

Characterization of milk production in the mesoregion of central amazon in the state of Amazonas

Caracterização da produção leiteira na mesorregião centro-amazonense no estado do Amazonas

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ABSTRACT

The objective of this study was to characterize the milk production in the central Amazonian region of the state of Amazonas. A questionnaire, consisting of objective questions, was applied to a sample of 50 properties located in the municipalities of Careiro da Várzea and Itacoatiara. The studied mesoregion develops an extensive dairy cattle breeding, where most of the producers have low schooling (60%), did not receive financing or financial incentive (70%) for the development of the dairy activity, nor are they engaged in associations or cooperatives (96%). Manual milking occurs in 100% of the analyzed properties, only once a day, with only 10% performing hygiene procedures in milking. The average production identified in the region was 3.5L/cow/day. The uncontrolled natural mount is the only way used in the reproductive management of the properties. The current production is diversified in cattle and bubaline mixed-race (90%). In this region all the owners make use of native pastures. This region develops an extensive dairy cattle ranching, and the efficiency of the production system is limited due to inadequate sanitary, reproductive and food management, which favors low animal productivity.

Keywords: Careiro da Várzea, Family agriculture, Itacoatiara, Milk production, Reproductive management.

RESUMO

O objetivo deste estudo foi caracterizar a produção leiteira na mesorregião centro amazonense do estado do Amazonas. Foi aplicado um questionário, constituído de questões objetivas, a uma amostra de 50 propriedades localizadas nos municípios de Careiro da Várzea e Itacoatiara. A mesorregião estudada desenvolve uma pecuária leiteira extensiva, onde a maioria dos produtores possui baixa escolaridade (60%), não receberam financiamento ou incentivo financeiro (70%) para o desenvolvimento da atividade leiteira e nem estão engajados em associações ou cooperativas (96%). A ordenha manual do leite ocorre em 100% das propriedades analisadas, uma única vez por dia, sendo que apenas (10%) realiza procedimento de higiene na ordenha. A produção média identificada na região foi de 3,5L/vaca/dia. A monta natural não controlada é a única forma utilizada no manejo reprodutivo das propriedades. A produção atual é diversificada em pecuária de animais bovinos e bubalinos mestiços (90%), nessa mesorregião todos os proprietários fazem uso de pastagens nativas. Essa mesorregião desenvolve uma pecuária leiteira extensiva, sendo a eficiência do sistema de produção limitado em decorrência do inadequado manejo sanitário, reprodutivo e alimentar, o que favorece a baixa produtividade animal.

Palavras-chave: Agricultura familiar, Careiro da Várzea, Itacoatiara, Manejo reprodutivo, Produção leiteira.

INTRODUCTION

In the Amazon, the growth of agriculture and cattle raising has occurred in an unplanned way. In order to populate the so-called demographic vacuums of the northern region in the 1970s and 1980s, the financial aid granted by the Brazilian government attracted and played an important role in stimulating these activities in the region. Today, however, the government's role does not seem to be as important as it was in the past, but despite this decrease in government resources, cattle raising in particular, is still in the process of expansion (SENA et al., 2013).

The state of Amazonas presents only 3% of the total number of bovines in the northern region, where a growth of 56.5% in the number of cows milked or in lactation was observed in the period from 1990 to 2006, while productivity decreased 21% in this period. In a more recent analysis (2006 to 2018) there was an increase of 15.7% in the number of

cows milked, while the production increased only 0.73%. (FARIAS, 2008; CARRERO et al., 2015, IBGE, 2019).

In this context, the state of Amazonas is characterized by insufficient production of dairy products to supply the domestic market, presenting a dairy activity, in its great majority, developed by small rural producers in a pasture system, who occupy areas that can be divided into two ecosystems: firm ground (non-flooded) and floodplain (periodically flooded areas). This makes milk production dependent on climate change, and management strategies are adopted according to the availability of pasture at each time of year, thus hindering productivity and consequently loss of profitability with production (TEIXEIRA, 2010; MOTA et al., 2012). The increase in this productivity depends on genetic, sanitary, environmental, and nutritional factors and their interactions, in addition to the level of knowledge of the cattle breeders (TEIXEIRA et al.,

2010; PATÊS et al., 2012). Thus, a regional study of the production chain in this region is justified to verify the types of animals used, the system adopted, and the health and food management in order to establish possible strategies and identify the factors that compromise the production of milk (MOTA et al., 2012). This study aimed to characterize the dairy activity in the municipalities of Careiro da Várzea which contributes with 26.8% and Itacoatiara with 11.1% of the milk production of the central Amazon region, addressing the productive, technological and health aspects in this region.

MATERIAL AND METHODS

The study was approved by the Human Ethics and Research Committee from Federal Institute of Science and Technology of Amazonas, protocol number 34017020.7.0000.8119. The study was conducted on 50 properties, of which 32 are located in the municipality of Careiro da Várzea and 18 of Itacoatiara (Figure 1). The data were obtained through semi-structured questionnaires applied to dairy farms, always with the same researcher, in order to reduce interpretation errors.

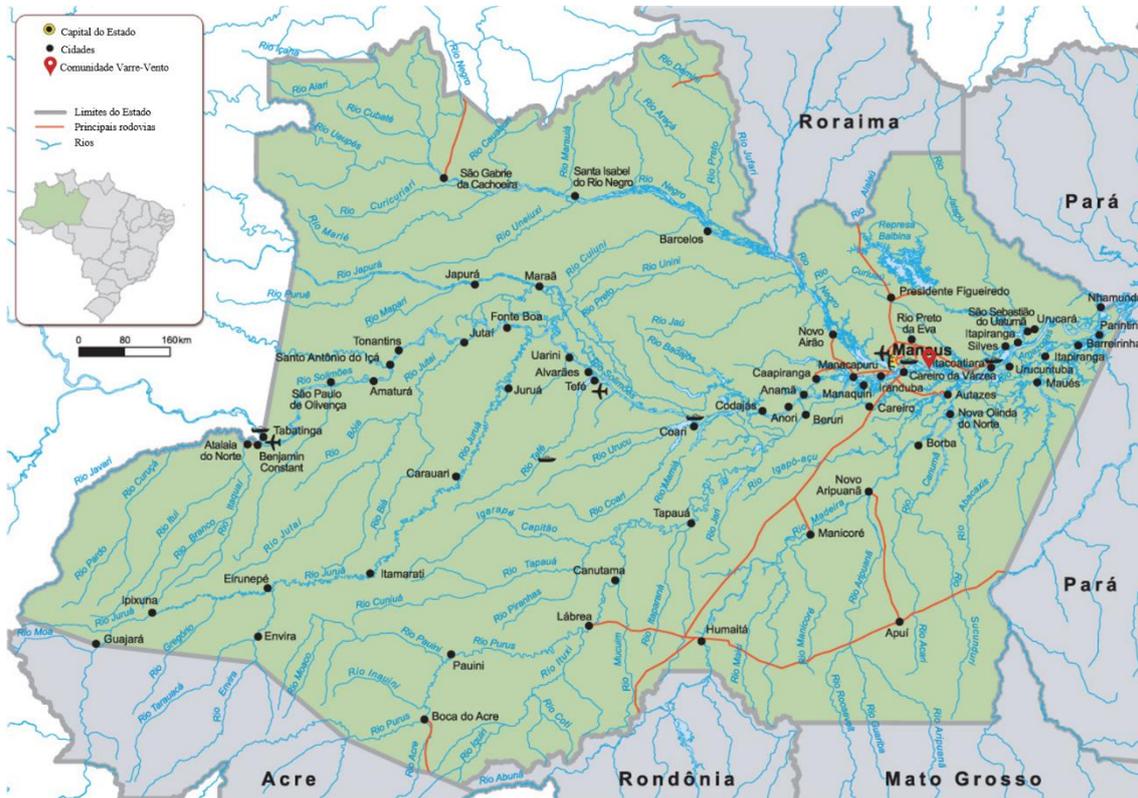


Figure 1. Location of the community Varre-vento municipality of Careiro da Várzea

The questionnaire addressed 12 points, totaling 65 questions:

- Identification of the property (1st – degree of schooling (%); 2nd – Has equipment with neighbors, such as mechanical milking machine, expansion

tank, crusher, and others (%); 3rd – It is associated with some cooperative or association (%); 4th – Children in the activity (%); 5th – Dedication to the business (%), divided in total and partial; 6th – Professional branch parallel to

livestock (%); 7th – Obtaining information (%), divided in books, lectures, internet, and conversations with others; 8th – Persons who manage the farm (%), divided in producer, son and manager).

- Questions related to the activity (9th – Types of animals raised (%) divided into pure and mixed animals; 10th – Objective of production (%), divided into milk, matrixes/producers and cutting; 11th – Received incentive to start the business (%); 12th – What the producer considers a problem (%), divided into credit, technical assistance, and infrastructure (road, electricity); 13th – What kind of technology is considered necessary to improve the herd productivity (%), divided in artificial insemination, expansion tank, nutrition, animal improvement, and others; 14th – Received some credit (financing) (%); 15th – If you had a financing line you would increase the herd (%); 16th Production of cow milk/day.

- Labor (17th – Labor in production (%), divided into producer, son, employees, and others; 18th – remunerates the milker (%); 19th – signs job contract; 20th – Technical assistance in cattle farming (%).

- Farm infrastructure (21st – Has a warehouse (%); 22nd – Has a corral (%); 23rd – Has a stable (%); 24th – Has energy (%); 25th – Has animal traction (%); 26th – Tractor (%); 27th – Computer/internet (%)).- Land use (28th – Has pasture area (%); 29th – Has forage grass (%); 30th – Has reserve (%); 31st – Takes the animals to the floodplain (%); 32nd – Soil analysis (%); 33rd – Performs fertilization (%); 34th – Rotation of pasture (%), 35th – Uses the native pasture (%); 36th – Performs mowing (%) divided into manual and mechanical; 37th – Weed control (%)).

- Supplementation (38th – Hay (%); 39th – Concentrate (%); 40th – Silage (%); 41th – Mineralization (%)).

- Animal inventory (42nd – Size of the herd (%), divided into bubaline and bovine).

- Management of the animals (43rd – Management of the newborn (%) divided into vermifugation, navel healing, and administration of colostrum; 44th – Pike/fence to separate the calves (%); 45th – Feeding system (%), divided into natural and artificial; 46th – How and when weaning is carried out (%), divided by weight and age; 47th – Dishorns (%); 48th – Castration (%).

- Zootechnical control (49th – Take notes (%), divided in animal birth, vaccination and vermifugation day, and animal weight; 50th – Take notes on economic control (%).

- Milking system (51st – Milking system (%), divided into mechanical and manual; 52nd – How many milkings/day (%) divided into one or two; 53rd – Where milking is carried out (%), divided into corral, milking parlor, and stable; 54th – Milking hygiene and/or mastitis diagnostic test (%), divided into teat washing, pre-dipping (H₂O chlorinated), screened mug, CMT (California Mastitis Test), post-dipping (Iodine), none; 55th – Treat/separate cows positive for mastitis (%)).

-Health practices (56th – Performs vaccines (%), divided into brucellosis, foot-and-mouth, rabies and clostridiosis; 57th – Performs tests (%), divided into brucellosis, foot-and-mouth, test for ketosis; 58th – Maternity paddocks (%); 59th – Uses quarantine method (%); 60th – Most common diseases in the herd (%); 61st – Fate of the dead animal on the property (%), divided into burial, burning and play in the river; 62nd – Uses endoparasiticide (%); 63rd – Uses ectoparasiticide (%); 64th – Uses endectocides (%)).

- Reproductive Management (65th – Reproductive Management (%), divided into artificial insemination, fixed time artificial insemination, embryo transfer, controlled natural mount, and natural mount.

The information obtained was tabulated, where a spreadsheet with the desirable variables was developed to meet the objectives. The data went through a descriptive analysis and were systematized in graphs and tables.

RESULTS AND DISCUSSION

This study showed that the Mesoregion Central-Amazon develops extensive

family dairy farming (96%), where most of the producers have low schooling, did not receive financing or financial incentive (70%) for the development of dairy activities, and do not participate in associations or cooperatives (96%). The lack of financial incentive combined with the low financial condition and schooling level of the producers contribute to the low productivity of the herd, since people with lower schooling levels usually have greater difficulty in accepting new technologies and assimilate information related to management practice (OLIVEIRA et al., 2013).

Table 1. Degree of schooling of dairy farm owners in the Central-Amazon region in the State of Amazonas.

| Schooling | Number of producers | Percentage (%) |
|------------------------------|---------------------|----------------|
| Illiterate | 4 | 8% |
| Complete Elementary School | 1 | 2% |
| Incomplete Elementary School | 30 | 60% |
| Complete High School | 14 | 28% |
| Complete Higher Education | 1 | 2% |

The producers work and develop their activities with their own resources. They do not have any organization, association or cooperation, which would enable a better organization, because associativism is a form of organization that brings benefits, such as better product prices, transformation of individual investments into collective, and search for specialization in the activity (FARIAS, 2008; GALANTE; COSTA, 2008)

The properties are managed only by men between 30 and 70 years of age. According to Magalhães (2009), men participation in the activity is predominant, despite the participation of

women in dairy production; however, when it comes to management and professionalization, men are the ones who most participate in courses and training. The dairy activity in this area has been conducted by people with relatively more advanced age, which may be related to the low interest of young people in the conduction and succession of the activity, since only 44% of the properties have participation of their children in the activity. Farias (2008) considers that the low participation of children in the business, may occur because they consider the activity tiring, without the right to vacation, rest, weekend and low income

generation. Although 62% of producers dedicate themselves only to milk production, 38% of producers complement their income with other sources, developing activities mainly related to fishing, since the development of milk production does not pay all the expenses of the property.

The constitution of the herd in this micro-region is based on the breeding of crossbred zebu cattle (90%). This characteristic is observed in other areas of the northern region, such as Parintins (MOTA et al., 2012), Rondon do Pará, and Abel Figueiredo (SOARES et al., 2013) and in the northeast of Pará (FARIAS, 2008) due to the climatic characteristics of the region.

Most producers reported that they consider a problem in production, the lack of infrastructure (road, facilities), followed by technical assistance (42%), and consider that animal breeding (58%), nutrition (32%) and artificial insemination (10%) would be technologies that would help improve production. The properties studied have no specialized technical assistance, and the information is received and transmitted mainly through conversations with other owners. Technical assistance in these areas is considered to be fundamentally important to improve productivity, since the absence of professionals with knowledge in the area prevents the exchange of knowledge and information on dairy production between producer and technician, in addition to the implementation of technologies and management that would enable innovation (BAZOTTI et al., 2012; PATÊS et al., 2012).

The workforce on the properties is predominantly family (78%), and milkers (68%) are usually paid, but do not receive labor rights. The association between low schooling, age group of

producers and lack of technical assistance is related to low access to knowledge and the difficulty of adapting to the technological transformations that occur in the agroindustrial milk system (FARIAS, 2008).

Regarding the infrastructure, most of the owners have a shed for storage of inputs (98%), corral (84%) and total access to electricity (100%). Rural electrification is an important factor of human, economic and social development, which allows the producer more comfort, access to the means of communication, mechanization of production, and consequent improvement in productivity (CRUZ et al., 2004; FARIAS, 2008). However, what you notice is that in these areas the information is not reaching these producers through the usual means of communication or technical assistance, since the majority informed that personal communication is the most common form of information exchange (76%).

In this region all the owners make use of native pastures, without the majority of the properties having forage grass (66%). In this area of study, as is characteristic of the Amazon region in the drought season (July to December), the animals are conducted to the floodplain areas (96%). Farias et al. (2008), in a study in the Parintins micro-region, observed that all the owners made use of pastures, but those with higher production cultivated grass for food supply during the dry season. In the studied micro-region, the nonuse of forage grass can be justified due to the conduction of the animals from this area to the floodplains during the dry season, because this area has food.

Regarding soil use, most of the producers do not analyze the soil (80%), fertilization (78%), and the control of weeds is based on rubbing (22%). According to Gonçalves et al. (2005), the

northern region has great potential for the development of milk production; however, it is necessary to plant pastures and choose adequate fodder and management of these areas, through the use of adduction, since they are soils poor in phosphorus.

The owners make supplementation with mineral salt (100%); however, the supplementation with concentrate (10%) is minimal and silage is absent. Animals raised on pasture do not receive all the necessary minerals, and the offer of mineral supplementation is important (TOKARNIA; DÖBEREINER and PEIXOTO, 2000). Contrary to the expected, most owners offer the animals a complete mineral mixture differently from that observed in other regions that offer only pure NaCl, with no addition of other minerals (MOTA et al., 2012). A study conducted in the city of Santarém (PA) showed that although the producers perform the mineral supplementation, the mixtures are deficient in phosphorus, an essential element for the productivity of the animals (MINERVINO, ORTOLANI; CARDOSO, 2008). As the animals are raised extensively, the use of concentrated feed is minimal in these productions, as observed by MOTA et al. (2012).

Regarding zootechnical and economic control, it was observed that the owners make notes on animal birth dates (74%), vaccinations and deworming (88%), but do not make animal weight control (98%) and economic control (78%). Zootechnical and economic control is an important management tool, because the absence of this tool limits the growth of the activity, since the zootechnical and economic management is important to keep the cash flow stable, besides a more accurate analysis of costs and its components, aiming to raise the profitability rates on rural properties (VIANA, 2006, FARIAS, 2008).

According to Oliveira et al. (2001), there are few properties that perform economic analysis, so they do not know their production costs. Thus, the lack of reliable information leads producers to make wrong decisions, because these decisions are based only on experience and tradition in business conduction.

Milking on the studied properties is performed manually in the barn only once a day, in the morning; nevertheless, milking hygiene and mastitis diagnosis procedures, such as teat washing (10%) and use of a screened mug (18%), are minimal. This reality reflects the low milk production in the region, which prevents the purchase of a milking machine and the availability of cheap labor for milking (PATÊS et al., 2012); therefore, producers choose lower cost facilities, since they do not have financial capital for the establishment of milking parlors.

Among the appropriate procedures for milking there is the need for a clean room, separation of cows with clinical or chronic subclinical mastitis for further milking, calm cow management, pre-dipping, daily Black Background Mug Test for identification of clinical mastitis, monthly California Mastitis Test (CMT) for the detection of subclinical mastitis, post-dipping, and feeding of animals after milking (ZANELA et al., 2006).

The properties have mixed breeding, with the existence of cattle, mainly associated with the breeding of dairy/meat buffalo, followed by horses and, to a lesser extent, small ruminants. The average production identified in the mesoregion was 3.5L/cow/day. It was reported by the owners that the production in the dry period decreases, although the animals are directed to the floodplain areas, where there is native pasture for animal consumption. Milk production was similar to that observed

by Mota et al. (2012) in the Parintins region. In the region studied the milk is

mainly intended for the production of artisanal cheese (rennet).

Table 2. Number of bovines and bubalines found in Careiro da Várzea and Itacoatiara micro-region

| Category | Bubalines | Bovines |
|--------------|--------------|--------------|
| Breeders | 36 | 59 |
| Matrixes | 894 | 1,326 |
| Steers | 645 | 854 |
| Heifers | 591 | 1,286 |
| Calves | 622 | 1,767 |
| Total | 2,788 | 5,292 |

In relation to the sanitary management it was detected that the owners make vaccination for brucellosis (100%) and foot-and-mouth disease (100%); however, few producers make vaccination for rabies (30%) and examination for tuberculosis (20%) and brucellosis (36%). Vaccination for foot-and-mouth disease and brucellosis is performed in all farms, probably due to the obligation of these vaccines by the national programs of prevention of foot-and-mouth disease and brucellosis (MOTA et al., 2012). Few producers use exams as a tool to identify diseases, but adequate sanitary management through the application of vaccines is possible to prevent, control, and even eradicate diseases (BANAI, 2002; WATERS et al., 2012).

According to the owners, the most common diseases in the herd are mastitis, followed by diarrhea in calves, plant poisoning, hoof diseases, and tympanism. Because it is a dairy area where health management is poor during milking, the occurrence of mastitis is an expected problem, as is diarrhea in calves, as observed by Patês et al. (2012). Intoxications are recurrent observations in these areas, which have *Palicourea marcgravii* in areas of firm ground and *Arrabidaea bilabiata* in areas of

floodplain, which cause sudden death in animals (TORKARNIA et al., 2007).

Most owners do not quarantine when the animals arrive at the property (88%), and usually discard the carcasses of dead animals in rivers (40%) or bury (24%). Quarantine is an advisable procedure that prevents contamination of the herd by animals from other properties, reducing sanitary problems. The practice of discarding carcasses in rivers is common in the region studied, since rivers have a large volume of water and take these carcasses to remote areas; however, the disposal of carcasses of dead animals in rivers promotes water contamination; therefore, incineration or burial of carcasses is indicated in these areas.

Regarding parasite control, owners use ectoparasiticides (100%) and endectocides (Doramectin and Ivomectin). Well organized health management is essential for preventing some diseases, in addition to avoiding losses for the producer (PATÊS et al., 2012). It was observed that 94% of the owners have facilities for calves, and breastfeeding is done naturally (94%), and age (94%) is the factor of choice at weaning. Individual or collective hutches are important to avoid agglomeration of animals, decrease the

transmission of diseases and facilitate local hygiene (PATÊS et al., 2012).

The uncontrolled natural mount is the only form used in the reproductive management of the properties (100%). The non-use of artificial insemination hinders the genetic improvement of the herd, obtaining animals with greater potential for production and reproduction (DANTAS et al., 2014).

CONCLUSION

The Mesoregion of Central-Amazon develops an extensive family dairy farming, where the majority of producers have low schooling, and the efficiency of the milk production system is limited due to inadequate sanitary, reproductive and food management, which favors low animal productivity, as well as the low dairy aptitude of the herd and the low technological level applied.

The production system of this mesoregion is fragile, with low levels of production and productivity; therefore, the implementation of public policies to improve the development of the activity is necessary.

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