



EMBRAPA

EMPRESA BRASILEIRA DE PESQUISA AGROPECUÁRIA

CONSULTANT REPORT

PROJETO NACIONAL DE BOVINOS

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BRAZIL

Report by

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and

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Objectives:

- (1) To specifically study and observe "cara inchada" in cattle for the purpose of identifying its etiology and discussing research for its prevention.
- (2) To assist the National Cattle Project in developing a mineral research program.

Methods of Procedure:

We arrived in Brasilia the morning of June 27 and checked into Hotel Das Nações. Reviews of National Cattle Research Program were given by Dr. Richard Houser, Dr. Donald Hargrove, Dr. Tony Jilek, Dr. Jose Mendes Barcellos and Dr. Wayne Kussow. The need for additional long-term U.S. staff for the National Cattle Project was stressed. The five unfilled positions are forage management, range management, forage plant physiology, forage seed production and technology and production agricultural economics. Dr. Jurgen Döbereiner presented a seminar on "cara inchada". Specific problems of pasture and soils were discussed with Henrique Lopes, Ivan Valadão Rosa, George Naderman and Russell Yost. In discussing soil differences between cara inchada and non-cara inchada areas, Dr. Naderman noted that Alfredo Lopez of North Carolina State had done considerable soil analyses in selected areas of Brazil and that we might write to him for some of his data.

A two day visit to the Pires do Rio area was made to observe cara inchada. Several animals were observed with the problem and teeth, jaw bone, rib and liver samples were obtained for chemical analyses. Also, it was learned that there was a slaughterhouse in Pires do Rio and within 45 days there would be one in Goiania. This information was valuable in regards to obtaining liver and blood samples for future mineral research.

Thursday night (July 4, 1974) we returned to Brasilia from Pires do Rio and Friday held more talks with Drs. Houser, Hargrove and Jilek. It was noted that the National Cattle Project in Brasilia will be the national center for both beef cattle and forages. The center will have the following responsibilities:

- (1) Generate and conduct beef cattle research in all areas of the country.
- (2) Coordinate all research for satellite experiment stations.
- (3) Training in applied research techniques. To start out there will be six satellite experiment stations. Within the next five years 1600 individuals will be trained at the M.S. level.

Friday night we had supper with Armando Primo and his family. Armando is working with a development bank, which is making loans to farmers. We discussed the forage experiments that Armando would be doing with the National Cattle Project. Armando said he would have copies of his proposed research for Dr. Mott to check prior to our departure for Florida.

Saturday morning, July 6, 1974, Dr. Houser, Dr. Döbereiner, Ivan Rosa, the driver and ourselves departed by car for the town of Rondonopolis in Mato Grosso. This is the region where cara inchada is reported to be the most prevalent. The first night was spent in the town of Jatai (Hotel Itamuraty). Sunday afternoon we arrived in Rondonopolis (Hotel Palace).

That afternoon we met with Eng. Agron. Jeronimo¹ Albes Chaves who is with CONDEPE. The situation of cara inchada on specific farms was discussed. On Monday and Tuesday two farms with a high incidence of cara inchada were visited. Liver samples were collected by biopsy from four calves with cara inchada and also four cows from these herds, two with calves and two without. Dr. Döbereiner had started these dams on a mineral mixture containing Cu, and several other nutrient elements last December. Mineral concentrations of the livers will be analyzed in Gainesville.

The general incidence of cara inchada in the Rondonopolis region generally has ranged from 8 to 30% in cattle between 3 weeks and 2 1/2 years of age according to Dr. Döbereiner. The problem occurs often in newly developed land that was previously woods. This land is productive and is high in organic matter. The condition usually develops in the low areas which are often near rivers. Moving cattle from low regions to high regions often corrects the condition. Cattle are routinely moved from Rondonopolis to São Paulo to improve their condition. Weight gain will improve but there will be no change in teeth after cattle have reached 2 1/2 years of age.

Wednesday, Dr. R. Shirley returned to Brasília while the rest of us visited an additional farm. One farm in the Rondonopolis region sent cattle to a slaughterhouse in Cotiasia (Rua Peixota). Other slaughterhouses in the São Paulo province and their general distance from the Rondonopolis region include: (1) Swift, 1500 Km and close to the city of São Paulo; (2) Guapeba, 800 Km - Jundiaí; and (3) Temaia, 800 Km - Aracatuba. Many cattle in this region are slaughtered at four years of age. Some cattle leave the region by truck while many are driven to the São Paulo region, which may take 40 days.

Thursday, July 11, 1974, we departed for Cuiabá where we met with the Ministry of Agriculture officials. One of the officials was Eng. Agr. Ivan de Lamônica Freire (Estado de Mato Grosso, Secretaria de Agricultura, Departamento de Assistencia Tecnica, Cuiabá, Mato Grosso, Brazil). Plans for experimentation to determine the etiology of cara inchada were discussed. The ~~Ministry~~^{SECRETARIA} was very enthusiastic about supporting this research. They agreed to support it financially and to supply a person to live at one of the farms where experimentation will be carried out.

Thursday afternoon we proceeded by plane to Rio de Janeiro. From the plane it was possible to see the severe flooding of the Pantanal region prior to Corumba. It is estimated that 300,000 cattle have been lost from the current flooding which is still continuing. Due to foggy weather the plane was grounded in São Paulo (Hotel Pao de Asucar) prior to reaching Rio. Friday morning we departed for Rio and upon arrival a car took us to Km47. We further discussed cara inchada in addition to general mineral research with Dr's Döbereiner and Tokarnia. The known areas of cara inchada include Rondonopolis, Cuiabá (Northwestern area), Corumba (South), Goiana (West and South, i.e. Pires do Rio) and Minas Gerais (West and East of Belo Horizonte). It was agreed that the future research of Dr's Döbereiner and Tokarnia would be responsible for diagnosis and histopathological studies of cara inchada while other facets of research would be handled by other groups. A feeling of general cooperation was in evidence. Prior to departing for São Paulo we met with Eng. Geraldo Dusi (UFRRJ Km 47 Rd. Rio - Sao Paulo Rio de Janeiro GB 20.000) who is in the forage area.

During the weekend we arrived in São Paulo and checked into Hotel Lord Palace. Monday, July 15, Dr. Houser and I visited Dr. Nelson Chachamovitz, Director Tecnico of Tortuga (Rua Progresso, 219 - Cx. Postal, 12635, Santa

Amaro, São Pávio), Tortuga is a large supplier of mineral supplements and is highly regarded in relation to quality of product. The planned feeding experiments for the Rondonopolis region were discussed. Dr. Chochamovitz was given the approximate formula for the mineral supplements to be used. Pending the approval of the president of the company Tortuga will provide mineral supplements for the experiment free of charge with the exception of salt, the cost of which will be billed to the project.

We also discussed with Dr. Chochamovitz the use of Cu injections, Se-Vitamin E injections and Co bullets for mineral supplementation trials. Dr. Chochamovitz volunteered to supply us with 1900 ml (150 mg vitamin E and 0.5 mg Se/ml) of a Se-Vitamin E mixture for experimentation use. The company that produces this is Roche (Ro 01-4065/268F). The recommended dosages are 10 ml for cows and 5 ml for calves given intramuscularly or subcutaneously. Prior to departing, we also talked with Eng. Agr. Genésio Mazon (Etagro, São Pedro, Fone 34, Urussanga, Santa Catarina) of Tortuga concerning mineral research.

Our next visit was with Sr. Ovidio Miranda de Brito, President of Frigorífico de Cotia, S. A. along with his son Paulo Carlos de Brito. Their address is Fábrica Avenida José Barreto, 189-Cotia, São Paulo. Sr. de Brito owns 19 farms in the Mato Grosso region in addition to a slaughterhouse in São Paulo which handles 10,000 head per month. Sr. de Brito is owner of the farm Santa Escolástica which is where it is hoped that one of the experiments will be carried out. The manager of the farm, Oscar Souza, and Sr. de Brito have previously discussed the use of part of their farms for experimentation. Sr. de Brito was very enthusiastic that the experiments be done. He noted that he would buy the cattle and

that EMBRAPPA personnel would have complete control of them. He noted that he would also buy cattle for other farms so experiments could be undertaken. In addition he volunteered the services of his private plane and also a house for our personnel to live in.

Monday afternoon we visited the Corning Glass Co. in São Paulo for the purpose of buying glassware for the Nutrition Laboratory in Brasília. A representative of the company took us to visit 3 additional companies selling glassware as a result of the visit the availability and cost of specific glassware were established.

Tuesday we visited the Ministry of Agriculture in São Paulo. We met with the following persons; Mario Montagnini (Av. Francisco Matarazzo, 455, São Paulo), Bianor Corrêa Da Silva, (Av. Francisco Matarazzo, 455 São Paulo), Luciano Marcondes Da Silva (R. Turiassu, 1083, Perdizes, São Paulo) and Fernando Gomer de Castro L. (Instituto de Zootecnia, Av. Francisco Matarazzo 985, São Paulo). With these researchers we discussed the current investigations we are planning in addition to their research program. Eng. Mantagnini is in the forage and animal nutrition area, Eng. Correa Da Silva is in the sheep production, while Eng. Gomer de Castro is the swine specialist. Eng. Marcondes Da Silva will be coming to Florida to study beef cattle management.

Wednesday, July 17, 1974, L. R. McDowell departed for Florida.

Recommendations of Consultants:

1. The University of Florida should make an all out effort to immediately fill the remaining positions in Brazil for the National Cattle Project.
2. EMBRAPPA should fully support the efforts of on-going Brazilian research groups such as the Pathology - Nutrition oriented group at Km 47 headed by Dr. Jürgen Döbereiner. Their ability to work with the National Cattle Project appears to be of the greatest importance for its long-range success.

3. The overall cattle research program deserves high praise. It is felt, however, that additional research is needed in supplementing cattle during the dry season with perhaps maintenance levels of energy-protein supplements (corn, cottonseed meal, urea, etc.) If maintenance energy-protein levels were fed during the dry season this might enhance resistance to cara inchada, calf crop, brevity of getting animals to market, and resistance to diseases, especially those that produce antibodies. It is realized that this may not appear to be economical; nevertheless, this needs to be verified in different areas of the country. A large amount of forage research is needed.
4. On the basis of farm visits and discussion with researchers and farmers, the group decided to attempt 4 farm experiments on cara inchada.

Experiment I:

Farm - Santo Antonio do Jurique (Rio Jurique)

Objective - (1) to determine if cara inchada is a nutritional disorder.

(2) to establish if a complete mineral supplement will affect the incidence of cara inchada, (3) to establish if energy-protein supplementation at the maintenance level will decrease the incidence of cara inchada.

Procedure - 100 bred cows will be allotted to each of the following three treatments: (1) control on pasture - no supplementation, (2) free choice complete salt mineral mixture supplementation, (3) Maintenance protein - energy supplementation, i.e., 3 kg per day of corn containing 5% cottonseed meal per 400 kg cow/day plus complete salt mineral mixture ad libitum. From the 300 cows plus their calves teeth will be evaluated for cara inchada, body weight

obtained at 6 months intervals and , blood and liver samples taken for evaluation of mineral status. Blood hemograms may also be determined. Forage samples should be analyzed for energy and protein digestibility as well as mineral composition. Soil should be analyzed for mineral composition.

Experiment II

Farm - Santa Escolastica

Manager - Oscar Souza

Owner - Sr. Ovidio Mirando de Brito

Objective - Same as experiment I, but using steers to study effects of treatments on cara inchada.

Procedure - 100 steers 1 - 1 1/2 years of age will be allotted to each of the following treatments: (1) control - no supplementation; (2) free choice complete mineral-salt supplementation. (3) maintenance protein-energy supplementation, i.e., 3 kg of corn with 5% cottonseed meal per 400 kg steer/day, plus complete mineral mixture ad libitum.

Animals will be purchased from an area where cara inchada is not known to exist. All cattle will be examined for cara inchada and only animals free of the condition will be used. Observation on weight gains and incidence of cara inchada will be determined at 3 month intervals after steers are placed on treatments. From the 300 steers, approximately 15-20 samples of both liver and blood tissue from biopsy or slaughtered animals should be taken for evaluation of mineral status prior to start and at yearly intervals or at experiment termination. In addition soil and forage samples should be analyzed for mineral concentrations. A blood hemogram may also be determined, which might include white blood cells, red blood cells, hemoglobin, packed cell volume, reticulocytes, corpuscular hemoglobin concentration, corpuscular volume, hemoglobin, bilirubin, SGOT, SGPT, etc.

Experiment III

Farm(s) - Santa Escolastica, Santo Antonio do Jurique or an additional farm.

Objectives - (1) to determine if injections of Cu . glycinate, and Se-Vitamin E preparations or administration of Co bullets might decrease the incidence of cara inchada, (2) To investigate effect on cara inchada prevention and production benefits from these treatments.

Procedure - Treatments will be administered separately or in combinations to steers, heifers, cows and calves. When the experimental animals are bred cows, the calves will also be given treatment from 1 to 6 months of age. Liver and blood tissue will be collected for evaluation of mineral status.

Duration - To start in October or November for a minimum of 2 years.

Experiment IV

Farm - Dr. José Fagunaly (Jageurdes)

Objective - To determine if the incidence of cara inchada is influenced by location.

Procedure - 100 steers with cara inchada will be moved to an area known to prevent or cure the condition. Mineral concentrations in tissues (liver and blood) will be evaluated at the beginning and termination of the experiment. Soils and forages will also be sampled and analyzed.

Duration - 2 years starting July of this year.

Experiment V

Forage, liver, bones and teeth samples from "cara inchada" areas and ones from areas free of the problem that have been sent to the University of Florida by Dr. Jurgen Doberien^{er} or brought here by us on our trip to Brasil will be analyzed for approximately 16

nutrient and potentially toxic elements to determine if there are elements deficient or toxic that need to be studied further in regard to this problem. Teeth and jaw of two calves with cara inchada have been mailed to Dr. James Shaw, Harvard University, School of Dentistry, Boston, Mass., for observation in regard to their periodontal aberration and for his opinion as to their cause.

4. The following mineral mixture is recommended for the supplemental trials. The requirements given by the National Research Council (U.S.A.) for beef cattle in the bulletin entitled "Nutrient Requirements of Beef Cattle, 1970" were used as a guideline for these recommendations.

<u>Source of elements</u>	<u>%</u>
$\text{CaHPO}_4 \cdot 2\text{H}_2\text{O}$	47.37
NaCl	50.00
Cu SO_4 (anhydrous)	0.60
CoSO_4 "	0.02
Na_2SeO_3 "	0.004
KI "	0.01
ZnCO_3 "	1.20
MnCO_3 "	0.40
NaF^1 "	0.40
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¹Fluoride was added assuming it was very low in this area, and because fluoridation of city water in the U.S.A. has been reported to decrease periodontal problems in humans.

5. Soils and forage studies should be made in the cara inchada regions. Dr. William Blue, Dr. William Robertson or others might do well to visit cara inchada farms to assess quality of these soils. Studies should be made in cara inchada areas of effect of burning dry pasture on the disease.
6. With these several projects in progress many aspects of animal nutrition, physiology and performance as related to these treatments should be pursued by able technicians or graduate students using these opportunities for thesis and valuable experience on practical investigations. Many Peace Corp volunteers have technical degrees and might be used for collection of data periods.