

5. COMPARATIVE EVALUATION OF LOCAL POULTRY BREEDS STATUS IN ALGERIA, VIETNAM AND THE DEMOCRATIC REPUBLIC OF CONGO

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ABSTRACT

Local chicken breeds contribute significantly to the world production of meat and eggs. Indigenous breeds represent 80% of the world poultry population. However, the majority of these breeds has not been recorded and studied. About 40% of poultry breeds have an unknown risk status. Hence, considerable efforts are necessary to evaluate them. Obviously, managing animal genetic resources requires the identification of the concerned phenotypes, population sizes, their geographical distribution, and their genetic diversity within and between breeds, using molecular biology methods. Nevertheless, the thorough understanding of the breeding contexts within which they are found is an oft-neglected prerequisite to set up sustainable management strategy of these resources. In the framework of our studies, the characterization of local poultry populations and their breeding systems have been carried out in Northeastern Algeria, Northern Vietnam and Southwestern Congo (DRC). A large phenotypic diversity has been revealed in each region of study, contributing different insights into the concept of local breed. The breeding systems have in common multiple objectives (nutritional, financial, and socio-cultural). Women and children played an important role in family poultry farming. The latter elements are, however, subject to variations between the regions of study and within them. Thus, solutions aiming at the promotion of biodiversity in poultry need to be tailored in accordance with the uniqueness of each breeding context.

Keywords: Biodiversity; genetic resources; poultry; socio-economic; smallholder

I. INTRODUCTION

Animal genetic resources are capital for sustainable development and production of poultry. However, a gradual and relentless depleting of available breeds is now rife at the scale of the planet. Diseases, epidemics, natural disasters and other conflicts also threaten these resources either through direct extinction or indirect effects such as the reduction in suitable habitat.

Local chicken breeds contribute significantly to the world production of meat and eggs (Moula, 2012). Indigenous breeds represent 80% of the world poultry population. However, the majority of these breeds has not been recorded and studied (Besbes, 2009). About 40% of poultry breeds have an unknown risk status. Hence, considerable efforts are necessary to evaluate them (FAO, 2008).

Family poultry farming plays an important role in poverty alleviation and in providing food security in developing countries. In some African and Asian countries, the local chicken breed is the sole source of animal protein to be found in the diet of rural dwellers. On top of being a source of income, the backyard chicken represents a form of holding in those areas.

The management of animal genetic resources in general and poultry in particular requires the identification of the concerned phenotypes, population sizes, their geographical distribution and even their genetic diversity within and between breeds, using molecular biology methods. Nevertheless, without understanding the breeding contexts within which they are found, no lasting management strategy of these resources can be set up.

II. MATERIALS AND METHODS

A. Survey of households keeping backyard poultry

The objective of this study was to investigate the family poultry characteristics in Algeria, Vietnam and the Democratic Republic of Congo (DRC). The investigation concerned exclusively with the traditional aviculture. The study has been carried with 90 local chicken breeders from 10 districts of Basse Kabylia (Algeria), 52 local chicken breeders from 3 districts of Hanoi and Hoa-Binh province (Vietnam) and 77 local chicken breeders from 3 districts of Bas-Congo province (DRC).

The interviews were semi-structured and covered household characteristics, poultry keeping practices as well as breed description, management and perceived evolution.

B. Morpho-biometric characterization

Adult males and females (Algeria: 162 and 153, Vietnam: 187 and 59; DRC: 351 and 140 respectively) were used for morpho-biometric characterization. The different body measurements were recorded in accordance with the FAO recommendations (1981), by means of a digital balance, an electronic sliding caliper and a tape measure. The data collected were sex, body weight and reported age of animal, thoracic girth, feathers type and color, the comb's type, length, height and color, wattles height and color, tarsus length and diameter, wings length as well as the length and color of the beak.

III. RESULTS

A. Survey of households keeping backyard poultry

The livestock portfolio of poultry farmers was diversified in all three regions (Table 1). In Algeria, sheep are the second most important species, after chicken at 86.7%. In the DRC and Vietnam, respectively 44.2% and 67.3% of poultry farmers keep pigs.

In Algeria and DRC, women were in charge of poultry breeding in 81.1% and 42.9% of interviewed households whereas in Vietnam, all family members are involved in this activity in most interviewed family (90.4%).

How the first backyard chickens are obtained differs from region to region. In the DRC, they are mainly bought (45.5%) and shared (29.9%); in Algeria, they are obtained as gifts (40.0%) and through inheritance (35.5%) and in Vietnam it is more through inheritance (67%) and buying (25.0%).

Various explanations have been given by farmers to the issues of reasons for keeping backyard poultry and reasons to choose the local breed. The main reasons are: egg production (Algeria: 57.8%, Vietnam: 23.1%) and meat (Algeria: 52.2%; Vietnam: 96.1%, DRC: 45.5%); tradition (Algeria: 53.3%; Vietnam: 80.8%, DRC: 59.7%); the culinary and nutritional quality of chicken meat and eggs (Algeria: 88.9%; Vietnam: 65.4%; DRC: 15.6%); toughness and resilience (Algeria: 73.3%; Vietnam: 88.5%;DRC: 53.3%) and easiness of breeding (Algeria: 65%; Vietnam: 90.4%; DRC: 75.3%).

Concerning feed and feeding systems for chickens, in Algeria, Vietnam and DRC; most poultry farmers (100%, 100% and 77% respectively) provided supplementary feeding to their chickens as following: kitchen leftovers (97.8%, 88.5% and 65.5%), crops and their residuals (2.2%, 65.5% and 94.2%). In the DRC, 10.4% of chicken breeders use a nutrition formula, [50% of corn, 30% of soya and 20% of manioc (10% of leaves and 10% of spuds)], suggested by a locally active ONG. In DRC, 22.1% of farmers in DRC do not feed them. The animals live of what they find their environment (insects, worms, grasshoppers, larvae, grass, crops...).

The majority of backyard chicken keepers in Vietnam (84.6%) never provide water to the birds; only 20.8% of farmers being in that case in the DRC and 100% of farmers provide water to the birds in Algeria

Drinking water sources cited are: the water tap (Algeria: 43.3%; Vietnam: 5.8%; DRC: 5.2%), the well (Algeria: 47.8%; DRC: 16.9%) and other sources (streams, springs, fountains...) (Algeria: 8.9%; Vietnam: 52.2%; DRC: 9.6%).

The mainly cited constraints on the productivity of family-based poultry are: predators (Algeria: 50.0; Vietnam: 73.5%; DRC: 93.5%), diseases (Algeria: 5.6%; Vietnam: 26.9%; DRC: 80.5%), expensive chicken feed (Algeria: 57.8%; Vietnam: 25%; DRC: 22.1%) and theft, cited by 26% of the chicken farmers of the DRC.

Table 1. Relative livestock distribution (%) by species in the surveyed households.

Species	% households - (n)		
	Algeria n=90	DRC n=77	Vietnam n=52
Chicken	100 (23)	100 (36)	100 (77)
Sheep	86.67 (12)	7.79 (4)	-
Rabbit	64.44 (12)	7.79 (4)	-
Goat	44.44 (8)	44.20 (3)	-
Cattle	37.78 (8)	-	11.54 (8)
Turkey	25.56 (10)	-	-
Duck	20.00 (6)	7.79 (9)	13.46 (11)
Pig	-	13.0 (5)	67.31 (10)
Guinea pigs	-	20.80 (8)	-
Pigeons	-	2.60 (8)	-
Buffalo	-	-	50.00 (6)
Dog	-	-	26.92 (8)

B. Morpho-biometric characterization

Color diversity has been observed in three countries (Table 2). White, black, silver, golden and brown represent 65% of the colors of the subjects studied in Algeria. In the DRC, mottled, tan, white, golden, black, golden salmon, and brown represent 65%. Tan, golden salmon and wheat represent 65% of the colors of the subjects studied in Vietnam.

Plumage showed a normal coverage of the body. Only 4.1% of bare-neck chickens have been observed in Algeria and 6.1% in the DRC and none in Vietnam.

Plumage is exclusively of the smooth type (Table 2). Weight and age of slaughter as well as the diameter of tarsus are highlighted in Table 2.

The comb is almost exclusively of the simple type (Algeria: 93.3%; Vietnam: 90.7%; DRC: 92.4%) and red (Algeria: 83.8%; Vietnam: 100%; DRC: 90.4%).

Table 2. Main phenotypic characteristics of local chicken population evaluated in Algeria, Vietnam and DRC.

Feather colors			
	Algeria	DRC	Vietnam
Number of colors (n)	17	20	13
Normal distribution (%)	95.87	85.3	100
Bare-neck (%)	4.13	6.11	0
Smooth type (%)	100	98.40	100
Weight and age of slaughter and diameter of tarsus			
Weight (kg)	1.461.50	0.93	1.56
Age of slaughter (month)	9	14	9
Diameter of tarsus (mm)	13.70	-	13.58

IV. DISCUSSION

Farming of local chicken breeds is generally considered as a secondary activity. Other animals are bred. Food and cash crops, which constitute the first pre-occupation of the farmers, meet the daily food needs of the family and generate income. The latter are often seasonal and precarious due to their inherent fluctuations. Therefore, traditional poultry farming could constitute a real opportunity to improve the food quality and income (Kitalyi, 1998; Moula et al., 2011; Moula et al., 2012). Thus, chicken rearing appears in such systems as a risk management tool rather than an activity in itself.

Backyard poultry keeping remains essentially an activity of women and children. It is an activity that is available to less-endowed households since it does not require extensive means for its acquisition, maintenance and (small-scale) development.

The free-range system allows farmers to provide only as supplement feed kitchen leftovers and some crop by-products.

Hence, the integration of chicken rearing to other agricultural activities or to daily life is integrant part of its rationale; here as a means of valorizing waste, above as a risk management tool. Local breeds or types find their usefulness in their ability to respond to these needs, through particular abilities referring to general resilience. This has to be taken into account in any in-situ breed conservation strategy. Let us note that the loss of the need for these functions through economic development and specialization is an important driver of biodiversity erosion. As far as particular phenotypes are observed and appreciated by populations, the building-up or support of existing breeder association around particular breeds should come to underpin in-situ conservation program in developing countries as well, especially in regions experiencing rapid economic development and urbanization.

The observed physical and qualitative characteristics reveal multiple colorings of the plumage. In Vietnam, this exceptional diversity is well managed. The notion of breed is used to distinguish between the different genetic groups. In the area of Vietnam where our studies took place, four chicken breeds (Ri, Mia, Hmong and Choi) have been well defined. In Algeria and the DRC, however, local chickens are all put under the name of local breed (Tayazit n'tmourth or Djajs Beldi in Algeria and Sosso Batéké in the DRC).

The backyard chicken is of great socio-cultural, economic importance and consider as a secondary activity.

The exceptional genetic diversity observed is differently managed:

- Organized management in Vietnam (notion of breed);
- Anarchic management in the Congo and Algeria.

However, in Algeria and the DRC, it is possible to create one or many local breeds of chicken.

The main backyard chicken keeping constraints are logistic, food related and sanitary. Nevertheless, if breeds with peculiar organoleptic, esthetic or recreational qualities may be conserved on this basis, it must be stressed out that many local poultry breeds find their very usefulness in these constraints. If desired and possible, their alleviation would cause loss of biodiversity. Ex-situ conservation strategies might then be mobilized if the originality of the breed justifies such more expensive approaches.

V. CONCLUSION

The management of chicken biodiversity has to take place in diverse socio-economic and cultural contexts. Full account should be taken of these contexts in order to evaluate the feasibility and opportunity for in-situ conservation scheme. Where the context leads to the dismissal of in-situ conservation, appropriate ex-situ strategies should be mobilized.

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