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THE STRUCTURES OF BREEDING DAIRY CATTLE IN THE SAHARA: THE STATUS IN THE M'ZAB VALLEY (SOUTHERN ALGERIAN SHARA)

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ABSTRACT: The dairy milk sector is a strategic sector in the Algerian agriculture with 2.39 billion liters in 2009, 2.7 billion in 2010 and 2.93 billion in 2011. The milk collection reached 572 million liters in 2011. The enthusiasm for milk production in the M'zab valley led to the creation of many cattle farms. The objective of this study is to investigate the dairy cattle infrastructures and its impacts on milk production. The conducted through a questionnaire over 53 farms representing 57.7% of the exploitations in the M'zab valley. The results show that 25% of farms have mechanical means for milking (milking trolley) and that 92% of buildings are equipped with troughs in a poor condition and do not meet accepted standards. All farms surveyed practice stalls. 32.92% of the buildings are designed with unsuited materials (tin, zinc, shrubs trunks, etc.), 49.88% are designed with a blend of modern (blocks) and traditional (Reeds, Diss) materials, and 17.20% are built with hard poles, walls in cement mortar and asbestos cement roof. The sanitary and hygienic appearance is a function of investments, which are supported by state subsidies in the context of the promotion of the dairy industry. This investigation gave rise to a set of proposals for the upgrading and modernization of the dairy cattle infrastructures, which meet specific climatic conditions, in order to improve the quality and the quantity of milk production in the region of the M'zab Valley with specific climatic conditions.

Keywords: Dairy cattle exploitation, Equipment, Livestock building, Hygiene, Saharan region, Valley of M'zab

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INTRODUCTION

The dairy industry is a strategic sector of the Algerian agriculture, with 2.39 billion liters in 2009, 2.7 billion in 2010 and 2.93 billion in 2011 and a collection of milk from 572 million liters in 2011 (MADR, 2012). The craze for milk production in the valley of Mzab led to the creation of many cattle farms.

In dairy cattle farms, worldwide, it was found that the architecture of the barn plays a major functional role in dairy production, including providing comfort in the work of the farmer and avoiding stress livestock. Indeed, during the construction of a building, the question of its size is related to the size of the herd and the requirements of the race in terms of housing. Building a barn is a big investment for the farmer, but in view of its life, the constraints of the operating cash will fade as and when capital depreciation and due to the rapid return on investment.

In general, it is recognized that the success of breeding dairy cattle is based on the mastery of his technique driving through the components that are: feeding, reproduction, health, and modernized building. This allows the emergence of modern farming incorporating the principle rationality and sustainability which, logically, should result in better technical and economic performance because of the increased milk production potential.

Indeed, infrastructure (technical buildings) must conform to accepted standards to ensure the welfare of animals and improving working conditions (atmosphere and organization of work). The low level of technology and lack of knowledge of farmers, highlight management issues (Bouaboub, 2008).

Also, it should be noted that to ensure food quality and animal welfare, the hygiene is particularly important in environmental surfaces of barns (Hanna et al., 2010). All these environmental and organizational constraints are imposed on the cattle industry Maghreb and induce some challenges in terms of meeting the demand for all the operators concerned: government in the foreground, farmers and industrial milk (Srairi, 2008).

The region of the Valley Mzab has received significant funding for the program of development of the dairy cattle industry. However, these effects are not evaluated. Indeed, no study has been conducted to determine the status of dairy cattle in relation to the structures of the livestock in this area.

This study subjected to identify the current state of infrastructure of dairy cattle and analyze different practices and strategies in place to manage these cattle farms, in order to recommend actions for their upgrade to improve the quality and quantity of milk production in the region of the valley of Mzab.

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MATERIAL AND METHODS

In the current environment, the available data on cattle and their owners in the Saharan regions are elementary and fragmentary. Given the lack of data on the dairy cattle industry, the livestock and socio-economic surveys are now proving an essential tool to generate a significant amount of information about the industry to better appreciate its performance.

The approach taken in this study is based on survey of producers farmers, agricultural institutions and local authorities. For investigations us a sample of 53 cattle sheds was selected on a population of 101 mother stables (or 57.74% of the statistical community) divided the territories of seven (07) municipalities of the province of Ghardaia. The selection criteria for the basis of this selection are related to milk production potential:

- The size of the farm (heads ≥ 12);
- Speculation owner;
- The high production potential.

Summary data on the geographical distribution of the sample are presented in table 1.

Table 1 - The different farms selected for investigation			
Towns	Total number of cattle farms	Number of cattle farms surveyed	Percentage
Guerra	45	20	44.44
Berriane	10	6	60
Zelfana	13	7	53.84
El Atteuf	10	6	60
Bounoura	5	3	60
Daya BenDahoa	11	6	54.54
Ghardaia	7	5	71.42
Total	101	53	57.74
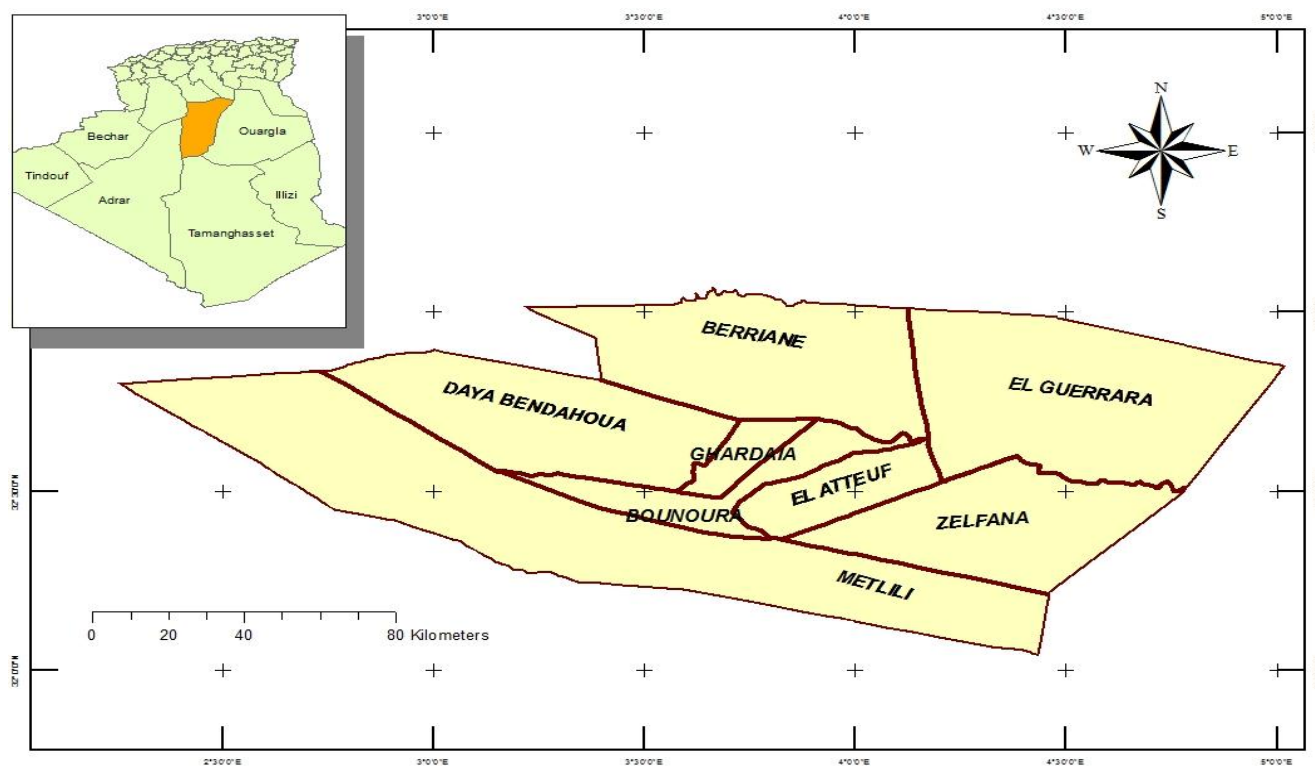
Figure 1. Geolocation of the study area

RESULTS AND DISCUSSION

During the investigation, the following items related to the quality of the buildings have been identified: the model of stable and age of infrastructure, building materials and flooring, the design of the building / rooms, furniture (feeders, drinkers, ..), mechanical means (trolley milking ..) and hygiene aspects.

Stable model and age of infrastructure

The barn is the most important parameter in the system of intensive dairy production.It appears from the survey that all stables visited are free stall. This model seems to be the benchmark in the area of the Valley Mzab.

The most popular is the stables with floor covered with straw. In this hot and dry region (with low humidity), it is possible to keep the animals in a barn sleeping areas composted - with a litter consisting of dried manure.

As noted Charron (1986), this mode provides little comfort barn animals, it causes difficulty calving and heat detection, and has repercussions on the health of the animals, which are generally dirtier.

Regarding the condition of buildings: 32.92% are in poor condition, 49.88% are in average condition and 17.20% are in good conditions (see Figure 02).

Animal load in the building is respected by all farmers. However, a living building for a possible adaptation of the production tool is not intended for farmers.
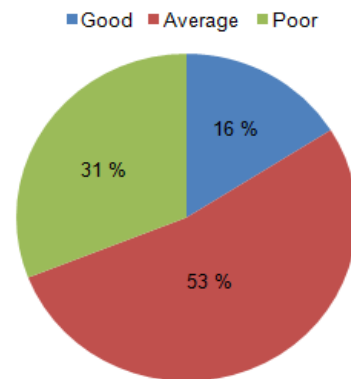

Figure 2. State farms surveyed buildings

Building Materials

The stables have surfaces ranging from 150 to 400 sqm. Most barns are built of granite stone with low ventilation conditions and without the possibility of mechanization to remove manure. They have a metal roof or dry palms to avoid sun exposure to rain. They are surrounded by wire fences and wood, or sometimes galvanized iron pipe.

Almost all the buildings (95%) have a surface composed of sand and are without litter. The few litters found consist of gorse and bracken. Stables have some part of their surface area paved. In the case of the presence of concrete slabs, cattle should not be on the bare concrete floors. Too hard floors can increase the incidence of injuries tail, swollen knees and hock abrasions.

But without a well built with good materials, essential parameter for efficient power management, cleaning and care of cows and calves building, the dairy industry can be a profitable business.

Building Design

Milking: A milking parlor should be comfortable for the milking and animal traits. Trafficking represents 50% of the time devoted to farming (DSA, 2012). The design of the milking parlor must enable efficient work and as comfortable as possible because it directly affects herd health, milk quality and farm profitability. In all farms visited the parlor is present. Its surface varies with the number of cows. On an average area of 3.5 m² it is isolated from the stable. The number of troughs is 5 to 10, constructed based cinderblock. It should be noted, in some stables without a waiting area for cows. It may be a temporary area defined not movable barriers.

Place food storage: All farms have a food premise (mainly concentrate). Most are in good condition (83%) and other (17%) in average condition. The surface of the deposit of food varies from 9 to 20 m². The building material is, in most cases block, but sometimes stone or clay are used.

Stall the bull: A stall consists of 6 m² useful area of straw per cow. The increase in animal density causes a decrease in the use of stalls and crowded hallways. Cubicles bulls differ from one farm to another. In 58% of farms, the bull is in a detached barn on an area of 9 to 16 m². In 37% of farms, it is attached to a corner of the barn. For the remaining operations (5%), the bull is always with cows. The housing conditions of the cows and the lack of space inside the barn, have a negative impact on economic performance, as well as the time and working conditions of farmers. Decrease of the surface, or the number of seats, also increases the risk of infections including breast lesions teat, microbisme.

Location projections: In 87% of the project takes place in the barn bull rarely in the building 13% of the cows. The cow in heat will be placed with the bull in his stall.

Room calving: In 88% of farmers, there being held in isolated rooms. In the rest of the farmers (12%), living calving is absent and there are places put in the stable, then used as a box for calves.

Room newborns: Newborns are collective boxes in all farms (100%). In 75% of farms are small rooms with surfaces ranging from 4 to 6 m² and 25% of cases, there are small semi-paved area surrounded by wooden fences or sheet. These boxes are used as stables for the calves in all farms (100%). This means that newborns are in their stables until the age of eight months on average for the bulls, or 14 months for heifers.

Desk: He noted the lack of an office in the barn to facilitate administrative tasks of the farmer, but also to optimize the management.

Furnisher

Furniture building is represented mainly by feeders and waterers small group.

Feeders

Drinkers are two types: A) Group: They are built either block, with a volume that differs from one farm to another, either based on galvanized sheets in the form of a half-cylinder with an opening of 40 to 60 cm and a length of 1, about 5-2 m. Are also found troughs made half a tube with a diameter / opening of 20 to 30 cm. The water in this type of drinkers tend to be quickly soiled (Kaouche et al., 2012). B) Automatic: modern metal, based

on aluminum, they have the shape of a hemisphere adhered to a tube where the water passes. Found, within the half-spheres, a movable plate which, driven by the stock of the animal, allows the water outlet.

Hygiene practices and prevention

The hygienic behavior includes hygiene of the building, healthy food, healthy watering the animals and maintains the treatment of major diseases encountered in the study area. Poor building design can generate health problems with significant negative economic impact, as well as the work of the farmer.

Health Building: The hygiene of the building is often poorly controlled. Only 12.82% of them have a good state of health, an average 38.46% and 48.71% hygienic condition ill hygiene. As mentioned Kaouche (2012), housing animals are cleaned to a variable operating frequency to another and depending on the season once a day in winter twice in summer, with detergents broad spectrum or only with water. At all farms, with the exception of four veterinary farmers who practice good hygiene, housing never disinfection, milking machines lying around on the ground, the animals receive brushing once or twice during summer and litter is renewed once every 30 to 80 days. In 90% of farms, cleaning is done manually, the organic material is stored a few meters from the building. Only 10% of farmers do mechanically. The manure is stored for sale or used for soil fertilization (organic fertilizer) Only 10% of farmers do mechanically. In 85% of farmers, cleaning is done irregularly during the year, when the thickness of the layer of manure reaches 15 cm. Only in 15% of operators it is frequently every month. The least popular tasks are those cleaning the milking parlor and barns, as well as trimming feet. As noted by Vallet (1981), under such conditions, the role of favorable thermal comfort straws disappears and they can instead become harmful by their microbial pollution that can cause diseases and mastitis podal.

Moreover, in most cases, the notion of building is only theoretical; stables are made of stone walls, no roof.

Healthy food: The concentrated power is distributed in troughs cinderblock. A large food waste is stored in 92% of farmers whose troughs are generally in average condition, especially for a lack of green fodder racks

Hygiene watering: Drinkers are basins block, half-tubes or modern metal troughs, which are not disinfected. In 92% of farms, the water is not renewed beyond the basins and creating a favorable environment for diseases. Among farmers who have automatic waterers (8%), the state of health of watering is good.

Animal Care: The state animal care differs from one farm to another. Herds of group Kharfi and BSIS, have relatively better than animals of other holdings which are often covered with mud and manure state.

Grazing animals can maintain a relatively good hooves, especially among farmers who feed crops under pivot. Washing the udder before milking is done at all breeders.

Prophylactic measures: It is necessary to emphasize the positive aspects of regular veterinary health action (semi-) associated with epidemiological investigations initiated locally to keep all epidemiological evidence to a satisfactory level. The results in visits to breeding establishments performed periodically to sensitize farmers on various aspects of their business: health, herd management, artificial insemination (Bensaha et al., 2012).

98% of farmers bring their animals to the vet in case of illness, others use traditional methods. All farmers (100%) reported having received one to two times a year, visiting the vet agricultural subdivision and have been vaccinated their cows. Vaccination of animals is carried out by the veterinary inspection management of agricultural services. Every six months, the agency made a blood sample and an injection of tuberculin for those who adhere to the program of the NADP and an annual vaccination against rabies and against FMD (Guerra, 2008).

Encountered major diseases and their treatments: The most common in the farms studied diseases are respiratory diseases and mastitis. There are also other such diseases, metritis, foot and mouth disease and lameness but at low intensities. In case of disease, breeders call the vet for treatment. According to our respondents and veterinary doctors, a certain number of diseases have been recorded (Table 2).

Table 2 - Major diseases and their treatments			
Diseases	Symptoms	Treatments	Drugs
Mastitis	Inflammation of the udder	Antiinflammatory	MASTIJET
Météorisations	Swelling of the rumen	Esophageal probe	–
Moths	Mushrooms	fungicides	Antibiotiques
Diarrhea	Acute diarrhea	Antibiotics	–
Infertility	Repeated abortions	–	–
Brucellosis	fever	Slaughter	–

CONCLUSION

Most studies on dairy cattle production focus on the production, nutrition, reproduction and welfare of animals because of the economic importance of these aspects both in regard to the dairy industry and breeding beef breeds. By cons, very few studies have examined the impact of buildings, facilities and their hygiene. However, effective management of livestock is incomplete without a well-designed building, well arranged and held. Failure to do so may affect the production level; additional charges apply for labor and limit the benefits of owner.

The maintenance and hygiene of cattle farms is complex, both for management and development actors and producers breeders. This is due to the complexity of strategies facing those responsible to implement the decrees raising and organization of facilities. This stable management should be based on consultation between

management and ranchers to remove all constraints on the improvement of milk production. It is only then that we can put these government interventions in sustainability.

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