54 cm^3, better results occurring in L1 and L2 groups, respectively of 10.63±0.50cm^3 and 10.73±0.75cm^3.

For the shape index there were found values of 76.46±1.10% in L1 group, of 75.46±1.22% in the eggs of L2 group and of 75.26±1.70% in those issued from L3 group.

During the reproduction period, it was done the ***analysis of natural incubation process***, finding thus the best fertility, of 97.3%, in L2 group, thus 0.87-3.55% better, compared with the other groups. The proportion of eggs with dead embryo was found at a level of 7.14% in L1 group, of 5.41% in L2 group and of 3.12% in L3 group.

Concerning the proportion of living chicks, as ratio to the whole hatched chicks, the data revealed a percentage of 96.0% in L1 group (24 viable from 25 hatched), of 97.06% in L2 group (33 viable of 34 hatched) and of 96.55% in L3 group (28 viable out of 29 hatched). The morbid

chicks proportion did not reveal big differences between aviaries, the recorded levels being of 2.94% in L2 group, of 4.0% in L1 group and of 3.45% in L2 group.

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The data related to the morphological and biological peculiarities of the standard undulated budgerigars (*Melopsittacus undulatus*) and of the parrots Great Alexander (*Psittacula Eupatria*) have been achieved from well genetically stabilized populations, as well as from a quite high amount of individuals. Knowing that for most traits we studied, there are no references in the literature, they become highly original.

Considering the data related to appearance quantifiable traits (body weight, size and indexes) for the flocks studied in the 3 aviaries within Iaşi and Vaslui counties, it resulted that the better developed individuals belonged to *Bârlad Zoo*, which meant L2 group. Then, the performances decreased, from *Condriuc Romeo aviary* (L3) to *Experimental Farm of Iaşi Animal Science Faculty* (L1).

The achieved results could also be explained through the fact that, despite the same origin of the biological material in the 3 aviaries, in the Bârlad Zoo-unit with serious tradition in exotic birds husbandry-there are constantly applied artificial selection of the breeders, and better accommodation conditions (appropriate shelters, rational nutrition, qualified zookeepers).

Therefore, it imposes to adjust the conditions in order to improve the technological comfort in aviaries L3 and L1, to be able to achieve the desired performances.

As general advisories for exotic and ornamental birds rearing in the 3 (three) studied aviaries, we mention:

- continuous improvement of the flocks, through the input of high value male reproducers;
- permanent improvement of the technological comfort: shelters, climate control, feeding and water consumption devices, nutrition etc, in order to better imitate the natural conditions of life for these delighting birds;
- design of an appropriate immune prophylactic program and its strict enforcement;
- individualization of the reared birds;
- keeping of the zootechnical records up to date, as related to the reproductive activity of studied birds (pairing, mating, amount of hatched chickens and their quality), to the providing feeding, to the rearing performances and so on.