PD-AAR-179
ISN: 39659

PROGRESS REPORT No.11

PROJECT : Agricultural Tecnhnology Development in Panamá

CONTRACT No. : 525-0180-C-00-2015 USAID/Panamá

PERIOD : January 1 to March 31, 1985

This report is submitted as part of the requirements of the USAID contract on the project"Panama Agricultural Technology Development" for the Technical Assistance component and provided by specialists of Rutgers University to IDIAP. Activities and accomplishments of the project and the Technical Assistance component for the period of between January 1 to March 31, 1985, are described in - detail. This is also the first report after the agreement for an extension of the original contract on ATD in Panama and includes activities by a new team member and Chief-of-Party, Dr. Carlos A. Neyra, the Agricultural Research Administration Specialist.

This report is being sub-divided into four main sections following the reports from each of the four Specialists, components of the Rutgers' Technical Assistance team. This sections are: I. Specialist in Tropical Pastures, Dr. Pedro Argel; II. Specialist in General Agronomy, Dr. Mark Gaskell; III. Specialist in Animal Production, Dr. Alfredo Serrano and IV. Specialist in Ag. Research Administration, Dr. Carlos A. Neyra. The fifth team member, an specialist in Soil Management is expected to join the Rutgers' TA team very shortly after conducting a thorough and extensive search to offer the best possible expert available for that position.

Dr. Carlos A. Neyra
Project Coordinator
and ATD Advisor

REPORT/ATD-PANAMA PROJECT

CONTRACT No.525-0180-C-00-2015

C O N T E N T S

PAGE

I. TROPICAL PASTURES SPECIALIST..... 2
Dr. Pedro Argel

Background..... 2
Germplasm..... 2
Collection..... 4
Seed Production..... 5
Establishment and Management..... 8
Pasture Evaluation..... 9
Future Plans..... 10
Technical Personnel Involved..... 11

II. SPECIALIST IN GENERAL AGRONOMY..... 13
Dr. Mark Gaskell

Background..... 13
Caisan Area-Dry Beans..... 13
Cerro Punta/Boquete-Onion Research..... 18
Training..... 23
Other Initiatives..... 23

III. SPECIALIST IN ANIMAL PRODUCTION..... 25
Dr. Alfredo Serrano

General Considerations..... 25
Specific Areas of Activity..... 25

1. Diagnosis and prevention of diseases of economic importance..... 25

Background..... 26
Progress..... 26
Future Plans..... 26

2. Effect of temporal weaning on the reproductive efficiency of dual purpose cows..... 27

Background..... 27
Progress..... 27
Future Plans..... 28

PAGE

3. Correlation between testicular development and body weight in beef catle..... 28

4. Evaluation of bull fertility and the variations in sperm quality/Calabacito..... 29

5. Determination of blood level progesterone in dual purpose cows..... 29

6. Incidence and etiological diagnosis of bovine mastitis..... 29

Background..... 29
Future Plans..... 30

Other Activities..... 30
Training..... 31
Institional Support and Collaboration..... 31

IV. SPECIALIST IN ADMINISTRATION OF AGRICULTURAL RESEARCH..... 34
Dr. Carlos A. Neyra

A. Initiation of Activities..... 34

B. Administrative System and Research Programs in IDIAP..... 35

C. Regional Centers, Experimental Fields and Specialized Laboratories..... 36

D. Project Coordination/ATD-Panama..... 37

SPECIALIST ACTIVITIES

I. TROPICAL PASTURES SPECIALIST

Dr. Pedro Argel, Agrostologo

Background

The period of this report falls in the dry season in the Republic of Panama. As a result, field activities tend to decrease with the exception of seed harvest, monitoring of animals and pastures and general maintenance of experimental plots. A large amount of time is dedicated to data processing and planning of research for the coming cycle in the rainy - season. The advances made during the reporting period are presented below.

Germplasm

Observations of diverse forage species have been concentrated on tolerance to the extreme drought at the Los Santos, Calabacito, Sona, and Chiriqui sites. The germplasm adaptation experiments at each of these sites have passed trough at least one complete cycle of rain drought and have provided the opportunity to recognize germplasm with adaptation potential under rainy or dry conditions. This is a very important factor for the conditions in Panama which is subject to periodic fluctuations between winter (rainy) and summer (dry) with related losses in animal production. A brief review of the more promising grass and legume especies which are outstanding for their capacity to retain foliar green mass during the dry season is given below:

A. LEGUMES SITE

Centrosema macrocarpum 5062, 5434.....Calabacito, Sona, Los Santos

Centrosema sp. 5112, 5278.....Calabacito, Los Santos

Stylosanthes guianensis 184, 136.....Calabacito, Los Santos

Stylosanthes guianensis Tardio.....Calabacito
1280, 1283

Galactia striata 964.....Los Santos

B. GRAMINEAE

Brachiaria dictyoneura 6133, 6369.....Chiriqui, Calabacito, Los Santos

Brachiaria humidicola spp.....Calabacito, Chiriqui

Cenchrus ciliaris Nunbank, Molopo....Los Santos

Andropogan gayanus retains relatively little leaf area during the dry season even though it is greater than that retained by Hyparrhenia rufa (faragua) which dries completely after flowering. The most outstanding of the grasses has been B. dictyoneura 6369 for the amount of leaf area retained and this has been true at each of the three sites where it is being evaluated - Gualaca, Finca Chiriqui and Calabacito. Because of this characteristic, plans are being made to evaluate this species in advanced trials in the coming season. Among the legumes, it is worth mentioning C. macrocarpum, also for its ability to retain leaf area during the dry season. Other legumes such as Pueraria phaseoloides (kudzu), tend to produce leaf area in the early stages of the dry season but are at the end of the season completely defoliated, and the same is true

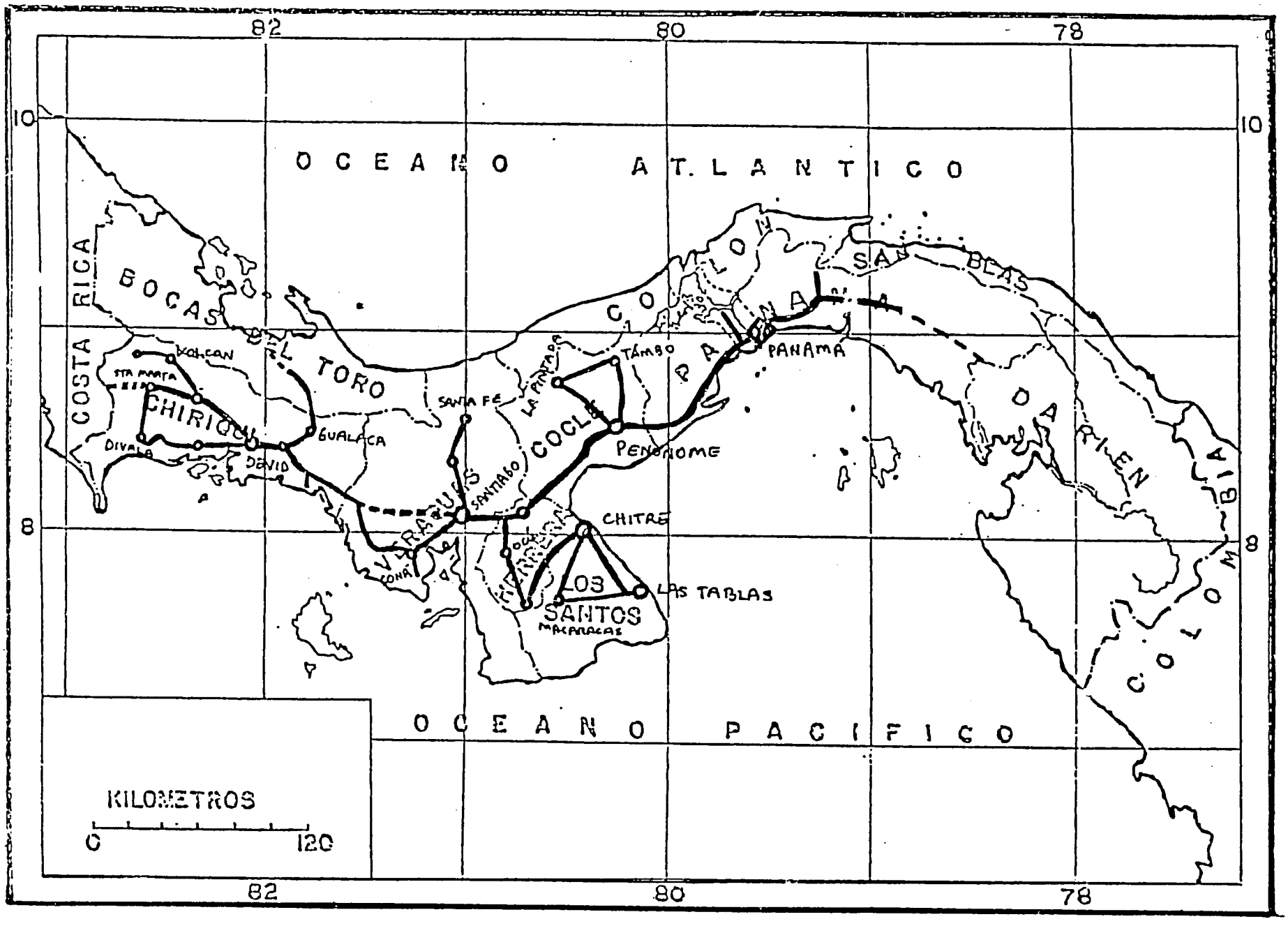
with S. capitata, S. macrocephala and some or the introduction of S. guianensis. The introductions of C. macrocarpum. 5062, Centrosema sp. 5112 and S. guianensis 184, are included in a grazing trial planned for Calabacito this year and the grasses B. dictyoneura 6133, B. humidicola comercial type 679 and A. gayanus 621.

Collection

A germplasm collection trip emphasizing forage legumes was made in collaboration with the International Tropical Agriculture Research Center (CIAT). The collecting trip was made between February 21 and March 2 and included the Provinces of Chiriquí, Bocas del Toro, Herrera, Veraguas, Los Santos, Cocle and Panama. A total of 2,179 km. were covered as indicated on the adjoinning map. A total of 331 samples of forage legumes from 20 some different genera were collected (Table 1). The genera Centrosema stands out with 15 samples from the species macrocarpum. This is the first report of the occurence of this species in each of the above provinces and of the occurence of C. brasilianum in Cocle Province. Samples were divided between IDIAP and CIAT and additional evaluations of promising introduced genera are also planned. For future reference the samples have been catalogued and placed in CIAT's germplasm bank and it is hoped to also establish a coding system within IDIAP for germplasm cataloging.

IDIAP staff actively participated in the trip and it served as an excellent in-field training opportunity in -

PANAMA



NATIVE PANAMANIAN GERMPLASM COLLECTION TRIP (21 Feb.- 3 Mar. 1985)

(————) ROUTE OF TRIP

identification, planning and collection of promising forage material. It also provided a good understanding of the distribution of forage germplasm in the various ecological niches in Panama.

SEED PRODUCTION

Seed of promising forage germplasm was harvested during the dry season at the Experimental Station at Gualaca. At the same time, seed of "Veranero" (*Andropogon gayanus*) was harvested as part of an agreement between IDIAP and two small ranchers in the central provinces. Five hectares were planted on each of the farms from seed of IDIAP's seed multiplication plots. After harvest the seed was divided equally between IDIAP and the ranchers based on the relative contribution toward harvest and processing. In total, 1268 kg. of seed was harvested from this the first comercial seed production plot of "Veranero" in Panama and the last stage of a varietal release process which was initiated 18 months ago. A similar arrangement could also be a possibility for future cultivars as long as both parties involved clearly understand their mutual responsibilities and benefits. In this case the approximate harvest cost was 1 $US per kg. seed which is relatively low and should leave sufficient margin for profit after including the costs of production (seed prices vary 2-15 $US/kg.). The interest and initiative of IDIAP's staff in the central provinces - particularly Los Santos - should be mentioned.

TABLE 1. SUMMARY OF NATIVE LEGUME GERMPLASM MATERIALS COLLECTED IN PANAMA. PROVINCES OF BOCAS DEL TORO , CHIRIQUI , VERAGUAS, HERRERA , LOS SANTOS, COCLE Y PANAMA. FEBRUARY 21 - MARCH 2, 1985

GENUS	No. OF COLLECTED SAMPLES
Aeschinomene	27
Alusicarpus	4
Calopogonium	32
Canavalia	11
Centrosema	66
Desmodium	54
Dioclea	9
Galactia	16
Mucuna	6
Rhynchosia	24
Stylosanthes	27
Teramnus	18
Vigna/macroptilium	18
Zornia	8
Other genus (*Desmanthus*, *Clitoria*, *Prosopis*, *Tephrosia*, *Crotalaria*, *Flemingia*)	11
TOTAL	331

It was they who initiated and executed the agreement at all stages of production.

The total amount harvested and the seed yields from the species at Gualaca are the following:

SPECIES	CRUDE SEED YIELD (kg./ha.)	TOTAL HARVESTED (kg.)
S. guianensis 136	45.0	6.8
C. macrocarpum 5056	50.0	10.0
P. phaseoloides	11.0	11.0
A. gayanus	192.0	192.0

The yield of C. macrocarpum was reasonably good even though it did not produce seed in the 1983/84 dry season because of rainy weather during reproductive period. Likewise, the yields of A. gayanus dropped from 431 kg./ha. in the first year to 192 kg./ha. this year. This is due to the low plant density that resulted from lost vigor of the stand as a result of the high rainfall - more than 5000 mm. in 1984 - significantly higher than the normal average for the area. In Finca Chiriqui, 45 and 5 kg. of A. gayanus and P. phaseoloides respectively were also harvested.

The S. capitata Capica which gave an acceptable seed yield the first year (589 kg./ha.) also showed persistance problems for the same reasons, as well as a high weed population that made harvest nearly impossible. The information gained form seed production at Gualaca however, has served to initially identify appropriate regions for secure seed production

This process should continue until more is known about the species/environment interacions.

ESTABLISHMENT AND MANAGEMENT

An experiment on weed control during the establishment of P. phaseoloides was conducted. A summary of the general conclusions are the following: a) the herbicide that least affected the survival of kudzu was Oxyfluorfen (Goal) at a dosis of 0.5 kg./ai./ha. and this also showed the greatest control of weeds and the least subsequent damage to the kudzu; Linuron (Afalon) at a dosis of 2.0 kg/ai./ha. severely affected the germination and survival of the kudzu; b) the best kudzu yields after the manual treatment was seen following treatment with Oxyfluorfen (Goal) and Alachlor (Lasso) + Acifluorfen (Blazer), eventhough this last treatment permitted an invasion of Borreria alata. This weed was controlled efficently with Oryzalin (Surflan); c) it is recommended to continue the research with the most promising products for selectivity and control, widening the range of dosis and in combination with mechanical control methods on a site with a varied weed complex. A 13 page technical paper was prepared from the results of this experiment and is being sent to CIAT for possible publication in the Bulletin of Tropical Pastures. The order of authorship is as follows: B. Pinzon, P.J. Argel and R. Montenegro or in other words a joint effort between IDIAP-Rutgers U./CIAT.

The evaluations of chemical control of shrubs in pastures have continued. Picloram + 2,4-D amine at 2.0% in diesel has

been the best treatment against the shrub Casearia javitensis in applications to the leaves or to the stem base. This control has not been equally effective against other shrubs such as Curatella americana or Psidiam sp. For this reason it was decided to make a second application to the regrowth of these six months after the initial application and during the dry season. The treatment tried was picloran + 2,4-D amine at 1.5% in diesel and the objective is to determine if under the stress conditions imposed upon the plant by the dry season as well as the effect of the original application, the plants will show greater susceptibility and possibility of control. The experiment was conducted in Gualaca on March 20 (1985) on a total of 30 shrubs chosen at random from the different species in an old pasture saved for this purpose.

PASTURE EVALUATION

The Type C grazing experiment was established in colaboration with the Faculty of Agronomy. The plots were lightly grazed during the dry season to take advantage of the green matter. A uniformity cutting will now be made to have all pastures at equal height at the beginning of the rainy season. The establishment of the grasses H. rufa (faragua), A. gayanus (Veranero) and B. humidicola, should be mentioned as well as the associated legumes S. capitata Capica, C. macrocarpum 5065 and P. phaseoloides (Kudzu). Grazing should be initiated as soon as the rains normalize and the pastures permit.

FUTURE PLANS

A change of work site from David to Chitre is planned for the near future for the Pastures Specialist. The objective of the move is to provide better research and training support to IDIAP technical personnel in the central provinces, which should have a higher priority for IDIAP because of climate and soil conditions, and the prevailing production systems.

In the next few months emphasis will be given to the establishment of and monitoring of new and old experiments programed as part of the 1985 IDIAP Annual Operating Plan, such as; Gualaca - Grazing experiments C & D; shrub weed control and weed control in legume establishment (*Leucaena* and Kudzu); Agronomic evaluation of ecotypes of *Brachiaria* and *Panicum*.

Finca Chiriqui	:	Agronomic evaluation of ecotypes of *Brachiaria* and seed multiplication plots.
Agronomy Faculty (Chiriqui)	:	Start Grazing Trial Type C
Calabacito	:	Agronomic evaluation of *Brachiaria*; establishment of seed multiplication plots, establishment of plots for pasture recovery and continuing the evaluation of germplasm adaptation experiments.
Divisa	:	Evaluation of *Leucaena* ecotypes
Los Santos	:	Germplasm evaluation (A & B Experiments) and establishment of seed multiplication plots.

It is also hoped to continue the supervision of the germplasm evaluation plots of the Smithsonian Research Institute (SRI) established on Barro Colorado and collaborate personally or using CIAT staff in the training of IDIAP researchers.

TECHNICAL PERSONNEL INVOLVED

A- IDIAP	DIRECT RESPONSIBILITY	INDIRECT RESPONSIBILITY	EVALUATION TYPE
Gualaca	Ing. David Urriola	Ing. Carlos Ortega	Trials of Grazing and Agronomy Brachiarias.
Gualaca	Ing. Bolívar Pinzón Agr. Rubén Montenegro	--	Weed Control
Gualaca	Ing. Andrés Márquez Presently at CIAT	----	Seed Production
Finca Chiriquí	Agr. Luis Martínez	Ing. David Urriola	Agronomy of Brachiarias
Calabacito	Ing. Héctor Aranda	Ing.Olmedo Duque	Regional adaptation and agronomic trials. Grazing trials.
Calabacito	Ing. Esteban Arosemena	--	Agronomy and recovery of pastures. 1985.
Soná	Ing. Lucas Tasón	---	Regional adaptation trials.
Los Santos	Agr. Efraín Vargas	Ing. Olmedo Duque	Regional adaptation trials and seed multiplication.
Chepo	Ing. Albán Guerra	---	Seed Multiplication

B.- AGRONOMY FACULTY

	DIRECT RESPONSIBILITY	INDIRECT RESPONSIBILITY	EVALUATION TYPE
Chiriquí	Ing. Norberto Pitty	Ing Metodio Rodríguez	Grazing trial
Divisa	Ing. Gregorio González	Ing Metodio Rodriguez	Evaluation of Leucaena

C.- SRI (SMITHSONIAN RES. INSTITUTE

Barro Colorado	Dr. Gilberto Ocaña	--	Germplasm Evaluation

II. SPECIALIST IN GENERAL AGRONOMY

Dr. Mark Gaskell

Background

The work of the General Agronomist is concentrated in two of IDIAP's priority geographic research areas in Chiriqui Province; Caisan, in Renacimiento District and Cerro Punta in Bugaba District. The crop focus in Caisan is on maize and dry beans, the two predominant in the region and in Cerro Punta on highland onion production. Maize and dry beans are important food grains in Panama and both require substantial importations to satisfy national consumption. Onions are another important food crop in Panama and the domestic production is limited to a four month period, which means that importations are high during the remainder of the year.

The activities or the general agronomist in these geographic areas are directed towards: 1) working with Panamanian collaborators to plan and conduct research on the previously mentioned crops, and 2) training these Panamanian collaborators in important tasks and subject matter areas related to managing an applied agronomic research program.

Caisan Area - Dry Beans

The primary agronomic work in Caisan involving the General Agronomist has been concentrated on determing the yield

response of dry beans in the area to nitrogen (N) and phosphorus (P) fertilization. On-farm experiments planted in November of 1984 were designed to evaluate the response of dry beans to factorial combinations of N and P. Nitrogen was applied as side-banded urea (25kg. N/ha. at planting and the remainder at 25 days after planting) and P as triple super-phosphate banded in the seed furrow at planting.

It has been an specially dry year in the Caisan area with rains continuing very heavily throughout much of November and ending abruptly of November 28. Much of the area did not see rain after that date even though many farmers in the area continued planting into the third week of December. Consequently, bean yields have been adversely affected by drought on a large number of farms in the area and overall yields for the area are below normal.

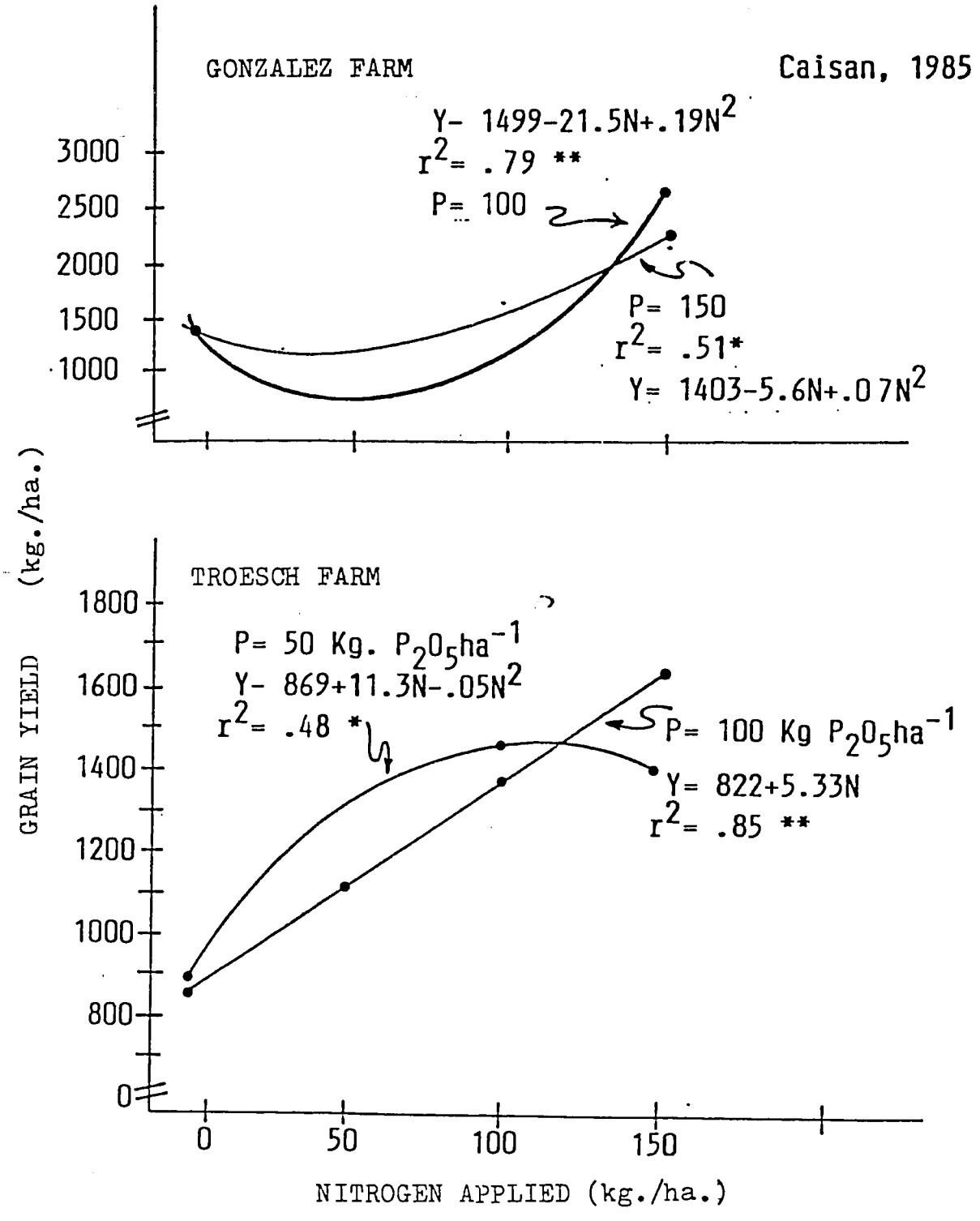
The fertiliy experiments were planted on two farms, one of which (Troesch Farm) suffered the same effects of drought as did much of the area and the other (Gonzales Farm) received two well placed showers that provided better than average growing conditions. The yield data from these experiments has been analyzed (Figures 1 and 2) and shows nitrogen response results similar to those observed the previous season (1983/84) but these 1984/85 experiments provide data over a wider range of P and N applications.

The Troesch farm data shows a strong response to

nitrogen in the presence of 50 or 100 Kg.P205/ha. of phosphorus but no response in the absence of phosphorus or whit 150 kg.P205/ha. The base yields and the magnitude of the response are lower than those of the Gonzalez Farm or of either farm studied in 1984. Undoubtedly this is due to the detrimental effects of the complete lack of rainfall at the Troesch site beyond seven days after crop emergence. The Gonzalez Farm data shows a response to nitrogen when 100 or 150 kg. P205/ha. of phosphorus in applied but no response in the absence of phosphorus or with 50 kg. P205/ha.

The data from both farms confirms one or the original hypotheses, i.e. that phosphorus is limiting the nitrogen response on the high phosphorus fixing soils that predominate in the area. There are sevetal inconsistancies in the 1984/85 data and it is hoped that the remaining analysis of other plant and yield component data which was collected will help to clarify the response of dry beans to fertilization. Future experiments planned for 1985 will also serve to more precisely determine optimum N and P fertilization practices for dry beans in Caisan.

The economic analysis of selected N and P fertilization levels from the two farms in 1985 (Table 1) shows results on the Gonzales far, where drought stress was not as marked, to be similar to the 1984 data (see Peog. Rpt. 10).



Figures 1 & 2. Dry bean grain yield response to nitrogen with different levels of band-applied phosphorus in the the seed furrow at planting

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Table 1. Economic analysis of selected dry bean fertilization rates based on fertilization trials on two farms in Caisan, Panama. 1985.

FERTILIZER APPLIED N (kg./ha.)	FERTILIZER APPLIED P2O5 (kg./ha.)	YIELD (kg./ha.)	ADDITIONAL YIELD VALUE ($1.18/kg.)	FERTILIZER PRICE ($)	ADDITIONAL INCOME ($)
			- GONZALEZ FARM -		
0	0	1263	-----		
150	100	2549	1017.48	231.25	786.23
150	150	2138	1032.50	281.25	751.25
* PA		1769	597.08	45.00	552.08
			- TROESCH FARM -		
0	0	1293	------		
100	50	1499	243.08	138.25	104.83
150	100	1621	387.63	231.25	156.38
PA		1018	-------		

*Current Farmer Practice = 300 lbs./ha. 12-24-12 fertilizer broadcast applied and 5 lbs/ha. foliar applied urea at 30 days.

****

On representative farms from Caisan in experiments from two years the application of nitrogen and phosphorus in the range of 50-150 kg./ha. has proved to be profitable. In three of the four cases additional income was near of in excess of U.S.$1000 per ha. in an area where average total dry bean crop income is in the $250 - 300/ha. range. The Troesch farm data from 1985 also shows a profitable response to N and P fertilization but the profitability was less than the other sites due to the drought stress which occurred on the Troesch farm and throughout the Caisan area generally. It is important to more precisely determine optimum economic fertilization recommendations for Caisan but the data thus far suggests that fertization of dry beans in Caisan holds the potential of dramatically improving farm income.

Cerro Punta/Boquete - Onion Research

The onion research program has been concentrated on the production of onions in the rainy season outside of the normal growing period. As part of this program an effort is underway to develop onion agronomic management practices for the rainy season and to design and test economical on-farm onion dryers. Several dryer models have been designed with the assistance of Rutgers University Agricultural Engineer, Dr. Mark Singley.

In January and February work continued on two of the most promising of these designs. The simple in-field dyer was

constructed and displayed as part of IDIAP's Pavillion at the Agricultural Fairs in Concepcion and David (Figure 3).

Plans have been made to evaluate this design under on-farm conditons during the coming rainy season. The second dyer, a larger reconditioned shed which was first built in late 1983 on a farm in Bambito is undergoing a second remodelling to improve ariflow. The solar colector system has show itself to have good heating capability but the absence of electricity on many of these somewhat remote onion farms has hampered development of a viable air-flow system. The most recent remodeling effort is building a large chimney to provide passive flow of heated air through the onions. This remodelling should be finished in April in time to be tested during the 1985 rainy season.

Results of an experiment designed to evaluate the effectiveness of four different commercial fungicide applications on onion seedling development in the seedbed was analyzed during January (Table 2). The experiment compared applications every three days of Dithane M-45, a relatively low-cost, broad spectrum fungicide with Dithane in combination with Daconil, Difolatan, or Benlate.

The results showed no statistically significant advantage to any of the combinations over that of Dithane alone in terms of seedling survival in the seedbed. These initial results suggest that farmers could significantly lower -

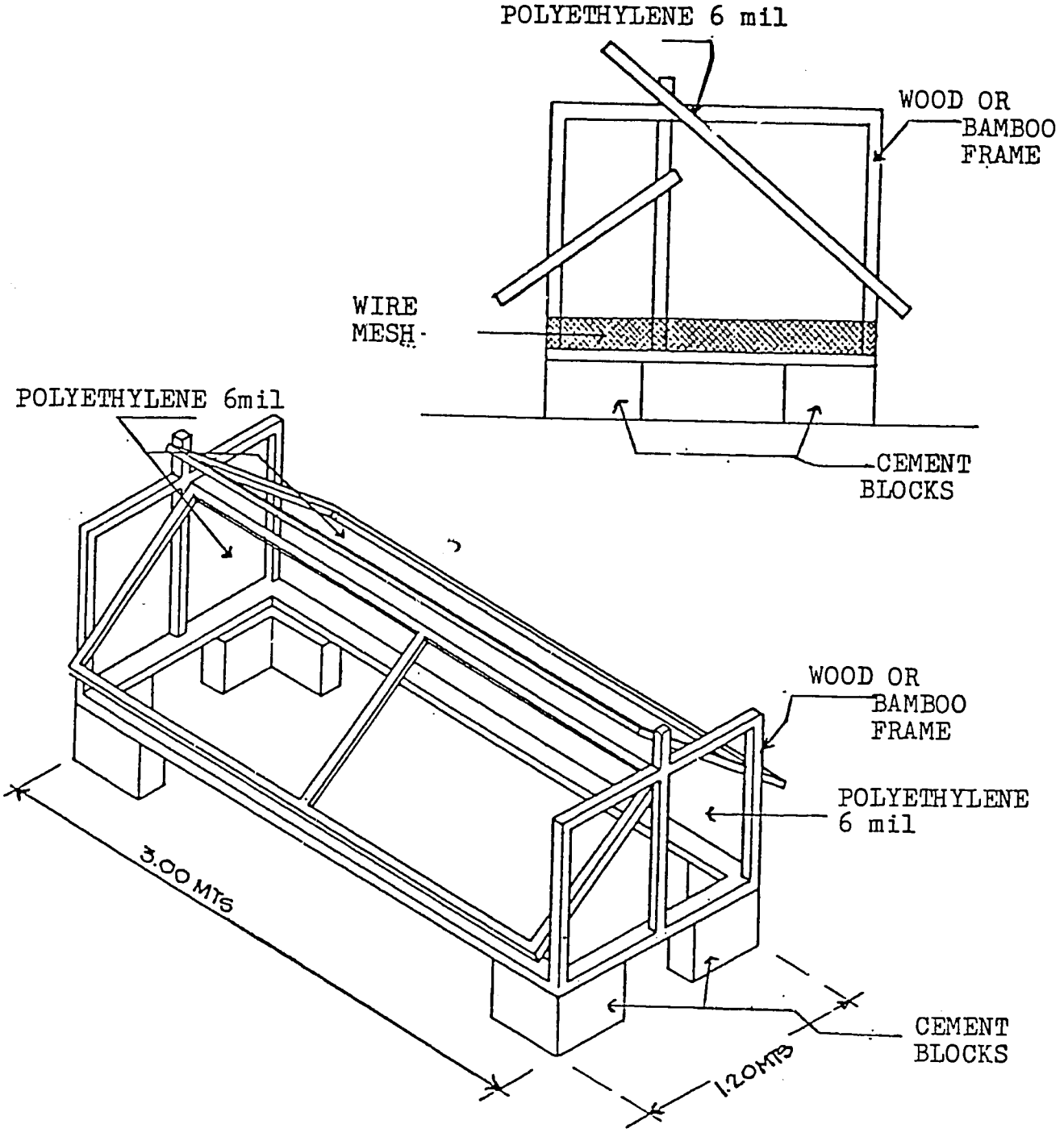

Figure 3. Experimental field-type solar onion dryer.

Table 2. Onion seedling survival at 60 days after emergence in seedbed receiving four different fungicide treatments at three day intervals.

FUNGICIDE APPLIED	SEEDLING SURVIVAL (No. Plants/250cm.2)
DITHANE M-45	98
DITHANE+DIFOLATAN	102
DITHANE+DACONIL	86
DITHANE+BENLATE	39
CONTROL(water)	50
L.S.D. (.05)	37

production costs by applying only Dithane rather than combinations of Dithane and other products. The addition of Benlate, a commonly used systemic fungicide to Dithane, negatively affected seedling survival in this experiment.

Care should be exercised in evaluating these results however, since onions in the area are affected by several different disease genera and no doubt different races within each species of these genera. Thus, one would expect that the most effective long term disease management strategy would include rotating classes of compounds to avoid the development of resistance by the organism to the chemical. To precisely determine the most appropriate compound or combinations of compounds for rainy season seedbed survival would require a major plant pathology effort in the area over several years. It is felt at this time however, that near term research should be directed toward covered seedbed management practices because the covered seedbed will yield a higher and sooner payoff.

The onion research program which Dr. Gaskell initiated in 1983 originally proposed two alternatives for rainy season onion production (see Prog. Rpt. 9). Alternative 1 proposes to establish irrigated seedbeds in the dry season for transplant at the begining of the rainy season. The validity of this alternative has been evaluated in several experiments in 1984. Other experiments desinged to evaluate Alternative 2

are still being harvested and analyzed and the second year of experiments are being planned. One of the 1985 experiments in Boquete which will reevaluate Alternative 1 has been planted. And other plantings are planned for April and May.

Training

Analysis of experimental results, the preparation of research summaries, and the preparation of technical papers to be presented at the XXXI Annual Meeting of the Central american Cooperative Program in Food Crops Research (PCCMCA) in Honduras in April have presented excellent opportunites for training sessions with Panamanian collaborators. In early March, Dr. Gaskell conducted a workshop for IDIAP collaborators Ing. José Román Araúz and Ing. Rubén De Gracia on the use of microcomputers to analyze and summarize research data. The general functioning of a microcomputer as well as the specific capabilities of spreadsheet and statistical software packages were reviewed. The data from the 1985 dry bean experiments was used to help make the microcomputer - instructional session mor relevant. Dr. Gaskell and Panamanian Ings. Araúz, De Gracia, and Acosta worked throughtout March to prepare the PCCMCA presentations using both dry bean and maize experiments from Caisan.

Other Initatives

In January Dr. Gaskell presented a talk entitled "The

Limiting Factors in Rainy Season Onion Production in the Higlands" as part of a farmer meeting in Boquete organized by the newly formed extension service (SENEAGRO). The meeting was well attended and interest in rainy season onion production is high. This interest combined with research of IDIAP's highlands onion research program and recent assurances by the National Marketting Institute (IMA) to prohibit imports until October of 1985 is expressing itself in an increased number of plantings outside of the normal planting period; particularly in Boquete where a larger percentage of farmers have irrigation.

III. SPECIALIST IN ANIMAL PRODUCTION

Dr. Alfredo Serrano

GENERAL CONSIDERATIONS:

During the first quarter of the present year, the Livestock Specialist submitted a new work plan to the Staff of the project IDIAP-AID-RUTGERS. This new plan is to be developed for the short, medium and long terms. The Speciallist also attended a meeting with the Director of Animal Science and the research team of IDIAP in order to discuss the experiments to be conducted during 1985. There were several meetings with Dr. Reed Hertford and the IDIAP staff to discuss the activities and progress in animal production in the last year. A student, Miss Pernilla Fajersson, from Rutgers visted the Central Region to investigate possibilities for a Ph.D. thesis. Dr. Don Drga, USAID staff and Dr. Carlos Neyra, Coordinator of IDIAP-AID-RUTGERS visited the Experimental Station in Calabacito and the Montijo District in Veraguas. The - Livestock Specialist continued to assist IDIAP's animal science technicians and partipated in the meetings of the Technical Committee with the Director of IDIAP, in Santiago. - Lastly, as IDIAP representative, he attended the field day on "Phisiology of Lactation and Mastitis".

SPECIFIC AREAS OF ACTIVITY:

1. Diagnosis and prevention of diseases of economic importance. Incidence and causes which determine the slaughter of fertile cows.

Background

The slaughter of cattle, during the first quarter of the year, which corresponds to the dry season, increased by 5.0% over previous years, due mainly to the lack of forages. The slaughter of cows increased approximately 6.0% in comparison with the national average; however, the incidence of pregnant cows slaughtered decreased considerably.

Progress

To date, the reproductive organs of 1,800 cows have been studied. The incidence of pregnancy during this quarter has decreased to 49%, a decrease of 24% when compared with the national average in 1984.

During this quarter, it has been found that 64% of the pregnant cows were 30-90 days pregnant, 20% were 91-180 days pregnant and 16% vere more than 181 days pregnant. These finding are similar to those found in 1984. The most common reproductive disorders found are those especially related with genital infantilism (heifers); there was also a high incidence of anestrous cows (non-functioning ovaries). Apparently, all these disorders are secondary to nutritional factors as well as stress conditions, especially during the dry season which began last December.

Future Plans

In cooperation with the Ministry of Animal Health and MIDA, and with partial financing from the AID-IDIAP-RUTGERS convenio,

samples from the slaughterhouse and collaborating farms will be taken and analyzed in order to study the prevalence of diseases which affect cattle production and reproduction.

2. Effect of temporal weaning on the reproductive efficiency of dual purpose cows.

Background

The research which had been initiated on the farm of Mr. Gregorio Villarraél, farmer from the Province of Los Santos, and on the Experimental farm of Calabacito had to be suspended due to the effects of the dry season.

Progress

On the farm of Mr. Gregorio Villarreal, a group of nine cows were stimulated by temporal weaning for one week with the following results:

Experimental Group

Cows stimulated	9
Cows pregnant	7
Percent pregnant	77.7%

The control group, those cows not separated from their calves, showed a pregnant rate of 57%.

On the Experimental farm of Calabacito, during the first trial, nine cows were stimulated by temporal weaning for two consecutive days with no significant results obtained. Later, five cows from this same group were separated from their calves

for 3 days and the pregnancy rate was 60%. In the control group, 20% of the cows became pregnant.

As mentioned in the last report, the initial results show that a) the season of the year influences animal fertility, especially when the cows are exposed to good forage and b) that it is possible to improve pregnancy rates throught the practices of early or temporal weaning.

On March 25, 1985 the National Institute of Agriculture (INA) in cooperation with MIDA, established two research projects on temporary weaning using 27 Zebu cows and 13 Brown Swiss x Zebu cows. Temporary weaning will be practiced daily for a period of 10 days. The low reproductive efficiency of the INA cows is very surprising. The average interval between pregnancies for beef cows is 603 days and for dual purpose cows, 554 days.

Future Plans

The plan is to repeat this type of trial on other of - IDIAP's collaborating farms and to study via the techniques of radio immunoanalysis (RIA) the negative effects the calf exercises on ovarian activity of nursing cows.

3. Correlation between testicular development and body body weight in beaf cattle.

   This study was suspended as it was not considered to be a priority of the Animal Science Department of IDIAP.

4. Evaluation of bull fertility and the variantions in sperm quality on the Experimental farm of Calabacito.

   This study began in February of this year with the object of studying the fertility potential of beef cattle by means of the precise analysis of sperm quality during the different seasons of the year.

5. Determination of blood level progesterone in dual purpose cows.

   The effects of nursing and climactic factors on blood level progesterone in nursing cows will be studied by means of RIA techniques.

   Initially, this study was approved by FAO through the International Atomic Energy Agency (IAEA). The Livestock Specialist would advise a cooperative project between IDIAP and the University of Panama. Unfortunately, due to lack of sufficient human and economic resources, the date for iniating the project has not yet been determined.

6. Incidence and etiological diagnosis of bovine mastitis.

Background

The present research began in February in Montijo District with the participation of eight duarl purpose herds. Initially a screening was done using the California Mastitis Test (CMT) to detect the degree of incidence of mastitis in each herd. Then, farms who showed their herds to be positive to the CMT

were submitted to a second examination to detect cows with subclinical mastitis. Later in the laboratory, microbilogical examinations were made to classify the microorganisms and to detect the degree of sensibility to medications used in treatment of the infection.

This research has been temporarily suspended due to lack of sufficient human and economic resources in spite or the good will and cooperation on the part of the Ministry of Animal Health.

Future Plans

To realize the same diagnosis in the Los Santos region and other regions where there are dual purpose herds.

Other Activities

The Livestock Specialist, working strictly with veterinarians and agronomists, has given technical assistance to the farmers in the Los Santos Province, to the MIDA-INA staff, to farmers in the Eastern Region and to the Bayano Corporation. Special attention has been given to the organization of registers and herd management practices on the experimental farms of Arenas and Calabacito. The Livestock Specialist has also worked with a group of nutritionists to establish alternative nutrition programs during the dry season on Calabacito Experimental Farm using rations based on Digitaria Swazilandensis hay, sugar cane (Sacharun sinensis) and cassava flour mixed with molasses and urea.

The Livestock Specialist solicited the International Atomic Energy Agency of FAO for the participation of IDIAP in the Regional Network of Laboratories for the Improvement of Cattle Production by Means of Radiommunoanalysis. To this end, the Livestock Specialist designed a research project to be realized with the cooperation of the Department of Biochemistry of the University of Panama.

Training

With the cooperation of the Ministry of Animal Health and the Veraguas Chapter of the National Association of Farmers (ANAGAN), a meeting with farmers was planned. In this meeting milk hygiene and the philosophy of milking and mastitis were thoroughly discussed. Forty-four milkers, 20 farmers and 15 technicians from MIDA, IDIAP and the Ministry of Animal Health attended this meeting. The Livestock Specialist gave a conference on milking and mastitis and published an educational pamphlet which was distributed to all the participants.

Finally, in continuation of activities planned in the first trimestre, the Livestock Specialist presented the rough draft of a reproduction manual (155 pages mimeographed) to be revised, edited and published as teaching material. Initially this material was approved for publication by Rutgers University and has been sent to the General Director of IDIAP for his revision and approval.

INSTITUTION SUPPORT AND COLLABORATION

During the present trimester, as in previous trimesters,

the Livestock Specialist's work progress has been affected due to various factors:

1. In the last year, two work plans have been developed by the Livestock Specialist and to date, neither plan has been officially approved.

2. The support of the Animal Science Deparment through the Regional Coordinator has been limited. There has been little collaboration and little interest on the part of the Animal Science technicians to incorporate themselves into the activities designed by the Livestock Specialist.

3. The lack of economic resources has limited training activities and research, especially research in the field of animal health.

4. The Experimental Farm of Calabacito lacks the minimum resources for developing animal science research.

Here follows a list of people who have participated in the development of the Livestock Specialist's activities and the corresponding amount of time the fiven to those activities:

NATIONAL TECHNICIAN	INSTITUTION	AREA	PARTICIPATION(%)
Dr. Victor Escudero	IDIAP	Chepo	5
Dr. Renato Barrera	IDIAP	Los Santos	10
Dr. David Quiros	INA-IDIAP	Divisa	5 (1985)
Dr. Ernesto Rodríguez	INA-MIDA	Divisa	10 (10-1984)
Dr. Jose L. Alba	IDIAP	Santiago	5
Ing. Hector Aranda	IDIAP	Calabacito	5
Ing. Esteban Arosemena	IDIAP	Calabacito	5
Ing. Olmedo Duque	IDIAP-Coordinator	Santiago	5
Dr. C. Montenegro	Ministerio de Salud	Santiago	10
Dr. Julio Greco	Ministerio de Salud	Santiago (Matadero)	20
Dr. Nicolas Alvarado	Ministerio de Salud	Santiago (Matadero)	15
<u>Administrative Support</u>			
Secretarial	IDIAP	Santiago	5

IV. SPECIALIST IN ADMINISTRATION OF AGRICULTURAL RESEARCH

Dr. Carlos A. Neyra

A. INITIATION OF ACTIVITIES

Upon his arrival to Panama on February 11, 1985, the specialist in Administration of Agricultural Research was received and welcomed at IDIAP by the Vice-Director and director-In Charge, Dr. Gaspar Silvera and was introduced also to IDIAP's personnel through an acquaintance visit through the different instalations of the Central Administration Building.

In subsequent days the Specialist in Adm. of Ag. Research went to visit the Facultad de Agronomía of the University of Panama and was attended by the Dean of the School, Dr. Alfredo Bernal and different possibilities of interaction and interinstitional coordination with IDIAP were discussed.

The period of introduction and visits included also the offices of AID/Panama where I was received first by Dr. Donald Drga, project officer, and discussions were held on preliminary aspects of getting installed and the initiation of the job duties. At the same time we discussed about the interactions between IDIAP and AID.

Dr. Donald Drga made arrangements for several courtesy visits that included the Institution Director General, Dr. Ronald Levin and the Director of the Agricultural Division, Dr. Gale Rozell. Later, I was introduced to several officers

which somewhat have to do with the success of the mission of the Specialist in Adm. of Ag. Research.

B. ADMINISTRATIVE SYSTEM AND RESEARCH PROGRAM IN IDIAP

During the last two weeks of February, the Specialist in Adm. of Ag. Research familiarized himself with current administrative systems and with the programs and activities of research conducted at IDIAP. In this function the Specialist received an effective collaboration from Ing. Bernardo Ocaña, Asesor de Cooperation Tecnica; Lic. Berta Perez, IDIAP's Head of Personnel who prepared a computerized listing of all IDIAP's personnel and from Ing. Gemino Kleber Vargas, officer in charge of Post-Graduate trainning abroad. I would like to express my appreciation and thanks to all three members of IDIAP who made getting started by this consultant much easier.

Among the documents I have available as sources of references for my function are:

1. Annual Plan of Operations of IDIAP, POA-1984, Tomos I (Investigacion Agricola) y II (Investigacion Pecuaria.

2. Bibliografía Agropecuaria de Panama compiled by CIDAGRO, IDIAP.

3. Personnel of IDIAP by regions, academic degrees and functions within the institution.

4. Listing of/IDIAP's workers on leave, to carry out post-graduate training, mainly in USA Universities.

5. Rutgers University Project for Agricultural Technology Development in Panama.

6. Copy of the Administrative organigram of IDIAP aproved on January 16, 1985.

7. Several miscellaneous documents.

C. REGIONAL CENTERS, EXPERIMENTAL FIELDS AND SPECIALIZED LABORATORIES.

To comply with the legal mandate expressed in Law 51 through the General Objectives, it must be put into action a series of joint actions allowing: 1) to elaborate an efficient system of administrative organization with a certain degree of descentralization and with capacity to elaborate realistic research plans; 2) to make decissions between different options (priorities) presented first at the regional level and later the national level, and 3) to monitor closely the research process in each region and this will facilitate later the global evaluation of IDIAP at the institutional level.

In this way, the administrative reorganization recently implemented at IDIAP implies a greater degree of descentralization while at the same truly gives more responsabilities to each of the regional centers which have been conceived to provide a greater coverture and presence of IDIAP at the national level.

The activities of research in each of these regional centers is actually conducted directly in the field, whether

on Experiment Stations where more controlled experiments are conducted or in selected Farmer's fields for this purpose who are voluntary collaborators with the different projects.

The Specialist in Adm. of Ag. Research visited during the month of march the Central Regional Center in Santiago, Veraguas and the Oriental Regional Center to become directly acquainted on their functioning and its relationship to the plans of action and institutional development of IDIAP. The agendas of each trip have been included at the end of this report as illustration.

In reference to the Specialized Laboratories the Specialist was involved into several actions, among them: 1) Visited the building known as "Bunker" where several labs were supposed to be hosted and this included the Cell and Tissue Culture Lab., Entomology, Phytopathology and Toxicology. This advisor at this time recomended that the Bunker be dismissed as a possible place to install the laboratories because it was obvious it did not meet minimal security standards along with other deficiencies such as lacking a green space to grow plants or install a greenhouse. These concerns were expressed in a Memo addressed to the General Director on April 2, 1985.

Besides, the Ag. Research Adm. Specialist did propose in a document entitled: "IDIAP: Logros y Expectativas" that the Specialized laboratories be built together with the new administration Head quarter buildings of IDIAP in Tocumen.

D. COORDINATION OF THE ATD PROYECT/PANAMA

Taking on the role of Project Coordinator has demanded a very significative attention, in terms of time and effort, to this function given the wide variety of activities that are encompassed, among them: 1) keeping records of activities and reports from each of the Rutgers Advisors providing Technical Assistance to the project; 2) participate and assist in the coordination of visits by Advisors involved as part af Complementary Technical Assistance associated with the project ATD; 3) Serve as a Liasson person between Rutgers University and IDIAP and USAID in Panama; 4) Revision and editing of quartely reports and plans of work prepared by team members; 5) Other complementary administrative tasks. So far the Coordination function has taken between about 30 to 40% of my time with the remainder 60 to 70% devoted to my functions as Specialist in Adm. of Ag. Research. However, it should be pointed out that the role of an In-Country Coordinator is important to assure a better participation of the Technical Assistance provided by Rutgers University.

AGENDA DE VIAJES

Dr. Carlos A. Neyra, Especialista en Administración de Investigación Agrícola y Coordinador del Proyecto Rutgers/IDIAP; Doctor Donald Drga, AID/Panamá, Agricultural Division.

DIA: VIERNES 8 DE MARZO

1.	10:00 a.m. - 11:00	Visita al Laboratorio de Suelos del IDIAP en Divisa. Contacto: Lic. Químico Pedro A. González Ing. Agr. Benjamín Name
2.	11:00 a.m. - 11:30	Visita de las instalaciones y al Director del INA, Divisa.
3.	11:45 - 12:00	Alojamiento Hotel David, Santiago
4.	12:15 - 1:15 p.m.	Visita de la Oficina Regional Central y reunión con el Director Regional Encargado, Ing. Santander Jaramillo
5.	1:30 - 2:00 p.m.	Visita a la Biblioteca del IDIAP (CIDAGRO).
6.	2:15 - 2:45 p.m.	Visita a la Oficina de Publicaciones y Documentación.
7.	3:00 - 6:00 p.m.	Visita informativa a los Llanos de Ocú con el Ing. Jaime López e Ing. José A. Aguilar.

DIA SABADO 9 DE MARZO

1.	8:00 - 9:00 a.m.	Reunión con el Dr. Alfredo Serrano, Especialista en Producción Animal del Proyecto Rutgers/IDIAP y visita de Finca Ganadera en Montijo.
2.	9:00 - 12:00	Visita del Campo Experimental en Calabacito con el Dr. Alfredo Serrano y el encargado local, Ing. E. Arosemena.

DR. NEYRA

Panamá, 11 de marzo de 1985

M E M O R A N D U M

PARA : ING. BERNARDO OCAÑA
Cooperación Técnica

DE : ING. FABIO GARIBALDO
Coordinador Pecuario

ASUNTO : Programación de Gira al Area de Chepo

La programación elaborada para el día jueves 14 pudiera ser la siguiente:

1. Visita a la Universidad de Panamá. (Tocumen)

2. Recorrido al área de la finca donde se piensa establecer programas de pastos y donde existe evidencia de los estragos de la erosión en potreros. (Area de La Mesa).
OPCIONAL (FINCA 27)

3. Campo Experimental de Chichebre.

4. Parcela de hortaliza de la Corporación Bayano.

5. Visita a Finca de productores de doble propósito, área de la Unión Tableña.

6. Recorrido a Puerto Coquira (Visita Finca del Legislador Tomás Altamirano Duque).

7. Visita al afea de El LLano-Carti.

8. Represa del Bayano (área de Loma del Naranjo).

9. Puente del Río Bayano.

Atentamente,

cc: Dr. Carlos Morán
Dr. Víctor Escudero

Salida 7:a.m. Oficina IDIAP
Ing. Garibaldo, Dr. Sasso, Dr. Neyra

40