

■ Scientific programme

SESSION A Monday, August 18

Key Note Lecture

Animal Housing and Management - Prevention of Bovine Diseases

Dr. *Olav ØSTERÅS*, Norway

SHORT PAPERS:

Effect of housing on animal behaviour, health and production of heifers in commercial dairy herds

J. SØRENSEN et al., Danmark

Critical points related to housing and management in control programmes for calf morbidity and mortality in French dairy herds

C. FOURICHON et al., France

Validation of a new method of oestrus detection in daily dairy practice

L. HERES et al., The Netherlands

Housing factors associated with mastitis in heifers

O. ØSTERÅS et al., Norway

The effect of housing on the probability of heifer calves contracting respiratory disease during the first three months of life

A-M. VIRTALA et al., Finland

Roof ventilation in the prevention of pneumonia in fattening calves

A. ASAJ, Croatia

The use of cow trainers in Norwegian dairy herds and the effect on health and milk quality

K. E. BØE et al., Norway

Cattle health and public wellbeing in frontier areas of the Brazilian Amazon

H. D. LAU et al., Brazil

Influence of the cafi immunomodulator preparation on indices of erythro- and limphopoiesis of calves reared in the zone of strict radiation control

V. MALINA et al., Ukraine

Studies on microclimate parameters of cattle barn and on microscopic fungi and their biological traits

B. BAKUTIS et al., Lithuania

Influence of some factors on subclinical mastitis incidence in cows at large farms

A. E. BOLGOV et al., Russia

Feeding during dry period and body condition score (BCS) at calving.

Influence on calving ease and post partum health of dairy cows

J. E. MITEV et al., Bulgaria



CATTLE HEALTH AND PUBLIC WELL-BEING IN FRONTIER AREAS OF THE BRAZILIAN AMAZON

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Summary

As preliminary results of a research program on animal production in agriculture frontier of Eastern Brazilian Amazon county of Uruará, the authors show the role of the cattle husbandry in the small holders production systems and the importance of animal health in the sustainability of agriculture frontier through the effects on the cattle productivity. As far as animal health, zoonose diseases, specially brucellosis, are a real critical problem because they are directly related to public well-being. A participative approach with a effective relationship between researchers and farmer organizations has allowed to carry out a zoonose control program and to develop actions towards the increasing of the cattle productivity, as the installation of small factories for processing mineral mixtures and a veterinary vaccination center.

Introduction

The present bovine spongiform encephalite disease out break in Europe rises the real problem of the relations between cattle health and public well-being. In developing countries, the systematic control and eradication programs carried out by veterinary service during the last forty years have allowed to reduce, and some times to eliminate, the incidence of the zoonose diseases and thus to get rid of their main effects on public health. In the same time, many countries of the Third World have not had the financial resources and the political measures to realize equivalent control programs. So, in present time, the zoonoses continue to be a serious problem in many countries through the impacts in human health and cattle productivity.

Although being an old and always developed activity in the natural savannah of Brazilian Amazon, specially in Marajo island and in Low Amazon region, cattle husbandry is a new activity in the agriculture frontiers of Brazilian Amazon, whose colonization began at the end of the sixties. In the agriculture frontiers of South of Para and Paragominas region, cattle husbandry was the main land-use of this colonization through the creation of latifundium ranching farms. The colonization process was different in the Transamazonic region, where the production system was based on the annual crops (rice, corn, bean and cassava) for local human consumption and perennial crops like cocoa, coffee and black pepper (Walker & Homma, 1995). However, in the last years, cattle husbandry exploitation has being increased, specially in small holders farms (Veiga & Tourrand, 1996).

The new interest of the Agricultural Research Center of Eastern Brazilian Amazon (EMBRAPA-CPATU) for the small holders production systems, called family agriculture, answered to a political concern in increasing the life conditions of rural people to stabilize the Amazon frontiers and to reduce the pression on the main rain forest in the world (Tourrand & Veiga, 1996). So, the control of animal diseases affecting the cattle husbandry productivity and the human health is an important factor in searching of the sustainable family agriculture. A research program about animal health began in 1995, and specific research program about zoonoses is planned for the end of 1997. Starting with a description of the role of cattle husbandry in the farming of small holders in the Transamazonic region and with the presentation of the first results obtained at the present time, this paper present the importance of animal health in the family agriculture, its main effects on public well-being and cattle productivity, specially brucellosis, and the veterinary control system elaborated by farmer organizations with local resources.

Material and methods

Three surveys were realized between 1994 and 1996 to see the importance of cattle husbandry in agricultural farming systems, to estimate the cattle productivity and to identify the main animal health problems. In the first survey, approximately 150 representative small holders farms were investigated through a questionnaire, where the main characteristics of farming system were inquired. So, for each farm, informations on history, composition and organization of the family, annual and perennial crop systems and animal production systems are collected. This survey has allowed to accomplished a first diagnostic of the family agriculture in the Transamazonic region. A typology of the agricultural farming systems were elaborated with multivariable analysis. The second survey, which began at the end of 1995, comprises monthly visits to 20 representative farms of the precedent typology. In these farms, all the horned cattle have been identified with auricular rings and a cattle husbandry book help the farmer to record all the new events about his herd management, like birth, animal saling and purchasing, death and disease occurrence, for example. During the monthly visit, these informations are recovered by a technician of the research program. They will allow to estimate the cattle productivity and the importance of the main management factors. Although the complete analysis of this second survey is not done yet, the preliminary results have shown the very high abortion rate and the importance of calf diseases. So, the third survey was carried out to estimate the incidence of brucellosis and, at the same time, the incidence of tuberculosis, specially in the production farms. A limited number of brucellosis tests were done by Sero-Agglutinin and Card Test. About 380 animals of nine farms were tested. For tuberculosis, the comparative subcutaneous test was used on approximately 600 animals in the same farms.

As first results of these surveys, it was possible to begin some development actions, which have been discussed in a collaborative research program including researchers, farmer associations and public and private institutions.

Results and Discuss

1. Cattle husbandry is a relevant component of the farming systems

In a typical regional farm, the forestal reserve covers about 60 % of the area, showing that deforestation obeys the limit allowed by law which is 50 %. The low value of secondary vegetation (7 %) is the result of short or absence of fallow periods, once the pasture is established one or two years after the annual crops in the predominant pattern of land use. Therefore, the average proportion of area covered by pastures is 26 % of the total area, or 64 % of the deforested land, highest value among all production system components. Annual and perennial crops cover about 3 % and 4 %, respectively. However, this result hides a great diversity of the properties and a regional trend, in which generally older farms, located closer the main road have higher percentage of open land than those more recent and located far in the secondary roads. In terms of frequency, the most important components of the production systems are : cattle ranching (99 %), annual crops (93 %), pigs and poultry raising (88 %) and perennial crops (80 %). So, diversification of production system plays an important role in familiar farms reducing risks of total losses, making better use of labour and getting better use of natural resources by integration of crops and animals, basis of integrated agriculture (Veiga & Hebette, 1992).

Approximately 76 % of small holders have horned cattle. In the other cases, farmers have pastures but not cattle yet, and most of them are planning to buy it soon. The herd size is from 10 to 25 heads by farm with an average of 20. In fact, 17 % of the farms have less than 10 heads and 37 % between 10 and 50 heads, meaning that half of the herds has less than 50 heads, featuring small production systems. On the other hand, only 5 % of the farms have more than 500 heads. The herd structure suggests that the aim of the systems is to sell calves between 7-8 and 18 months of age. Herd average composition is 9 cows, 1 bull, 4 heifers, 2 steers and 4 suckling calves. This composition confirms the trend of selling young animals. The genetic pattern of the herds suggests a production system based on milk production, (Tourrand *et al.*, 1997). In 39 % of the farms, zebu and European cross breeds predominate. Nelore breed dominant in the whole country, is present in 22 % of the farms. As this genetic group dominates in all large farms, which have 70-80 % of the cattle of the region, it can be concluded that Nelore is the most representative breed of the region population. However, European breeds like Holstein and Brown Schwitz and zebu breeds like Gir and Indubrasil are more common, in terms of frequency in the farms. About 60 % of small holders are running a milk production system, but only 12 % sell a part of this production (milk or cheese), the others use it for family consumption.

Beside its importance in the regional land use, the cattle husbandry have an important role in the economy of small holder production systems. In the first place, in the Transamazonian region, household savings and milk production for family consumption are two basic roles of cattle husbandry in the family agriculture, according to Lhoste *et al.* (1993). Tourrand *et al.* (1996) observed a low cattle productivity, about US\$ 40 per hectare and US\$ 115 per cow, respectively. However, due to minor labour needs for cattle management, man power productivity appears to be higher when compared to other agricultural activities. The high flexibility in saling, compared to crop products, also contributes significantly to

the strong cattle dynamic in the Transamazonic region and in whole Eastern Amazon (Hamelin, 1991 / Léna, 1992). An other function of cattle husbandry is the possibility to invest profits from others components of production systems. For example, profits from perennial crops represent the main source of capital for cattle purchasing in the small farms of the region. Several authors have already noticed this process, also with annual crops, in other agricultural frontiers of Eastern Amazon, like Southern Para (Reynal *et al*, 1995) and Bragantina region (Billot, 1995). However, in the Eastern Amazon, investments in cattle ranching are made to increase land value through the pasture establishment. Depending the farm location, one hectare of well established pasture worths from three to five times more than one hectare of fallow, and from five to ten times more than one hectare of natural forest. This difference in land value means that, in agricultural frontier, the pasture established in association to annual crops which cover its initial costs, is an investment of farmer labour. Thus, the great importance of cattle husbandry in small farms explains the interest of the farmers to improve its productivity.

2. Mineral nutrition and animal health are the two main cattle problems

The first survey showed the deficiency of mineral supplementation, in qualitative and quantitative terms. About 40 % of the farmers did not supply any mineral supplementation (Veiga *et al.*, 1989). Half of the farmers supply salt alone, and only 10 % use mineral mixtures which contain salt and others mineral ingredients. Generally, the mixtures are not appropriate to the local cattle needs (Veiga *et al.*, 1996). For example, in approximately all mixtures, phosphorus is frequently very low, although it is the most deficient mineral element in soils and forages of Amazon basin. In the other hand, large quantities of mineral elements, not so deficient in the region, like sodium, chlorine and iron, were furnished. In fact, the percentage of the most expensive mineral elements are generally the lowest, and the percentage of the cheapest are mainly the highest. However, the mineral nutrition is directly related to cattle productivity in the region, particularly the reproduction rate, the growth of young animals, the resistance to diseases and the development of the heifers. Nevertheless, the main problem about mineral nutrition appears to be the lack knowledge of mineral cattle nutrition by the farmers. So, most of the farmers do not use any mineral supplementation or use inadequate commercial mixtures for the local conditions.

As far as animal health is concerned, the brucellosis appears to be one of the most critical diseases, since about 12 % of the tests have been positive, confirming the importance of this zoonose in the Transamazonic region, like in others regions of Eastern Amazon (Lau & Singh, 1986). The first results allow to estimate the abortion rate of about 10 %, and 33 % of farmers reported one or several cases of abortion occurrence in their farms. According to the farmers, cases of retention of fetal placenta are very common. It was not observed a higher frequency of chronic endometritis. In the same way, the cases of articular hygromas and arthritis are not very frequent. As dairy cattle comprises a large part of the sample, it is easy to understand the gravity of the brucellosis in human health in the Transamazonic region. However, the presence of the brucellosis in the region seems to be old, probably since the beginning of the colonization with the first entries of bovin

cattle from the regions of the South of Brazil in the seventy years. Now, the high demand of dams and sires by the family agriculture involves a stronger bovine traffic into the regions, increases again the importation of not controlled animals from the South of the country, and so promotes the dissemination of brucellosis. Like the mineral nutrition, the lack of knowledge of brucellosis by the small farmers and the absence of correct vaccines, although Brazil being the second market of veterinary products in the world, explain the present importance of this disease in the Transamazonic region.

No case of tuberculosis has been detected in the tested samples of approximately 600 adult bovines and in some slaughter-houses of the Transamazonic region, although this disease is common in bufaloes farms, specially in savannah ecosystems of Eastern Amazon, like Marajo Island. Among the others infectious diseases which occur in Transamazonic region, the apthous fever and the symptomatic carbuncle are the more frequent.

During the surveys, it was observed that the colibacillosis and the salmonellosis, consequence of a gerally deficient hygienic conditions, are the main causes of calves death, whose the effect on cattle productivity is very critical considering the role of young animals in the small holders economy. Ticks are more frequent in dairy herds with a higher proportion of European blood, and rarely are controlled by the farmers. Toxic plants are of main concern, mainly *cafezinho* or *vick* (*Palicourea marcgravii*). About 62 % of the farmers consider this plant as the main cause of animal death, although a great part of them are not able to differ *cafezinho* from an other similar non-toxic plant. *Lantana* (*Lantana camara*) is an other toxic plant responsible of animal health problems, specially photosensibilization injuries.

3. Training and farmers organization are the priorities to improve animal health

Due to the absence of a mineral mixture adequat to the Transamazonic region available in the local market and the possibility of making one with all appropriated ingredients bought directly from southern dealers, some farmers decided to install, with technical support of the project, two small factories for processing mineral mixture to satisfy the producers demand. In the same way, some effort is being done to train farmers through several workshops and field-days. After 18 months, the two main qualitative responses of mineral nutrition program reported by the farmers are the strong improvement of calves health and the reduction in the use of veterinary products.

After the first experience with the mineral nutrition, the associations of farmers decided to create and manage a veterinary vaccines center, also with technical support of researchers. Now, this center sales part of the necessary vaccines for the cattle of whole Transamazonic region. Like in the case of the mineral ingredients, the vaccines are bought from veterinary dealers of the South of Brazil. A rigid control of the temperature during the travel between the factory and the center, and during the stocking allow to keep the good quality of the vaccines. So, after five months, about 800 brucellosis vaccines and 5.000 apthous fever vaccines were purchase by small holders. During the field-days and workshops about mineral nutrition, some time is reserved for topics on animal health, specially vaccination and basic calves cares.

A control program of the brucellosis was elaborated according to the economic conditions of the farmers and their associations. At first time, a booklet about brucellosis was written and distributed to the farmers (around 2.000 copies). During the meetings, after the discussion with the farmers about brucellosis, a program controlling brucellosis is proposed and explained. Basically, a farmer has three possibilities of being grouped : A, B and C.

- In the group A, called the paradise, 1/ a brucellosis test will be done on all bovines of the farm, and the positive animal must be sold. 2/ The farmer will vaccinate all the female calves between three and eight months old. 3/ All the bovines entering into the farm, will be negative tested, except the vaccinated ones. This group is on the right way to be free of brucellosis.

- In the group B, called the purgatory, the farmer will follow the second and the third conditions, will vaccinate all the female calves and will make a serious control with the animals entering into the herd. The farms of this group may be free of brucellosis in seven or eight years.

- In the group C, called the hell, the farmer will wait for better time the future to begin to attack the brucellosis problem. For this group, the bet of the control program is the pressure of neighbours that will bind the farmer to choose quickly the A or B groups.

To improve this program, it is planned a control of the animals traffic along the Transamazonian road by the veterinary service, supported by the farmers organization and the city government.

Although the quality of this control program of brucellosis is not excellent, it presents some advantages, specially the low cost. An other positive aspect of this approach with a great involvement of the farmers associations is the relationship between the farmers and the researchers through a participative research approach. After these first experiences on mineral nutrition and veterinary vaccinations, it was decided to begin a large program about animal health and public well-being. This program will deal with the more common zoonoses in the region as brucellosis, rage, tuberculosis and leptospirosis, and the set of the transmissible diseases through the food products.

Conclusion

In Brazil, the second place in size of the cattle herd and amount of veterinary market, there is a large new-colonized regions in Amazon basin, called agriculture frontiers, where cattle husbandry presents at the same time a very strong dynamic and an critical absence of technical support by the public services. In these regions, the deficiency in adoption of basic rules in animal health explain a part of the low cattle productivity and increase the risk of transmission to the human. Training of farmers about animal health and strength of

producers associations appear to be the unique possible solution without strong financial support.

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