

# News Release

INTERNATIONAL RICE RESEARCH INSTITUTE

FOR IMMEDIATE RELEASE

IRRI Names Dr. M.S. Swaminathan  
as New Director General

Los Baños, Philippines -- The International Rice Research Institute (IRRI) announced the appointment of Dr. M.S. Swaminathan, 56, as director general on Friday 18 December.

Dr. Swaminathan, a plant breeder and geneticist, is known as an "architect of modern Indian agriculture." He assumes duties in mid-April 1982, replacing Dr. Nyle C. Brady, senior assistant administrator, U.S. Agency for International Development, who served as IRRI director general for 8 years.

Dr. Swaminathan is member (Agriculture), Planning Commission, Government of India. He also serves as president and chairman of the Board of Trustees of the International Federation of Agricultural Research Systems for Development, an organization dedicated to strengthening and gaining international support for agricultural research and training systems in developing nations.

He has held previous positions as secretary, Ministry of Agriculture, Government of India; as director general, Indian Council of Agricultural Research; as cytogeneticist and director of the Indian Agricultural Research Institute; and as plant breeder, Central Rice Research Institute, India.

Dr. Swaminathan received his Ph.D. degree from the University of Cambridge, UK in 1952, and has been awarded honorary doctoral degrees by 14 universities, most recently by the Technical University of Berlin, Federal Republic of Germany.

In 1972 he was elected Chairman of the United Nations Advisory Committee on Science and Technology for Development and independent chairman of the Food and Agriculture Organization Council, and was awarded the prestigious Meghnad Saha Medal by the Indian National Science Academy. Dr. Swaminathan is recognized as a fellow or honorary fellow of the Royal Society of London (UK), the National Academy of Sciences (USA), the All-Union Academy of Agricultural Science (USSR), and other societies.

In 1971 he received the Ramon Magsaysay Award in the Philippines for his contributions to agriculture as a scientist and educator.

The new director general has published more than 200 research articles in scientific journals and has guided more than 50 students through their Ph.D. research.

Dr. Swaminathan has served as vice chairman of the Technical Advisory Committee of the Consultative Group on International Agricultural Research (CGIAR), a group of donor agencies dedicated to the improvement of agriculture in developing nations.

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IRRI works with national rice improvement programs to increase the productivity of rice lands by developing and testing improved varieties, production technologies, and rice-based cropping systems. The Institute, about 60 km south of Manila, is best known for its development of improved semidwarf rice varieties that spearheaded the green revolution -- a term coined to describe the phenomenal increases in rice and wheat production in developing nations since the mid-1960s. Today about 30% of the rice in the tropics is planted to IRRI varieties or to their progeny.

Dr. Swaminathan's early recognition of the potential of semidwarf varieties of wheat and rice contributed to their wide-scale adoption by Indian farmers. Dr. Swaminathan was born in 1925 in Tamil Nadu, India. The Swaminathans have three children.

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## SUBSTANDARD VETERINARY SCHOOLS ?

The consensus among those in the know seems to be that there are too many veterinary schools and that most of them are substandard and, consequently, are turning out "half-baked" veterinarians.

This thinking surfaced recently during a symposium held at the Asian Institute of Tourism of the University of the Philippines. Among those in attendance were Dr. Salvador H. Escudero III, director of the Bureau of Animal Industry and concurrently dean of the U.P. College of Veterinary Medicine; Dr. Pio de Guzman, president of the Philippine Veterinary Medical Association (PVMA); Dr. Mario S. Tongson, associate dean of the U.P. College of Veterinary Medicine; Dr. Clodualdo Perez, dean of the UPLB College of Agriculture; and Dr. Mauro F. Manuel, professor and chairman of the Department of Veterinary Parasitology, UPCVM.

Since there appears to be a surplus of veterinary schools, with most of them turning out ill-equipped graduates, there is a glut of veterinarians at the end of each school year, with the result that many find themselves jobless. In the words of Dr. Tongson, "we are fast approaching the saturation point."

The same apprehension was voiced by Dr. De Guzman over the growing number of veterinarians graduating from about a dozen veterinary schools in the country who seem to be inadequately prepared for the job.

To remedy the situation, Dr. Tongson, after making the observation that one good veterinary school would be enough to effectively meet the requirements of the industry, suggested the closing of some veterinary schools that are substandard. He said, in this regard: "The quality of our graduates will deteriorate with the continuance of substandard schools, and the good image of the veterinary profession we have been painfully trying to build for years will suddenly go to waste. If closing some of the substandard schools is not possible, it would be wise to regulate the number of students enrolling in each school in relation to the resources and facilities it can offer so as not to flood the market with 'half-baked' veterinarians."

The conferees were agreed, however, that there should be established minimum standards which every school must meet to continue operating. To this end, a listing had actually been made by the Technical Panel for Agricultural Education (TPAE) of the Ministry of Education and Culture, of which Dr. Perez is vice-chairman. The listing specified the minimum facilities a veterinary school must have to ensure the quality of education it can provide its students, one requirement being that a veterinary school must be affiliated with an agricultural school.

It was pointed out, however, that the minimum requirements set by the committee would require huge investments and thus some private schools may not be able to raise the necessary funds to purchase the needed equipment.

Commenting on the minimum requirements set by the committee, Dr. Manuel said that as far back as 1974-75, the UPCVM "planned" to equip their college for a targeted turnover of 80 to 100 graduates a year at an estimated cost of P19 million for equipment alone. The plan fizzled out, however, because as pointed out by Dr. Escudero, UPCVM's budget amounts only to P1.9 million a year.

Therein lies the horns of a dilemma.

# AHAJ Outlook

## ATTENTION: MINISTER TANCO —

Steps should be taken by the leadership of the Ministry of Agriculture to minimize or cut down meetings or conferences of the Ministry's fieldmen, especially the provincial veterinarians and agronomists. What is happening now is that in five days of work, the provincial veterinarians and provincial agronomists and their respective technicians or extension workers seldom find time to actually perform their primary duty which is to promote agro and livestock production.

Because of the many "conferences" required by the Ministry of Agriculture for their fieldmen to attend, livestock and agricultural farms are seldom inspected. The agronomists, veterinarians and livestock technicians are supposed to go to the field and conduct extension work, advise the farmers how to do their "thing".

Most of the time, however, the conferences called by provincial governors or municipal mayors end up with nothing but speeches and the partaking of sumptuous lunches.

It is a different matter with the Regional Directors and Assistant Regional Directors. They have to attend meetings and social affairs — it is their job to promote a continuing dialogue with local politicians.

The complaint of the private sector is that the field personnel of the Ministry of Agriculture are inaccessible, especially to the small farmers, cattle ranchers and hog raisers.

The Ministry should also look into the report that its fieldmen are engaged directly or indirectly in the sale of pesticides, insecticides and veterinary products. For example: if a veterinarian or livestock inspector checks up hogs or cattle, the small hog raisers or cattle ranchers usually end up paying through the nose, as it were, for expensive drugs or vaccines administered on their livestock.

The sad part of it is that usually, the vaccines administered are government issue and supposed to be given free to the people. It is very hard to admit but it is true nevertheless that fieldmen of the Bureau of Animal Industry and the Bureau of Plant Industry make themselves inaccessible to the common people.

It has also been reported that veterinary products, pesticides or insecticides are sold by the government technicians at a price higher than that prevailing in the market. It makes the people wonder whether the government is truly the government of the people, for the people and by the people.

When the people get fed up with the abuses of government officials, when the people cannot get redress for their grievances, when the people are abandoned by the government, they usually end up hating the government. It is not difficult for people to lean towards the New People's Army or other leftist anti-government movements when they become disenfranchised with or abused by government employees. Small farmers live on a day to day basis, their income hardly could meet both ends. Abusive and corrupt government officials are worse than the NPA's.

## COUNTER- PROPAGANDA —

The Ministry of National Defense is now training political officers in the Armed Forces of the Philippines (AFP) to counter the full-scale propaganda offensive launched by the Communist Party of the Philippines (CPP) and its military arm, the New People's Army (NPA) in the countryside. The fieldmen of the Ministry of Agriculture should be the main arm, not the military, to counter the propaganda effort of the CPP and bring the people closer to the government by helping the common people in the farms and barrios to bring about social and economic stability.

Strategies are being adopted by the CPP propagandists now being worked out by an intelligent group led by Horacio "Boy" Morales, a former government technocrat who defected to the dissident camp, to exploit the failure of the government to help the farmers. For example: if the farmer's livestock, especially cattle and carabaos, are rustled and he cannot get immediate help from the government, the military arm of the Communist party — the New People's Army — deal swift justice to the cattle rustlers. By so doing, the dissidents exploit the failure of the government to go after the cattle rustlers.

Aim is to determine causes of severe population outbreaks.

SAVANTS STUDY GROWTH OF DEADLY RICE PESTS

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COLLEGE, Laguna — They are tinier than grains of rice but farmers and agricultural experts know better than to ignore the presence of the brown planthopper (BPH) in farms.

For the insects have become among the most dread pests in rice-producing countries in Asia, including the Philippines.

In 1979, damage caused by BPH in the region in terms of yield losses was placed at over US\$30 million.

The International Rice Research Institute (IRRI) noted that BPH, while a major problem in China, Japan and South Korea for centuries, was only a sporadic problem in the tropics.

Attacks on lowland rice crops in epidemic proportions started only in the second half of the seventies. It caused considerable damage in the Philippines, Indonesia, Malaysia, Thailand, Vietnam, India, Sri Lanka and the Solomon Islands.

Researchers associate the increase in brown planthopper population with the changing agronomy of rice production.

Expansion of irrigation facilities, for instance, provided the insects with a more continuous habitat. New high-yielding varieties were found to possess characteristics which favored the BPH's population increase. Even the use of fertilizer contributed to the increase.

An annual trans-oceanic migration of the insect has also been observed.

"This phenomenon accounts for the pest invasions in the temperate countries of Japan and Korea," says Trevor John Perfect of the London-

(Continued on page 38)

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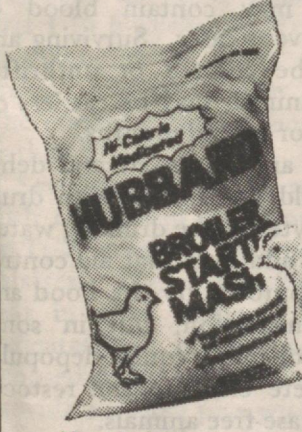
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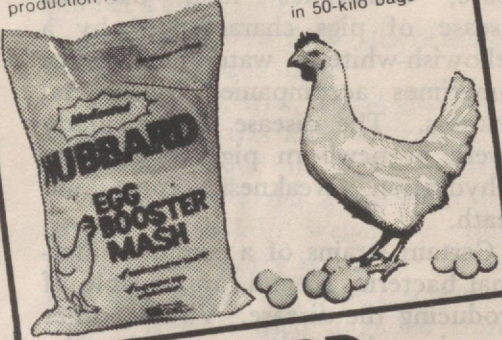


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# PIG SCOURS: A COMMON SYMPTOM WITH MANY CAUSES\*

By G. W. MEYERHOLZ, D.V.M.

Diarrhea, commonly referred to as scours, is one of the most important causes of death and economic loss in pigs. Diarrhea is not a disease, but a common sign of several disease processes. Mounting evidence suggests that diarrhea outbreaks in pigs are multicausal — a combination of bacterial, viral and parasitic agents influenced by stress, improper nutrition, environmental factors and poor management. The sum of these factors determines if pigs will have diarrhea and how severe it will be. The following outlines various causes of scours, symptoms and suggested treatment.

## COLIBACILLOSIS (WHITE SCOURS)

Colibacillosis (white scours) is an acute, sometimes fatal bacterial disease of pigs characterized by a yellowish-white, watery diarrhea sometimes accompanied by general sickness. The disease is particularly severe in newborn pigs resulting in dehydration, weakness, coma and death.

Certain strains of a common intestinal bacteria, *E. coli*, are capable of producing the disease. Viruses, other bacteria and parasites may infect the pig during or after the *E. coli*.

Failure to get adequate colostrum immediately after birth, poor sanitation, chilling temperatures and moist environment influence the pig's resistance and transmission. Diagnosis is based on clinical signs, necropsy and identification of significant numbers of pathogenic *E. coli*.

Affected pigs must be treated promptly with antibacterial drugs which have been shown to be effective against *E. coli* in the herd. Oral or injectable administration of fluids to overcome dehydration also helps reduce mortality. A method used by some veterinarians is the feeding of cultures of *E. coli* isolated from the herd to sows late in gestation. The vaccinated sows secrete antibodies in their milk that help protect newborn pigs.

## CLOSTRIDIAL DIARRHEA

Clostridial organisms are being recognized more frequently as a cause of diarrhea in pigs. The disease is usually seen in the first week of life, but pigs up to a month of age may be affected.

The diarrhea is watery and yellow and may contain traces of blood. The majority of affected pigs die.

There is no effective treatment after signs appear, but pigs may be given Type C antitoxin as soon after birth as possible to reduce losses. This is effective against the toxin produced by the organism. The disease can be prevented or severity reduced in problem herds by vaccinating the sows 6 weeks and 3 weeks before farrowing with Type C toxoid.

## SALMONELLOSIS (NECRO)

Salmonella organisms can infect pigs of any age, but diarrhea due to these bacterial organisms is more common in young, growing pigs. Pigs have a watery, yellowish diarrhea that may contain blood. Infected animals may have a temperature as high as 107 degrees F.

Tissues lining the intestinal tract may be destroyed resulting in necrotic enteritis (necro). Pigs may be unthrif-

ty, emaciated and some may never reach market weight.

Antibacterial drugs are used in treatment, however, good sanitation and reducing stress are most important in preventing the disease. Feces of infected animals can contaminate the environment, feed and water, and rodents and wild birds are sources of infection.

## SWINE DYSENTERY (BLOODY SCOURS)

Swine dysentery can occur in pigs over 2 weeks of age, but is more frequently seen in 8 to 14-week-old pigs. A bacterial organism, *Treponema hyodysenteriae*, has been shown to cause the disease when acting synergistically with other anaerobic bacteria in the pig's intestinal tract.

Diarrhea may contain blood or mucus in severe cases. Surviving animals may be stunted or unthrifty. Recovered animals may be carriers of the disease for several months.

Pigs that are depressed and dehydrated should be treated with drugs and electrolytes in the drinking water. Several feed additives that aid control have been approved by the Food and Drug Administration, but in some herds, control may require depopulation, complete clean-up and restocking with disease-free animals.

## TRANSMISSIBLE GASTRO- ENTERITIS (TGE)

Transmissible gastroenteritis or TGE is the most devastating disease of young pigs. Mortality may be as high as 100 percent in pigs up to one week of age, however, TGE is usually a mild disease in pigs over 3 weeks and

*(Continued on opposite page)*

\*Reprinted from National Hog Farmer, published by The Webb Company, 1999 Shepard Rd., St. Paul MN.

## PIG SCOURS...

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in adults, except in sows that sicken at or near farrowing.

The first sign is usually vomiting followed by a very thin, watery diarrhea that runs down the legs or off the tip of the tail. Young pigs become dehydrated and usually die. If the disease becomes established in a continuous farrowing facility, the entire pig crop can be lost. TGE is caused by a coronavirus that is highly contagious.

No drugs are effective against the TGE virus. Water and electrolytes can be provided to help overcome starvation and dehydration, but has limited success in pigs less than 10 days of age.

Oral and injectable vaccines have become available. Vaccination of sows and gilts in advance of farrowing provides protection to pigs through the milk. The disease is most prevalent during winter months.

TGE is introduced into herds by purchase of new stock, or birds may be a method of introduction. Vaccination of sows and gilts, particularly those farrowing during the winter months, is suggested. New swine should not be brought into the herd during the farrowing season.

## ROTAVIRAL DIARRHEA

Recently, another group of viruses has been shown to cause diarrhea in pigs 1 to 6-weeks-old. Feces are white or yellow at the onset, then become creamy and pasty after a few hours. The disease is similar, but much milder than TGE.

Severity and death rates increase with concurrent infections of E. coli or TGE virus and by inadequate milk or stress. The virus apparently is present in most swine herds. Evidence indicates that many sows have been exposed to the rotavirus and therefore provide suckling pigs with variable degrees of immunity. No specific treatment or approved vaccine is available.

## STRONGYLOIDES (THREADWORMS)

Strongyloides is one of several parasites that inhabit the intestinal tract, particularly in hogs in southern states. Their eggs pass out in the feces and hatch within a few hours under favorable conditions. The parasite can also

multiply outside the animal host, can be transmitted from the sow to the pig before birth (prenatal infection), can be transmitted through the colostrum, and is capable of penetrating unbroken skin. As a result, mature threadworms have been detected in baby pigs as early as 4 days old. The resulting yellowish diarrhea and possible death loss in baby pigs can be a difficult problem.

Surveys of feeder pigs in Florida indicate that about 80 percent of pigs have strongyloides. Their presence is not usually a problem except in very young pigs. Because of the widespread infection in swine herds in the south, treatment with thiabendazole at 5 and 10 days of age in problem areas is suggested to prevent scours due to this parasite.

## COCCIDIOSIS

Coccidia are tiny protozoan parasites that may cause diarrhea in pigs from 5 days to 3 weeks of age. Finding coccidia by microscopic examination of fecal samples collected three to four days after onset of diarrhea is suggested.

However, since many pigs shed coccidia without any signs of disease, confirmation of diarrhea due to coccidiosis depends on necropsy and microscopic examination of tissue samples from several sites in the intestinal tract. Drugs effective against coccidia are available and sanitation and farrowing environment are important in prevention.

## TREATMENT AND CONTROL MEASURES

Identifying the cause of diarrhea in pigs is needed before management procedures can be initiated. A veterinarian may conduct a postmortem examination of dead or dying pigs, tissues may be collected for examination by a diagnostic laboratory, or diagnostic tests, bacterial culturing and sensitivity tests can identify the causative agent and best drugs for treatment.

In some cases, vaccines are available that provide partial, to good protection. However, swine producers should not place too much emphasis on antibiotics, chemotherapy and vaccines. Sanitation, nutrition and management are at least as important to reduce losses from scours.

*It has tensile strength similar to that of abaca.*

## SALUYOT BARK IS GOOD MATERIAL FOR ROPE

**BAGUIO CITY** — The bark of an indigenous plant whose leaves are considered a delicacy in the Ilocos region has been found to be a good material for rope.

Called saluyot, the plant produces barks which, when stripped, dried and twined, show tensile strength similar to that of abaca rope.

The potential of saluyot bark as material for rope was discovered by a 12-year-old high school student at the University of Baguio Preparatory High School in a research study he submitted as entry to the Division Science Fair and Quiz.

Joris-Karl Dacawi, son of a newsman, recalled he got interested in the bark while gathering saluyot leaves for food in his Galimuyod hometown in Ilocos Sur. He said he stripped off a piece of the bark from its trunk and then twisted it around another until it looked like a rope. Curious about its tensile strength, the young researcher did a follow-up study.

Young Dacawi gathered saluyot stems, sun-dried and split them. The barks were then stripped and twined to form a rope.

He tested the bark's tensile strength by determining the weight it can support at a given time.

Results showed that saluyot rope is as strong as abaca rope.

In the first trial, a five-gram fiber supported or was able to carry a 15-kilogram weight in three minutes.

In the second trial, a half-gram fiber carried a 16-kilo weight in three minutes and thirty seconds. The last trial gave almost the same result as the first. Weights used included stones and steel bars.

The young researcher says the fibers of the saluyot bark withstood an average total load of 15 kilos and 3 grams in 3 minutes and 6 seconds before it finally snapped.

Judges at the science fair considered the research findings quite timely. In these days when prices of commodities go nowhere but up, low-cost utilization of indigenous material that ultimately will result in cheaper pro-

(Continued on page 11)

# WATERMELON RIND MEAL FOR BROILERS<sup>1/</sup>

By L. S. CASTILLO, A. L. GERPACIO, F. SD. PASCUAL, C. I. MERCADO,  
E. E. ABENIR, and L. P. PALO, University of the Philippines at Los Baños

Pakuan or watermelon, [*Citrullus lanatus* (Thurb.) Mansf] is commonly cultivated in many places of the Philippines and in all warm countries (Brown, 1920; Quisumbing, 1951). The peel or watermelon rind (WMR) of the fruit which is abundant during late rainy to the dry season poses a problem of waste disposal. This is particularly true in the cottage manufacture of torrefied seeds for snacks or as substitute for peanuts. This study is one of the aspects on the utilization of non-conventional fibrous wastes.

## MATERIALS AND METHODS

**Watermelon rind.** About one ton of watermelon rind was obtained from a cottage manufacturer of torrefied seeds in La Paz, Tarlac. A mechanically - driven chopper was used to slice then after washing. The following treatments were imposed.

- T<sub>1</sub> - Control 0% WMR
- T<sub>2</sub> - WMR boiled soft and dried, 20%
- T<sub>3</sub> - WMR soaked in 2.0% calcium hydroxide for 36 hours, washed, not boiled, dried, 20%
- T<sub>4</sub> - WMR soaked in 2.0% calcium hydroxide, washed, boiled, dried, 20%
- T<sub>5</sub> - WMR soaked in 2.0% calcium hydroxide, and 1.0% sodium hydroxide, washed, not boiled, dried, 20%
- T<sub>6</sub> - WMR soaked in 2.0% calcium hydroxide and 1.0% sodium hydroxide, washed, boiled, dried, 20%

The rations were compounded as shown in Table 1.

**Broilers.** Commercial strain of broilers individually caged and fed for

Table 1. COMPOSITION OF BROILER RATIONS WITH DRIED WATERMELON RIND (WMR).

FEEDSTUFFS	T R E A T M E N T S					
	Control 1a/	2	3	4	5	6
Yellow corn	50.0	40.0	40.0	40.0	40.0	40.0
Soybean oil meal	30.0	20.0	20.0	20.0	20.0	20.0
Fish meal	7.0	15.0	15.0	15.0	15.0	15.0
Copra meal	5.0	—	—	—	—	—
Rice bran	5.0	—	—	—	—	—
Watermelon rind	—	20.0	20.0	20.0	20.0	20.0
Coconut oil	—	3.0	3.0	3.0	3.0	3.0
Salt	0.2	—	—	—	—	—
Limestone	0.2	—	—	—	—	—
Bone meal	2.0	—	—	—	—	—
Commercial vit-min-mix	0.3	0.3	0.3	0.3	0.3	0.3
Poultry feednectar	0.3	0.35	0.35	0.35	0.35	0.35
Premixed supplement <sup>b/</sup>	—	1.35	1.35	1.35	1.35	1.35
Total	100.0	100.0	100.0	100.0	100.0	100.0
Protein, %	23.0	22.3	22.3	22.3	22.3	22.3

<sup>a/</sup>M.E. of control 2815 kcal/kg.

<sup>b/</sup>Premixed supplement contained: methionine, 0.35%; lysine, 0.35%; sugar-mate, 0.35%; dicalcium phosphate, 0.25%; antioxidant, 0.05%.

six weeks were used. There were six replications per treatment.

## DISCUSSION OF RESULTS

**Chemical composition of watermelon rind.** Table 2 and 3 show the samples had high dry matter contents. Crude protein from the rind which was boiled was highest 7.66%. The range is wide from 5.86 to 7.66% for all samples. As expected the crude fiber contents are high. And because of the calcium hydroxide treatment, the calcium content increased from the 1.88% to 3%. The detergent fiber, analysis (Table 3) showed consistent increases due to the chemical treat-

ments except that on silica where sodium hydroxide treatment caused a decrease.

**Performance of broilers.** Results shown in Table 4 suggest that slicing watermelon rind and boiling it soft makes it a palatable and nutritious feedstuff. All treated watermelon rind produced broilers which were just as heavy as those fed the control diet. Broilers fed with WMR treated with calcium hydroxide, sodium hydroxide and boiled were significantly better in both weights and gain/protein than WMR calcium hydroxide-sodium hydroxide but not boiled.

(Continued on opposite page)

<sup>1/</sup>Presented at the 18th Annual Convention of the Philippine Society of Animal Science, PICC, Metro Manila, November 13-14, 1981.

**Table 2. PERCENTAGE CHEMICAL COMPOSITION OF WATERMELON RIND (WMR)**

Treatments	Dry Matter	Crude Protein	Ether Extract	Crude Fiber	Ash	NFE	Calcium	Phosphorus
Watermelon rind (WMR), boiled and dried	93.16	7.66	2.63	37.66	15.28	29.93	1.88	0.33
WMR + 2% Ca(OH) <sub>2</sub> not boiled	98.80	6.20	2.40	38.31	24.60	27.29	3.03	0.40
WMR + 2% Ca(OH) <sub>2</sub> , boiled	96.96	5.86	2.22	34.98	28.22	25.68	3.06	0.45
WMR + 2% Ca(OH) <sub>2</sub> + 1% NaOH, not boiled	94.99	7.12	3.03	35.34	22.86	26.64	3.24	0.43
WMR + 2% Ca(OH) <sub>2</sub> + 1% NaOH, boiled	97.59	6.48	2.14	38.10	28.34	22.53	3.08	0.47

**Table 3. DETERGENT FIBER ANALYSIS OF WATERMELON RIND, PERCENT.**

Treatments	NDF	ADF	Hemicellulose	Permanganate Lignin	Silica (Ash)
WMR boiled	40.00	37.33	2.67	34.46	0.86
WMR + 2.0% Ca(OH) <sub>2</sub> , not boiled	66.08	57.26	8.82	56.20	1.06
WMR + 2.0% Ca(OH) <sub>2</sub> , boiled	66.22	56.11	10.11	55.22	0.90
WMR + 2.0% Ca(OH) <sub>2</sub> + 1% NaOH, not boiled	56.88	50.16	6.72	49.70	0.46
WMR + 2.0% Ca(OH) <sub>2</sub> + 1% NaOH, boiled	56.66	50.66	6.00	49.86	0.80

**WATERMELON RIND...**  
(Continued from page 10)

**ACKNOWLEDGEMENT**

The second semester 1980-81 Graduate Students in Animal Science 270 — "Research Techniques in Animal Nutrition" for their valuable help.

Dr. Mario Marcos Labadan for feed supplements.

PHARMA INDUSTRIES Inc. for poultry feed nectar, sugarmate.

**LITERATURE CITED**

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**Table 4. PERFORMANCE OF SIX-WEEKS OLD BROILERS FED DRIED WATERMELON RIND.**

Treatments	Initial Weight	Final Weight	Gain/Protein
	gram	gram	
T <sub>1</sub> — Control	47.9 <sup>a</sup>	1337 <sup>ab</sup>	1.616 <sup>ab</sup>
T <sub>2</sub> — 20% WMR, boiled	46.7 <sup>a</sup>	1414 <sup>ab</sup>	1.724 <sup>ab</sup>
T <sub>3</sub> — 20% WMR + 2.0% Ca(OH) <sub>2</sub> , not boiled	48.4 <sup>a</sup>	1372 <sup>ab</sup>	1.583 <sup>ab</sup>
T <sub>4</sub> — 20% WMR + 2.0% Ca(OH) <sub>2</sub> , boiled	47.3 <sup>a</sup>	1364 <sup>ab</sup>	1.480 <sup>ab</sup>
T <sub>5</sub> — 20% WMR + 2.0% Ca(OH) <sub>2</sub> , + 1% NaOH, not boiled	45.8 <sup>a</sup>	1210 <sup>b</sup>	1.342 <sup>b</sup>
T <sub>6</sub> — 20% WMR + 2.0% Ca(OH) <sub>2</sub> + 1% NaOH, boiled	48.8 <sup>a</sup>	1563 <sup>a</sup>	1.676 <sup>a</sup>

In each column figures with the same letter superscripts are not significantly different.

**SALUYOT BARK...**  
(Continued from page 9)

ducts is most welcome, they said.

They noted that nylon and abaca ropes have now become expensive, and the use of the saluyot which abounds in the Ilocos region as material for rope can result in cheaper binding material.

Saluyot grows well in warm places even if denied proper care. It reaches a height of four feet with its stem usually utilized as firewood.

Saluyot leaves are favorite vegetable fares among the Ilocanos. It also has medicinal values. Its leaves, when boiled, can cure stomach troubles. Ground into paste form, it has been proved effective as first-aid for skin wounds.

Young Dacawi urged farmers, particularly those who have good use for twine for bundling agricultural produce, to cultivate the plant in their backyards. He said saluyot bark can provide good substitute for store-bought abaca or plastic cords or ropes.

## CLOSTRIDIUM DISEASES: A MAJOR SOURCE OF INFECTION

By WILLIAM L. SIPPEL,  
V.M.D., Director Emeritus, Texas  
Veterinary Medical Diagnostic Laboratories  
College Station-Amarillo, Texas

Diseases caused by the clostridium group of bacteria are a major source of loss in cattle dying from infections. Nine members of the genus are known to cause disease and others are suspected. The most notorious is blackleg (*Clostridium chauvoei*). Others are malignant edema (*Cl. septicum*), redwater (*Cl. hemolyticum*), black disease (*Cl. novyi*), *Cl. sordelli*, enterotoxemia (*Cl. perfringens*), tetanus or lockjaw (*Cl. tetani*), botulism or loin disease (*Cl. botulinum*) and others less well known. Enterotoxemia and botulism each cause different types of disease, depending on which type of toxin is elaborated by the bacteria.

The clostridia have also been classified into toxin producers (primarily tetanus and botulism) and gas-phlegmon producers — which also produce toxins. One company has divided its products for protection against these diseases into the liver group, muscle group and gut group — depending on the site of the major lesion.

### WAYS THE BACTERIA SPREAD

These bacteria are spread primarily in the droppings of cattle, most of which are normal animals exhibiting no signs of illness. The author witnessed the introduction of redwater into the state of Florida around 1960 when cases of this previously undiagnosed disease began to appear. Probably cattle carrying *Cl. hemolyticum* were introduced into a fluke-infested area and the disease appeared.

These diseases are spread primarily by the bacteria being swallowed by cattle, becoming established in their gut and spread by their droppings.

Various circumstances lead to disease from these intestinal inhabitants, most of which cause no trouble under normal conditions while in the gut.

In the so-called muscle group, the bacteria are carried to different muscles in the body, begin growing, and produce gas and toxins causing a phlegmon. Blackleg, malignant edema and *Cl. sordelli* belong to this group. The liver group includes redwater and black disease (*Cl. novyi*). These bacteria get to the liver from the intestine where they may remain without causing trouble; but if a liver fluke larvae or some other agent damages the liver tissue, they may begin to grow and elaborate their very potent toxins which cause an area of necrosis as well as death of the animal, often in a matter of hours. The enterotoxemia bacteria (*Cl. perfringens*) exists in the gut and proliferates with production of several different toxins when the nature of the gut content becomes favorable, usually from overeating. The different toxins produce disease in different species and ages of animals. Types C and D cause trouble in cattle.

### BACTERIA PRODUCE TOXINS

The botulism and tetanus bacteria both produce very potent toxins. Botulism is classed as an intoxication rather than an infection, as the toxin is formed in decaying flesh or organic matter (feed, hay) outside the body and causes poisoning when eaten. As little as one gram of contaminated flesh can cause death of a cow. In Texas, botulism is also called loin disease and sometimes occurs in phosphorous-deficient cattle that chew bones obtained from decom-

posing carcasses. Tetanus is a wound contaminant and grows in deep puncture wounds or others where the area of growth is protected from the oxygen in air. This toxin affects the nervous tissue and causes tensing of the muscles. Infection in cattle is usually seen in cows following calving or in calves following castration.

Symptoms of these diseases are related to their site of infection. Blackleg and malignant edema produce muscle lesions in various areas with accompanying gas and fluid production. Sudden death is characteristic of redwater and *Cl. novyi* infections, whereas severe intestinal lesions and bloody diarrhea is seen in enterotoxemia.

These diseases should be suspected in any condition where, in addition to the characteristic local lesions, hemorrhages are noted on the heart and other organs, as well as fluid in the chest and abdominal cavities, often blood-tinged.

### BACTERINS PREVENT DISEASE

Fortunately food bacterins or bacterin-toxoids are available for prevention of these diseases. Blackleg and malignant edema are probably the most widely used biologics sold. In spite of the prevalence of this infection and proven effectiveness of these vaccines, the diagnostic labs see many cases each year and many more are diagnosed by practicing veterinarians who don't request laboratory assistance.

The other diseases are not as widespread and vaccination is not as universal as for blackleg. If they exist

*(Continued on page 15)*

*Deposit at Sab-A Basin in Leyte alone is estimated at 350 million cubic meters.*

**PEAT: NEW ANSWER TO ENERGY CRISIS**

The Philippines can count on another natural fuel resource to meet the energy crisis: peat.

In the Sab-A Basin in northeastern Leyte alone, peat deposit has been estimated at 350 million cubic meters, according to Abercio V. Rotor, assistant director for corporate farming at the National Food Authority (NFA).

He says studies are being conducted at the Sab-A Basin area on the possible uses of peat as substitute for oil-based fuel. One experiment is looking into the potential of dried peat blocks as substitute for kerosene for grain drying. Initial findings show tremendous savings in fuel costs.

Formed by the partial decomposition in water of plant tissues, peat has long been used as fuel for heating and drying in countries with inadequate wood and coal supply.

In many parts of Europe, notably Holland, Germany, Belgium and Ireland, peat is dug, cut in blocks, dried thoroughly and used as fuel. It is also used in gasifiers. Its coke content has been found suitable as fuel for motor transport.

Experts say peat fires used to smoke malt give the characteristic flavors to Scotch and Irish whiskey.

Peat is used either in briquette or pulverized form. In the Sab-A Basin experiments, they dried peat in blocks measuring 10 by 40 centimeters.

Chemical analyses show that peat contains 55.44 percent carbon, 6.28 percent hydrogen, 1.72 percent nitrogen and 36.56 percent oxygen.

According to records, the Soviet Union produces the biggest quantity of peat — 150 to 200 million tons a year. Part of the output is used to generate electricity.

In the United States, peat outturn is estimated at 500,000 to 600,000 tons a year. Canada produces twice as much, while Germany (East and West combined) comes up with 2 to 4 million tons a year. Slightly higher is Ireland's output of 5 to 6 million tons.

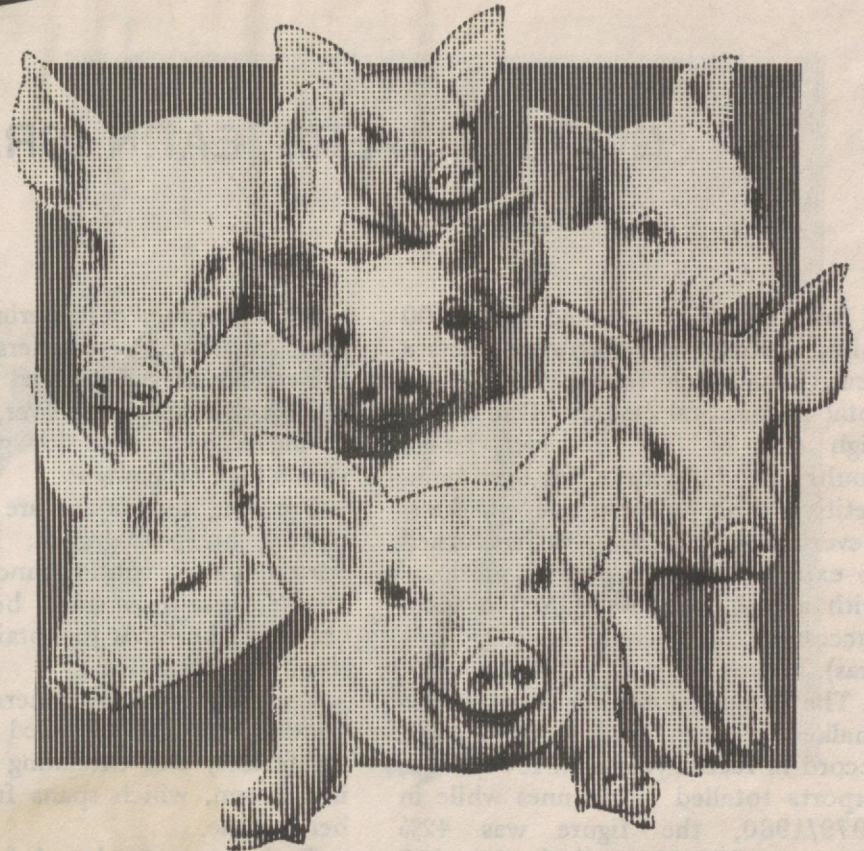
Peat has another valuable use: as organic fertilizer. When mixed with mine-

*(Continued on page 17)*

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## GOOSE LIVERS EARN ISRAEL \$12 MILLION

Israel's farmers produce some \$400 million worth of poultry products a year, accounting for about 23% of total agricultural output. Due to the high cost of feed however, Israeli poultry products have not been competitive on international markets. Nevertheless, the industry has turned to exporting luxury poultry products with a high profit margin. The most successful has been goose liver (foie gras).

The Israeli goose-liver industry has chalked up an impressive growth record in recent years. In 1978/1979, exports totalled 190 tonnes while in 1979/1980, the figure was 42% higher, at 270 tonnes (valued at \$12 million) according to the Israel Economist.

Today Israel is the third largest supplier of goose liver to Europe, after Hungary and Poland. Marketed by Agrexco, a large portion of the trade is with France. Indeed, about 10% of the foie gras consumed by the French comes from Israel.

Fresh Israeli goose liver is also sold in other European countries and reaches markets as distant as Japan.

Israel has applied to America's Food and Drug Administration for approval of its slaughterhouses. When granted, FDA certification will allow pate de foie gras processed in France from Israeli goose liver, to be exported to the US. The local industry has profited from the know-how brought by Eastern European immigrants who began raising geese in Israel as early as the 1950's, relying on traditional methods handed down from generation to generation. Due to religious dietary laws, European Jews traditionally used goose fat instead of pork fat. The raising of the bird for its liver, however, seems to have originated in Egypt.

At a government experimental station in Akko, researchers examine the effects of various feed rations on the fat content of the liver, gourmets having a preference for goose liver with a high fat content.

Breeding techniques are also constantly being upgraded. Israel imported geese from France in the 1950's, but has since been cross-breeding the birds to obtain sturdier stock with large livers.

Currently Israeli farmers are conducting experiments aimed at increasing fertility and extending the breeding season, which spans from October to June.

Techniques developed for chicken and turkey breeding are now proving successful with geese. Although the biological mechanism involved is not completely understood, it is known that the hormones which stimulate breeding can be activated by simulating winter and then spring conditions for the birds. Activation of the hormone is apparently linked to exposure to light rather than to variations in temperature. So, the geese are exposed to only six hours of sunshine a day and then placed in well-ventilated dark houses for six weeks. Subsequently, their biological systems react as if it were springtime, and the birds start to lay eggs after about 20 days.

Uri Weiss, manager of the water fowl division of the Egg and Poultry Board has successfully bred through August using this method and he is hopeful that eventually year-round breeding will be possible. One of the country's largest incubating facilities for geese is located at Kfar Saba, north of Tel Aviv. During the 30-day incubation period, the eggs are rotated 120° every two hours.

After 10 weeks of life, the birds are slaughtered for their livers. Traditionally, farmers compensated for the lull in the breeding season by raising some geese for as long as six months, an expensive practice but with no adverse effect on the quality of the liver.

The geese are raised on specially-selected corn-based pellets, designed to produce top-quality liver. They are also fed greenery to strengthen the passageway in the neck for the next stage in their lives — force feeding. In the last 28-35 days of their lives, the geese are force-fed with a tube-like apparatus that is inserted down their long gullets. They consume about one kilo of grain each day this way. At slaughtering, the force-fed goose's liver weighs between 400 and 1000 gm.

Eight slaughterhouses in Israel handle geese. After slaughtering, the goose is hung and stored for 24 hours in refrigerated rooms, allowing the liver to solidify before removal. After extracting the liver is cleaned, packed on ice and flown to Europe. Grade A livers find their way to the best restaurants and delicatessens of Europe and Japan. Imperfect livers, which are downgraded due either to size or to blemishes, are sent to the French food processing industry for pate. Exporters would like to increase sales to delicatessens and restaurants, which currently account for about half of their market, because prices are higher.

Besides the liver, almost every part of the goose has a use. The breast, thighs, wings, gizzards and heart are packed and sold separately. The inner fat is used for perfumes and soap, as well as by industrial food-processing plants. None of these products, however, is nearly as profitable as the liver.

*(Continued on opposite page)*

## GOOSE LIVERS...

(Continued from page 14)

The industry's future remains somewhat uncertain. As in other agricultural sectors, producers are worried that the rate of devaluation of the Israeli currency will not be fast enough to offset soaring grain prices and production costs. Although the depreciation of the shekel has quickened in recent months, farmers still have doubts as to how long their prices will remain competitive on international markets.

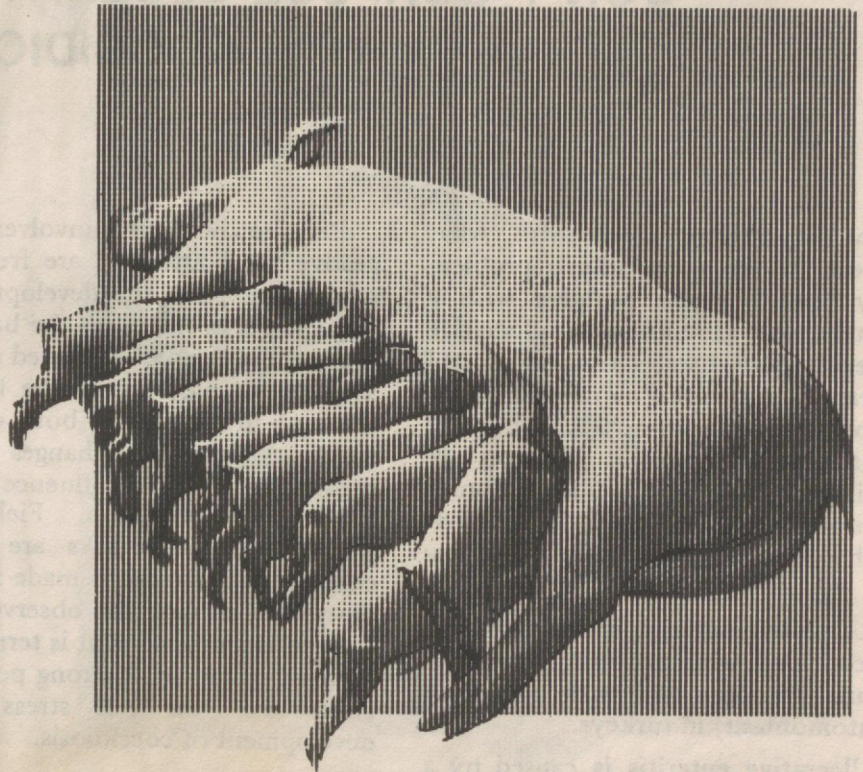
The domestic market is small, and the likelihood of Israelis becoming habitual consumers of foie gras is slim. Not only is the delicacy strange to most Israeli palates, but wholesaling at \$40 a kilo is unlikely to attract many buyers. However even the world market for foie gras is limited.

At present, Israel's goose-liver industry is one of the most profitable — though far from being the largest — within the poultry field. Someday the Israelis may set up a pate plant to process the product. Meanwhile, the industry will continue to be a welcome foreign currency earner for the country. — Galina Vromen

# IRON-VITE

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## CLOSTRIDIUM...

(Continued from page 12)

on your ranch, you should weigh the cost of the vaccine against the expense of the expected losses and act accordingly. This should be done for all diseases for which biological products are available. Use of any product is not warranted unless the cost of probable loss justifies its use.

Most cattlemen experience unexplained deaths in their animals, especially on ranges where they are not seen daily. If these become numerous, clostridial diseases should be considered and the assistance of your veterinarian and possibly the diagnostic labs sought. If a clostridial disease is diagnosed, proper vaccination may solve the problem.

**Warnings:** With winter upon us, hopefully the winter feed supply is available. The memory of a few winters past, when so many cattle died from starvation caused by cold and inadequate feed, is still all too vivid.

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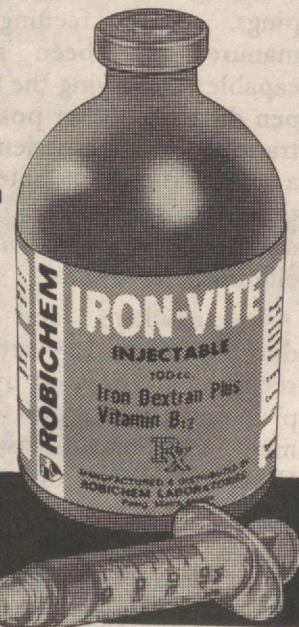
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## DON'T CONFUSE ULCERATIVE ENTERITIS WITH COCCIDIOSIS

Pullet growers faced with what appears to be a coccidiosis problem may really have a problem with a bacterial infection known as ulcerative enteritis. This disease, also called quail disease, is occurring more frequently in pullets and in turkey poults. Many of the clinical signs it produces are similar to those of coccidiosis. Confusion also can result from the fact that both diseases can occur simultaneously.

Ulcerative enteritis is also frequently confused with necrotic enteritis in young chickens and with blackhead (histomoniasis) in turkeys.

Ulcerative enteritis is caused by a bacteria that forms spores. The ability to form spores makes these organisms extremely resistant to disinfectants and to adverse environmental influences. For this reason, after the disease is experienced in a building a re-occurrence in the next flock is likely even though efforts are made to clean up the pens.

Infection passes from bird to bird as the result of the diseased birds shedding the bacteria in their droppings. Flies feeding on infected manure have been shown to be capable of carrying the bacteria. Dried pen dust is another possible means of transmission. Experience with quail, a bird that demonstrates great susceptibility to the disease, has shown that maintaining the birds on wire does not eliminate the disease.

In chickens and turkeys the development of ulcerative enteritis seems to be assisted by stress. Stress probably plays a part in the development of most diseases of poultry. However, with ulcerative enteritis stress has greater importance. Coccidiosis, particularly necatrix and brunetti infections, have been observed to be an important stress.

Because the disease involves the digestive tract attempts are frequently made to explain the development of the clinical problem on the basis that a change in the diet has acted either as a stress or has altered the bacterial flora of the tract. In both chickens and turkeys ration changes do not seem to have any influence on the incidence of infection. Field experience indicates breaks are apt to occur after a change is made in coccidiostats. Cases are also observed when the use of a coccidiostat is terminated. In both instances, a strong possibility exists that the real stress is the development of coccidiosis.

In most cases chickens experiencing ulcerative enteritis demonstrate clinical signs similar to those associated with coccidiosis. The first birds that die often show few signs. They will be found dead, usually with a little manure sticking to the feathers around the vent. Birds that survive a few days are listless and depressed. They will stand with ruffled feathers, experience a diarrhea and may pass bloody droppings. With no medication, most will begin to recover in two or three weeks. During this period they will lose skin pigment and become pale. Death loss often is negligible, seldom over 10%. Since growth is checked many of the birds will be undersized for weeks after they recover. Replacement pullets under 12 weeks at the time they experience infection experience complete recovery.

Diagnosis of ulcerative enteritis can be made successfully by observation of the gross lesions of the disease. The disease starts as a haemorrhagic enteritis in the duodenum (the loop) of the intestinal tract. A red appearance of small red spots can be seen before the tract is opened. In twenty four

hours small yellow areas outlined with a red line of haemorrhage develop. These form into round shaped ulcers that are depressed in the centre. At this stage most of the small intestine and often the ceca are involved. The ulcers can perforate the intestine. This will cause a peritonitis. In the areas of perforation the intestines often stick together.

Infected birds also display enlarged spleens of uneven colour and livers that carry yellow areas of necrosis. These areas are of uneven size and shape and are not distributed uniformly.

The observation of the typical ulcers in the intestine along with the presence of the changes in the liver and spleen is enough evidence to rule out other possible disease. Young turkeys with blackhead have liver lesions that have a more depressed crater-like appearance. The edges of these lesions are also very distinct. In more advanced cases this outline will be lost but this time cecal cores or caseated masses will be evident to aid in diagnosis. Necrotic enteritis will produce white areas of necrosis on the liver. They tend to be of relative uniform size, about an eighth of an inch in diameter. The lesions in the intestine occur in the last third of the small intestine and lack the distinct round shape found with ulcerative enteritis. Coccidiosis will not produce lesions in the liver.

Ulcerative enteritis has been treated successfully with furazolidone, tetracyclines, streptomycin, bacitracin and possibly other drugs. Most popular current treatments are 100 gms of bacitracin or 200 gms of furazolidone in the feed until death losses are no longer experienced. Treated flocks can experience a re-occurrence of the disease. However, this is not common.

*(Continued on opposite page)*

**PEAT: NEW. . .**  
(Continued from page 13)

ral soil, peat not only insures a good soil condition but also increases the ability of the soil to hold water. Thus, it is valuable for greenhouses, lawns and nurseries, says Rotor.

Also a good mulch, peat is used extensively as field soil for vegetable gardening in the United States and Europe.

At the Sab-A basin, experiments include briquetting of raw and carbonized peat, determining the proper thickness of fuel blocks and processing of peat into boards for construction.

The Sab-A basin is what remained of a large body of water which covered Northeastern Leyte about 4000 to 5000 years ago. It turned into a swamp measuring some 7,000 hectares. About 1,000 of this had been reclaimed and developed into farms.

The reclaimed area is the site of the Sab-A farm project managed by NFA for eight private corporations.

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# MULTIVITAMINS with ELECTROLYTES



**DON'T CONFUSE. . .**  
(Continued from page 16)

In all cases of ulcerative enteritis a careful check should be made for coccidia. If enough protozoa are present that occidiosis is possibly acting as concurrent infection additional medication through the drinking water should be undertaken to suppress the coccidia.

Control of coccidiosis is probably the most important element in any management programme designed to avoid ulcerative enteritis. Elimination of coccidiosis as a stress will permit chickens and poults to survive exposure to the disease without the development of clinical signs. Sanitary control of pen area is of value. However, because the spores produced by the agent of the disease are so durable clean up practices can not be relied upon to eliminate the infection.

The status of the birds in respect to infectious bursal disease should also be checked. Flocks that have a history of bursal disease early in the grow-out are more subject to ulcerative enteritis. — Glyde A. Marsh, DVM

(The author is extension specialist at Ohio University, USA. — Editor.)

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# HIGHLIGHTS: NATIONAL INTEGRATED LEUCAENA RESEARCH PROJECT FOR THE PHILIPPINES<sup>1/</sup>

By DR. FILIBERTO S. POLLISCO<sup>2/</sup>

The "National Integrated Leucaena Research Project for the Philippines" came into being as an offshoot of the First International Consultation on Ipil-Ipil held at UPLB, Los Banos, Laguna, Philippines last 2-4 September 1976, jointly sponsored by the Philippine Council for Agriculture and Resources Research and the US National Academy of Sciences. The overall objective of this consultation was to conceptualize a realistic program of research that would enable full utilization of the potentials of this plant in countries where this species is grown.

There are at present two large research programs on ipil-ipil being coordinated by PCARR. One is financed jointly with the International Development Centre (IDRC) of Canada and the other with the International Bank for Reconstruction and Development (IBRD). The IDRC project was implemented in 1978 and spans 5 years whereas the IBRD project started in 1980 and spans 4 years. Aside from Leucaena, the IBRD project also deals with *Albizia falcataria*. The IBRD project has been designed to pick up from where the IDRC project ended.

The over-all objectives of these projects are to explore the value of ipil-ipil and *Albizia falcataria* for the small land holder and to explore the economics and technology of its use as an animal feed, fuelwood and fertilizer.

Three research institutions are presently implementing these projects: The Forest Research Institute (FORI), UP Los Banos and Forest Products Research and Industries Development Commission (FORPRIDECOM). A list of individual researchers involved in the project is given on page 21.

## BRIEF DESCRIPTION OF ACCOMPLISHMENTS

### 1. Nutrition Studies —

A growth chamber study was conducted to determine the nodulation and dry matter accumulation patterns of ipil-ipil 'K-8' inoculated with *Rhizobium sp.* Strain CB 81. Nodule count and nodule fresh weight increased up to the ninth and tenth week, respectively, then decreased at the eleventh week. On the other hand, dry matter and the amount of nitrogen fixed increased with time.

Under greenhouse conditions where ipil-ipil was grown in two acid soils (Antipolo and Luisiana Clay), nodulation was not influenced by the method of seed inoculation and seeding method. Dry matter yield was increased by seed inoculation but not by seeding method.

The nodulating ability of *Rhizobium sp.* strains CB 81 and L on Peruvian ipil-ipil was compared in the greenhouse using Taal sandy loam and Lipa clay loam. The two strains formed greater proportion of nodules when applied as individual cultures than when inoculated as a mixture. When used together, strain CB 81 was more competitive (based on percentage of nodules produced) than strain L in both soils.

The ability of ipil-ipil to grow in different soils was shown to be positively correlated with soil pH, available phosphorus, and exchangeable calcium and negatively correlated with exchangeable aluminum.

The effect of rhizobial inoculation, phosphorus and lime on ipil-ipil was studied further using four soils, three of them acidic and deficient in phosphorus. The fourth soil was Binangonan clay which supported a heavy growth of ipil-ipil. Inoculation, phosphorus and lime significantly increased nodulation, dry matter production and nitrogen yield. However, the growth of ipil-ipil in Binangonan clay was markedly better than in the three soils even if they were amended with phosphorus and lime.

A field experiment conducted at the La Mesa Dam Watershed on Novaliches clay showed that growth of outplanted ipil-ipil could be increased by Rhizobial inoculation and phosphorus application.

### 2. Management and Utilization of Leucaena for forage.

Herbage production in pure *Imperata* prior to grazing ranged from 5.0 to 7.0 tons per hectare. This can easily carry .5 to .6 AU/ha at 25% herbage utilization or .7 to 1.0 AU/ha. In Leucaena/*Imperata* pastures after a year of establishment the carrying capacity could increase up to 1.5 AU/ha.

Defoliation treatments showed that highest herbage yield could be obtained at 100 cm. cutting height. This is advantageous for manual harvesting than for mechanical harvesting. Highest herbage yield was 110

<sup>1/</sup>Paper presented in the NFTA Conference, 7 January 1982 at Magsaysay Center, Manila, Philippines.

<sup>2/</sup>Director, Forestry Research Division, PCARR and FORI, Los Banos, Laguna, Philippines.

tons/ha/year.

Beef cattle (being fattened) had the highest average daily gain (ADG) in weight (1.3 kg/day/animal) if fed with 45% ipil-ipil, 15% sugarcane type plus 40% concentrate. Animals fed with 60% sugarcane tops plus 40% concentrate had ADG of .79 kg/day. Ipil-ipil has a coefficient apparent digestibility of 68%, 58% crude fiber, 76% crude protein, 35% Ca.

Performance of goats fed with ipil-ipil showed that breeding does fed with as much as 56% to 75% DM from fresh ipil-ipil leaves consumed significantly less dry matter, but crude protein intake was appreciably higher thus heavier daily and total liveweight gain was obtained than those fed with lower ipil-ipil rations. Also, there was no adverse effect on reproduction function.

### 3. Silviculture and management for reforestation and wood production.

Site preparation particularly burning or scalping with weeding significantly affect germination of directly seeded ipil-ipil seeds. They are cheap but effective site preparation techniques. Weeding is a necessary post planting treatment.

Uncoated seeds gave higher early survival than those coated with Arasan or Rhizobium. Fertilizer mixed underneath seed spots before direct seeding, ipil-ipil. It appreciably enhances germination and seedling growth.

In the Philippines, there are several factors causing failure of the direct seeding efforts in reforestation. The most important of which are:

- a. use of non-certified seeds which may be old stock, immature or disease infected seeds;
- b. pest attacks particularly rodents;
- c. uncontrolled forest fires;
- d. inadequate and/or inappropriate site preparation;
- e. poor soil condition which may be due to lack of moisture, extreme temperature, too acidic or too thin soil surface; and
- f. social factors, particularly kaining encroachments.

### 4. Varietal introduction, hybridization/selection and seed technology.

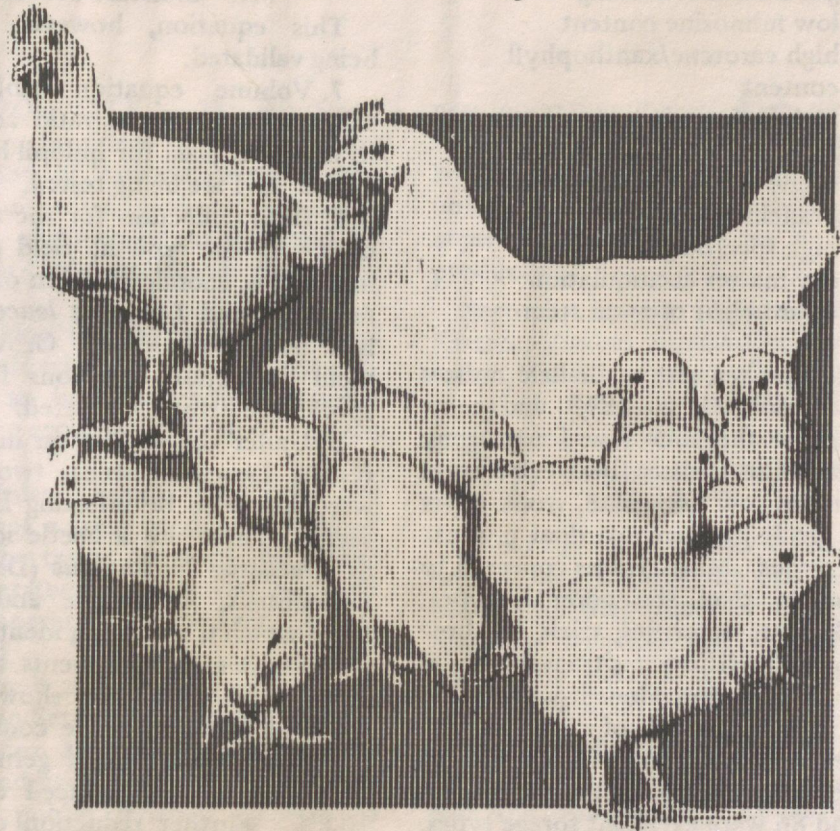
120 different varieties/accessions composed of 61 local and 59 introductions have been assembled by Institute of Plant Breeding. All accessions had been screened and classified

*(Continued on next page)*

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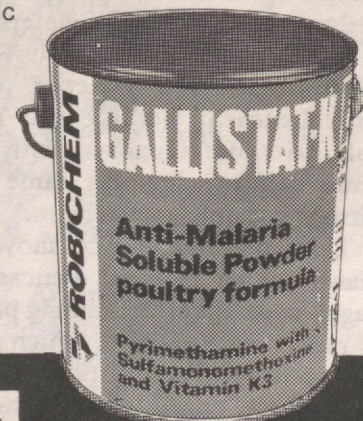
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## HIGHLIGHTS:NATIONAL...

(Continued from page 19)

as to forage or wood types. Two sets of parameters/indices were used in determining whether an accession is a forage or wood type. They are:

### A. Forage/M meal Type

- good basal branching
- low mimosine content
- high carotene/xanthophyll content
- high leaf meal yield

### B. Wood Type

- single stemmed (without basal branching)
- high specific gravity
- dry matter accumulation
- clear height of main stem

The first ten sets of diallele crosses were produced in 1978 and were planted in the same year for progeny evaluation. Crosses between forage types and low mimosine, wood types were made to produce dual purpose plant types. Most crosses appeared to be better than the parental types.

Likewise, screening trials in three ecologically different sites were made. Most of the introduced wood type had greater range of adaptability, however, Copil No. 61, 65 and 70 proved to be outstanding. Copil No. 84 and 86 were excellent forage types.

### 5. Economics of *Leucaena* production and its integration into appropriate farming system.

Corn plants fertilized with herbage from intercropped *Leucaena* produced as much grain (3T/ha) as the pure stand of corn fertilized with inorganic fertilizer at the rate of 60-30-30 kg/ha N,P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O, respectively. A higher level of corn was obtained in plots where *Leucaena* intercrop was established in singlehedge rows spaced 2 meters apart than in plots with triple hedgerows spaced 5 meters apart.

Tests on irrigated rice showed that yield of the test varieties fertilized with *Leucaena* herbage was comparable to those fertilized with ammonium sulfate using the same rate of nitrogen applied per hectare.

Tests on upland rice showed that plants which received *Leucaena* herbage 25 days before seeding produced as much yield as those which received inorganic fertilizer. Applying *Leucaena* herbage ahead of planting allows enough time for the incorporated herbage to decompose releasing nutrients for plant use during the early stage of

growth of the crop.

6. A tentative equation for the determination of weight-volume relationship for ipil-ipil has been derived:

$$V = 0.14195815 W + 0.01017692$$

MC

where: V = volume

W = weight

MC = moisture content

This equation, however, is still being validated.

7. Volume equation tables and solid-stacked volume ratio according to diameter class for ipil-ipil had been derived and are being tested.

8. Data collection for the determination of the growth, yield production, and economic rotation of *Albizia falcataria* and *Leucaena leucocephala* had been completed. Growth and yield prediction equations for both species are being formulated.

9. Under the studies on insects infesting *Leucaena* seeds, two insects were found to be infesting *Leucaena* seeds. These are a beetle identified as *Aracaerus fasciculatus* (De Gaer.). Coleoptera, Anthibidae and a tiny moth which is still being identified.

10. Studies on treatments and seed storage of *Leucaena* showed that seeds of lower moisture content had a greater percentage of germination. The MC can be reduced down to 10.8%. Further reduction decreases seed viability.

11. Another component study is on fungi associated with *Leucaena* species and their control. Under this study, ten genera of fungi are found to be infesting *Leucaena* seeds. They include:

a. *Fusarium* spp. (*F. moniliforme*, *F. semitectum*, *F. oxysporum*, and *F. solani*)

b. *Collectotrichum* spp. (*C. gloesporioides*, *C. truncatum*, and *C. graminicola*)

c. *Botryodiplodia* spp.

d. *Cephalosporium* spp.

e. *Paecilomyces* spp.

f. *Aspergillus* spp.

g. *Phoma* sp.

h. *Cladosporium* sp.

i. *Chaetomium* sp.

j. *Penicillium* sp.

Findings also showed that three fungicides are effective to control most of fungi under laboratory condition. These include Benlate, Delsene and Daconil.

12. Another aspect being looked into in this Project is on the economic significance of *Leucaena* and *Albizia*

tree farming to small farm holders. Specifically, this research aims to:

a. Determine the amount of production inputs that farmers directly or indirectly invest in the farms;

b. Determine benefit-cost ratios in the tree farming practices;

c. Determine the socio-economic significance to farmers of the agro-element in agro-forestry plantation scheme; and

d. Determine the farmers' attitude toward the program.

Data gathering by interview/survey is still in progress.

13. The marketing and price structure of *Leucaena* and *Albizia* end-products is also being researched on under this project. Data gathering had been completed and analysis is in progress. Data gathered include the marketing costs incurred by the farmers, middlemen and end-users, marketing practices performed local and export prices of various end-products, and other relevant data.

14. Studies on the utilization of *Leucaena* and *Albizia* are also being conducted. One aspect deals with the determination of the specific gravity and calorific value of ipil-ipil as fuel for different ages and different varieties.

15. Present methods of charcoaling by the earth-kiln method namely use of Malaysian-type oven, Vitoria-type oven and the Brazilian-type oven were investigated and evaluated. Combining the good aspects of these ovens another oven called, "Kaunlaran oven" has been designed, constructed and tested in Iligan City. Findings show, however, that for the use of the small tree farmers, Vitoria oven is more practical and economical.

16. Studies on the utilization of Moluccan sau (pure and in mixture with other wood species) for the manufacture of particleboard proved the potential of the species for such use. Observations on the proper glue mixture, resin application and pressing methods are still in progress.

17. The last component of the project deals with the designing and construction of efficient fuelwood stove for household use. Various designs of 1-, 2- and 3- burner clay-sand stoves were constructed and tested for the evaluation of their heat utilization efficiency using ipil-ipil as fuel. Results indicated that stoves with four

(Continued on next page)

**HIGHLIGHTS: NATIONAL...**  
(Continued from page 20)

*In Leyte and Samar*

cm. chimney diameter are more efficient. Likewise fixed stoves were found more efficient than portable ones.

In the latest (October, 1981) In-House Review on Leucaena held among Leucaena researchers and organized by PCARR, the participants identified are the following research areas:

1. Economics of plantation establishment and management.
2. Appropriate site preparation methods on various site-vegetative cover conditions.
3. Use and economics of herbicides in eradicating weeds in plantations.
4. Economics of various cultural and maintenance activities of plantation establishment and management under various site-vegetative cover.
5. Appropriate and economical equipment in harvesting and transporting Ipil-ipil for various end-products.
6. Biomass of trees grown in various sites at different spacings.
7. Relationship of physical, mechanical properties and pulpwood characteristics with age and spacings.
8. Best rotation of ipil-ipil for various end-uses.
9. Study on use of Leucaena as fertilizer (Pilot-verification study).
10. Study on the effects of continued use of Leucaena fertilizer on soil properties.
11. Use of Leucaena fertilizer in different agro-climatic zones.
12. Economic feasibility studies on various wood end-products.
13. Economics and acceptability studies on charcoaling by earth kiln method.
14. Intensive research on ipil-ipil's potential as a reforestation crop.
15. Utilization of crop by-products and other poor quality roughages available under different cropping patterns for cattle, carabao and goat production.
16. Studies on the utilization and management of Leucaena in combination with other pasture grasses under different stocking rates.
17. Reproductive performance of cattle, carabao and goats of ipil-ipil pastures.
18. Development of appropriate and effective mechanism for technology transfer.
19. Extension strategies on Leucaena

## INFANT FISHPOND INDUSTRY DYING

QUEZON CITY — Dr. Saturnino Abesamis, president of the Philippine Federation of Aquaculturists, sought today immediate government assistance to save the infant fishpond industry in Leyte and Samar from total collapse.

In asking for government aid, the PFA official said the industry is playing an important role in accelerating the economic growth of Eastern Visayas.

The inland fishing industry in the region has a total productive area of 2,995 hectares operated by some 100 operators. Almost 97 per cent of the operators are bankrupt, it was reported.

Abesamis appeals to the First Lady & Human Settlements Minister Imelda Romualdez Marcos and all government leaders from Eastern Visayas to request public lending agencies to grant additional loans to rehabilitate the industry.

The Waray fishpond operators are encountering difficulty in their busi-

ness operation due to high development cost in converting virgin swamplands into fishponds and lack of technology to operate newly opened areas which are acidic to be highly productive.

Segundo Vargas, president of the Eastern Visayas Aquaculturists Federation, cited inadequate financing and series of typhoons which struck the region as contributing factors which adversely affected the viability of the industry.

The PFA official said there is an urgent need to help the operators in order that they can pay their loans with the Development Bank of the Philippines estimated amounting to over P30 million.

To protect the investment of the DBP and the sacrifices of the operators, the Alliance of Leyte and Samar Associations (ALSA) in Manila has presented a position paper to Malacanang seeking help for the Waray fishpond men, it was revealed.

technology utilization.

20. Further studies on the natural resistance of different giant ipil-ipil strains.

21. Field testing on the natural resistance of ipil-ipil wood.

22. Species site adaptability studies for different line of ipil-ipil.

23. Site quality studies for the different strains of Leucaena.

24. Studies on the use of ipil-ipil as a soil and water conservation crop.

25. Identification/delineation of areas for ipil-ipil production.

26. More intensive studies on insect/disease prevention and control.

### LIST OF RESEARCHERS

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1. For. Victoria T. Lasmarias
2. For. Agustin A. Pinol
3. For. Aleli M. Luna
4. Dr. Saturnina C. Halos

5. Mr. Horacio C. San Valentin

6. Dr. Sebastian S. Quinones

7. For. Pio Bote

8. For. Celso P. Diaz

9. For. Eustaquito Tandug

10. Mr. Sofredo Chua

11. For. Florencio Mauricio

12. Ms. Merilyn Rivera

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13. Dr. Pancrancio Bawagan

14. Ms. Nieva Laxamana

15. Engr. Arturo A. Pablo

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17. Dr. Arturo C. Alferez

18. Dr. Basilio B. Mabbayad

19. Mr. Alejandro Soriano

20. Dr. Santiago N. Tilo

21. Dr. Neptale Q. Zabalala

22. Prof. Cerenilla Cruz

23. Prof. Domingo Jacalne

# TIPS IN CHOOSING THE RIGHT DEWORMER FOR YOUR CATTLE OPERATION

By ROSELLER T. LANNU, DVM

Before buying a dewormer it is very important to consider the following factors: Efficacy; Safety/Toxicity; Economy; Ease of Administration; Withdrawal Time and its Environmental Effect. If the dewormer offered satisfies all the above factors by all means buy it!!

Here is a brief guidelines:

## A. EFFICACY

In choosing a dewormer its efficacy against your cattle's worm problem should be of primary consideration. It should be effective against mature and immature stages of the parasite infestation is a rule rather than an exception, therefore, a total spectrum dewormer offers a distinct advantage. Some parasites of cattle, studies show, have developed resistance to many of the old dewormer remedies. This should be taken into account seriously because a dewormer that is effective recently does not mean that it is still effective today.

## B. SAFETY/TOXICITY

A good dewormer should be safe both for man and animal. It should have a wide margin of safety even when dose is multiplied many times over. At any stage of pregnancy of cow it should be safe.

## C. ECONOMY

More often than not economic consideration weighs more than anything else in considering a dewormer. There are many ways of looking at a product whether it is worthy of consideration or not. And the best gauge is to look into the cost benefit ratio of using the product. It should satisfactorily answer the question how much more will I earn/save by using the product?

Not how much is the product per se? Let us take an example between dewormer A and dewormer B:

operators as well as ranch operators with chute and holding pen a worm drench is very suitable. The bolus

	A	B
List Price	P340.00	P350.00
Volume	1 liter	1 liter
Efficacy Range	Roundworms Lungworms Tapeworms Larvae/eggs	Roundworms Lungworms Tapeworms Larvae/eggs Flukes
Assuming we will deworm weanlings with an average weight of 180 kgs.	1 ml/9 kgs. $\frac{180 \text{ kgs.}}{9 \text{ kgs.}} = 20 \text{ ml.}$	1 ml/12 kgs. $\frac{180 \text{ kgs.}}{12 \text{ kgs.}} = 15 \text{ ml.}$
Volume of dewormer needed per head of 180 kgs.	$\frac{1000 \text{ ml.}}{20 \text{ ml.}} = 50 \text{ heads}$	$\frac{1000 \text{ ml.}}{15 \text{ ml.}} = 66.7 \text{ heads}$
Total No. of heads dewormed per liter of dewormer	$\frac{P340.00}{50} = P6.80$	$\frac{P350.00}{66.7} = P5.25$
Cost of deworming per 180 kg. weanling	P4.00	none
Additional cost of fluke-cide if you are in a fluke stricken area	P10.80	P5.25
Total cost of deworming a 180.00 kg. weanling (with flukeicide)		

This example shows your savings in actual cost of dewormer alone by choosing B although B initially costs P10.00 more than dewormer A.

## D. EASE OF ADMINISTRATION

Sometimes a dewormer has all the above mentioned qualities but if it could not be easily administered it becomes impractical. For feedlot cattle

form is convenient for backyard farmers with one or two cattle. Dewormers in parenteral form is quite good especially when working in large herds with limited facilities. A drawback of this form, however, is the possibility of irritation at the injection site which

(Continued on page 25)

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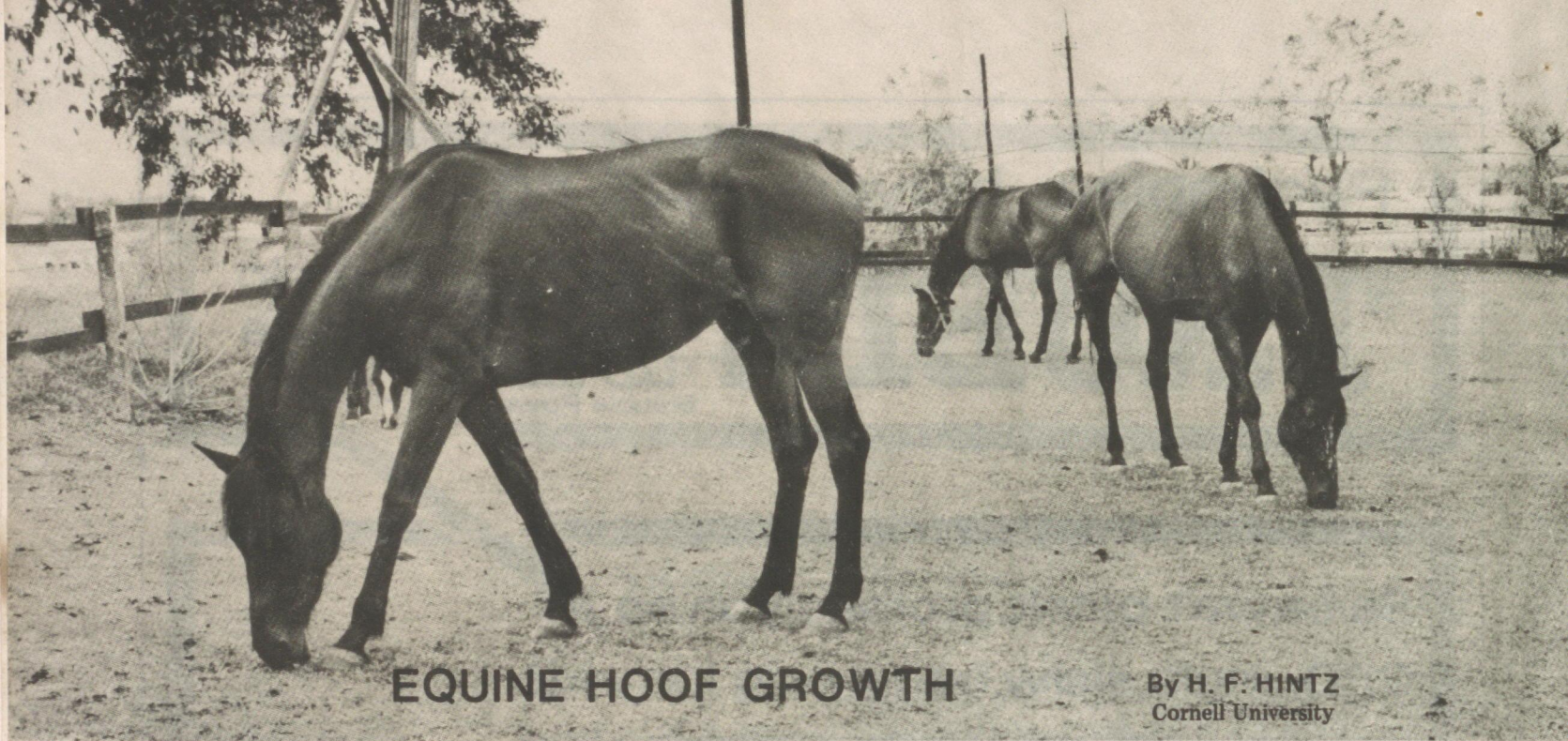
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## EQUINE HOOF GROWTH

By H. F. HINTZ  
Cornell University

What can I feed my horse to make his hooves grow faster and tougher? The above question is frequently asked by horse owners whenever nutrition is discussed. Of course, fast growth is not necessarily highly correlated with high quality hooves. But fast growth may be desired to grow out a hoof with a problem such as a quarter crack or for horses such as endurance or racehorses that must have their shoes replaced frequently. Unfortunately, it is not easy to give an answer that satisfies the horse owner. Many factors other than nutrition are shown to influence hoof growth. The following is a brief review of some of these factors.

**Genetics:** Although I could not find any studies on the genetics of hoof growth in horses, I suspect the heritability of hoof growth and quality is quite high. Many horsemen claim certain horses families have superior hooves. Studies with other species support the importance of genetics. For example, Brinks and co-workers, (1980) concluded that the heritability of hoof growth in cattle was quite high and that selection for hoof growth or for normal hooves should be effective in cattle.

Brinks et al were considering selecting for slow grow because cattlemen may prefer slow hoof growth rather than fast in order to decrease the time and effort required to trim feet. McDaniel et al (1979) reported that heritabilities for hoof characteristics

such as heel depth in dairy cattle were significant and they concluded that genetic variation in hooves could be recognized even if trimming were practiced.

**Age:** Shannon and Butler (1979) studied rate of hoof growth in horses of various ages. The horses were divided into three groups: (1) animals two years of age, (2) animals three years of age, and (3) animals seven years or older. The animals in the older group had a hoof growth rate about 95% of that of the two other groups. Other studies (Butler, 1976) have suggested that foals under one year of age would have much faster rate of hoof growth than older animals. For example foals may have a growth rate of .5 mm per day whereas .2 to .3 mm per day might be expected in older animals.

**Season of year:** Shannon and Butler (1979) compared hoof growth during fall and spring in Texas. They reported some differences among months but no significant differences between seasons. That is, the most rapid growth was in October (.267 mm/day) and slowest growth in December (.191 mm/day). The average for the fall (Oct., Nov., Dec.) was .240 mm/day and for the spring (March, April, May) was .244 mm/day. They suggested that moisture and temperature appear to affect growth more than season *per se*. The periods with warmer temperatures and greater rainfall showed faster rates of growth. Studies in New York indi-

cated that hooves grow faster in September and October than during January and February (Schott et al, 1981). This difference could also be due to changes in temperature and moisture.

**Hind vs. front feet:** Shannon and Butler (1979) reported that the front hooves of mature horses grew 6% faster than the hind hooves. Butler (1976) reported that the hind hooves grew 12% and 7% faster than the front hooves in horse foals and pony foals respectively. Schott et al, (1981) reported that the hind hooves of polo ponies grew 18% faster than the front hooves. Adams (1923) stated that the hind hooves of draft horses grew faster than the fore hoof. Richardson (1978) found no differences in hoof growth between hind and front. Thus it appears that in most cases hind hooves grow faster than front but several factors such as use, age, and weight distribution may influence the difference.

**Blood supply:** It is commonly thought that increasing the blood supply to the hoof will increase rate of growth. Thus irritants, blisters or other circulation stimulating agents are sometimes applied to the coronet.

Daily massage of the coronet to stimulate circulation has also been reported to increase hoof growth (Butler, 1976). Further studies are

(Continued on opposite page)

## EQUINE HOOF. . .

(Continued from page 24)

needed to evaluate these practices. Some practitioners feel that the more rapid hoof growth produced by the use of irritants results in hoof tissue of poor quality.

**Nutrition:** Several nutrients are known to influence hoof growth. A reduced energy intake can result in decreased rate of hoof growth in growing animals. A complete pelleted ration was fed limited or *ad libitum* to two groups of Shetland pony foals for 117 days (Butler and Hintz, 1977). The limited group was fed an amount to allow a weight gain of about 0.2 lb per day. The *ad libitum* group gained 1 lb per day. The hoof growth in the limited group was .25 mm per day compared to .38 mm per day in the *ad libitum* group. Of course, it might be possible that any factor that decreases body weight gain will decrease rate of hoof growth. Several studies have shown a high correlation between rate of hoof growth and rate of weight gain.

Protein deficiency can also result in decreased hoof growth. The hoof growth of weanlings fed 10% protein was only 2/3 of that of weanlings fed 14.5% protein (Meakim, 1981). Several studies have been conducted to determine if additional protein or amino acids, that is, supplements above the requirements will enhance hoof growth. Butler and Hintz, (1977) found no benefit from the addition of gelatin to commercial complete pelleted feed. The hoof growth was .33 mm per day for those weanling ponies fed the pellets and .31 mm per day for those ponies fed the pelleted diet plus 90g of gelatin per 100 kg of body weight.

The effect of supplemental methionine was studied with polo ponies (Schott et al, 1981). The ponies (actually horses with primarily Thoroughbred breeding) were divided into three groups. One group was fed the control diet of 13 lb of a commercial pelleted feed and 6 lb of timothy-alfalfa hay (mostly timothy). Group two was fed the control diet plus 3 g of DL-methionine per day and group three received 6g of DL-Methionine per day. The methionine was mixed with molasses and poured over the pellets.

The methionine requirement of horses is not known. Based on the requirements for swine, it was thought that the addition of either .06% or .03% methionine per day would provide a significant percentage of the requirement for a mature horse.

The growth rate of the left front and right rear hoof was measured in a manner similar to that described by Butler and Hintz (1977). The trial was conducted for 210 days. No significant differences in growth rate were found among treatments as the average rate was approximately .20 mm for all three groups.

The addition of 0.3% lysine or 0.3% lysine and 0.1% methionine to a ration containing 14% protein did not improve the rate of hoof growth of weanling horses. The average daily rates were .62, .61 and .60 mm for the control, control plus lysine and control plus lysine and methionine, respectively (Meakim, 1979).

The rates of hoof growth of yearlings fed a control ration or control plus 0.15% lysine or plus .30% lysine were .40, .40 and .41 mm/day respectively (Richard and Ott, 1977).

Several vitamins and minerals are known to influence hoof development. For example, Howell *et al.* (1941) reported that horses suffering from avitaminosis A may have marked scaling of the periople. Biotin deficiency has been reported to cause heel cracks, erosion of the heel, cracks at the junction of heel and toe and cracks in the toe itself in swine (Brooks *et al.* 1977) and would perhaps cause hoof problems in horses but biotin deficiency in horses appears to be highly unlikely.

Zinc is essential for normal epidermis and in a recent symposium it was suggested that zinc deficiency could be a cause of foot problems in cattle. Although zinc deficiency has not been reported under field conditions in horses, such a possibility cannot be ignored because it was previously thought that zinc deficiency would not be a problem in ruminants.

Selenium toxicity in horses can result in hair loss from the mane and tail and, degeneration of hoof quality and eventually complete loss of the hoof.

The above studies demonstrate that a complete balanced diet is essential for proper hoof growth. No studies were found that indicated any special benefits of additional nutrients on hoof growth. That is, the addition of nutrients to balanced diets did not promote hoof growth.

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## TIPS IN CHOOSING. . .

(Continued from page 22)

is common. This irritation site more often than not becomes a foci of infection especially when needles used are not clean. Myasis flies then invades the injection site and it complicates the problem.

### E. WITHDRAWAL TIME

An ideal dewormer should have a short withdrawal time. This is very important in the point of view of public health. A tolerable level of tissue residues should be attained in the shortest possible time.

### ENVIRONMENTAL EFFECT

Lastly, a good dewormer when excreted by the animal in its metabolite form should have no deleterious effect upon our environment.

Pampanga hog farms doing well  
despite high costs of feed.

## PROPER MANAGEMENT INSURES SUCCESS OF SMALL PIG FARMS

Despite steadily rising costs of feed, small piggery ventures can still become viable investments after only one year of operation.

Small hog farms in Pampanga have proved this, according to Bureau of Agricultural Extension (BAE). With proper management, their operators were able to more than double their investments in only a year or two.

One such operator is lawyer Telesforo Pascual who started out with only four landrace breeders. In five years, his brood had increased to 3,000 hogs. He raises the hogs in a three-hectare land where he also grows feedcrops for livestock and fowl.

Success of a piggery venture, says Pascual, lies in a high survival rate among litters or piglets. He now markets 100 hogs a month.

A litter is ready for market when it reaches weaning stage or three months old. By then, it weighs 80 kilos and is sold at P920 in Angeles City. Most big farms in Pampanga sell their produce there.

Springdale Farms, one of the big producers, yields 100 hogs a week in a 10-hectare farm that now boasts 10,000 hogs.

Emily Balilo, head of a BAE research group in hog raising and diseases, reports that five big piggery farms surveyed in Pampanga had only four percent mortality for every 100 litters. These deaths were caused by accidents arising from the carelessness of the sow.

Large-scale deaths due to diseases have not occurred in Pampanga hog farms in the past 10 years that Dr. Arturo Malig has worked as provincial veterinarian, according to BAE. Pampanga farmers know well that proper care of a sick pig could save farms from trouble.

Thus, local growers always isolate a sick pig and immediately inject it with antibiotics. The rest of the pack also are given antibiotics to contain the disease.

According to Dr. Malig, hogs have to be vaccinated periodically to prevent the spread of disease in the area. The most transmissible diseases of hogs are TGS, hog cholera, foot and mouth disease (FMD), and broccelis. Fortunately, none of these diseases has bothered big farms in the province. The health of the swines is maintained by protein-rich feed.

Successful hog raisers moderately feed farrowing sows with milk to avoid overfeeding. Experience shows that overfeeding a sow with milk could result in the death of its litters from gastro-enteritis. Some operators give their boars an egg every day.

Pampanga hog farms also raise paragrass, napier grass, upon, and ipil-ipil to supplement commercial feedstuff, BAE found. Dried poultry and hog wastes mixed with bran is excellent dish for fowls and swines. Chicken manure contains 21 percent protein while bran gives 15 percent.

Angeles City absorbs virtually all the hog output in the province, according to BAE. It is well noted for

processing pork into tocino and longanisa which have a good market in the country.

Pampanga hog raisers normally would not increase their brood beyond 20,000 hogs for many reasons. One is the cartelized operations of corporate producers.

These commercial integrators are now in control of the swine business in Metro Manila and have a decided advantage over other raisers.

Bureau of Animal Industry Director Salvador Escudero III notes that high cost of feed has thrown many backyard raisers of poultry and swine out of business. Integrated hog and poultry farms are taking over, having control over all the factors of production.

Corporate producers enjoy economies of scale through integration with feed mills, notes BAE. To some extent they have also integrated production with processing and marketing.

There are about 100 integrated farms located around the Metro Manila area. These are engaged not only in poultry and swine raising but also in supplying the industry with feedstuff, a big advantage over the small raisers.

As one consumer group, Kilusan ng mga Mamimili ng Pilipinas has observed, the cartel operates at the expense of backyard and small poultry and hog raisers who are being squeezed by the ever-increasing cost of feedstuff.



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*Wanton destruction of plants  
by collectors blamed.*

## WILD ORCHIDS BECOMING EXTINCT

LA TRINIDAD, Benguet — Several highly-priced species of wild orchids which grow only in this province may become extinct soon unless conservation measures are taken immediately.

This warning was issued by Norma Palispis, a floriculturist at Mountain State Agricultural School here who is conducting studies on the orchids. She identified the four most threatened species as “*dendrobium sanderae*,” “*dendrobium victorae-reginae*,” “*dendrobium papilo*,” and “*dendrobium aureum*.”

Ms. Palispis said the orchids, which used to be found in abundance in this province’s forests, have now become rarities. They appear to be as endangered as Mindanao’s renowned “waling-waling.”

The orchid expert said the near-extinction of the species is caused by unscrupulous collectors who wantonly destroy plants they do not find interesting.

Through the years, orchid propagation has become an extremely popular hobby.

Researches on the cultivation of the plants, whose exotic flowers have become top favorites for special occasions, have made it possible for a growing number of people to propagate them in their own backyards.

Prior to the studies which made orchid-growing a lot easier, very few

people raised orchids believing it was an extremely exhausting and time-consuming job. Orchid-raising was considered a job only for experts or for the rich who can afford to hire competent people.

Breakthroughs in the propagation of the plants have made it possible for anybody to grow orchids without much time and effort. Collectors now compete with each other for the rare species which will make their collections more impressive.

The demand for the plants has been a good enough incentive for many to go orchid-hunting.

But more compelling is the even greater demand for the colorful flowers. Orchid-growing has become a very lucrative occupation for a handful of people with the flowers still among the most expensive one can buy.

Contributing to the problem are “kaingineros” or slash-and-burn farmers and loggers.

Ms. Palispis said denudation caused by indiscriminate cutting of trees has destroyed the plants’ natural habitats. Orchids generally grow in areas of high altitude, particularly on moss found on trees. But now it is extremely difficult to find certain orchid species even in the deeper parts of the forests.

Ms. Palispis, who needed samples

of certain orchids for her studies, reported that the people she sent out to gather the plants came back empty-handed.

The flowers of the four most endangered species cited by the expert are reportedly among the most beautiful of those found in this province.

Local collectors, including Ms. Palispis, recall that only a few years back orchids grew so profusely in this province that school children would stop by nearby forests on their way to school to pick flowers for their teachers.

The floriculturist has already expressed her concern to provincial authorities who have made tentative moves to protect the threatened species.

But local authorities have yet to adopt specific rules aimed at conserving orchids.

Ms. Palispis also hopes to impress national agencies with the urgency of the problem. She is also worried that what is happening to this province’s orchids may be also happening to species in other parts of the country.

What appears to be urgently needed is an inventory of the country’s orchid species to see which ones are to be given priority should conservation efforts be undertaken in earnest.

Give trees time to recover after each fruiting season, advised specialists.

## FRUIT-INDUCING CHEMICALS HARMFUL TO MANGO TREES

Like most fruit trees, mangoes also need time to recover after each production season.

Inducing mango trees to flower and bear fruits every year with the use of chemicals shortens their life span, warn fruit specialists from the Bureau of Agricultural Extension (BAE).

Unless they ease up on the use of fruit-inducing chemicals, add the specialists, growers may wake up one day to find their mango trees wilting.

Normally, mango trees do not bear fruits annually but every other year, according to the specialists. But in their haste to make the most out of their mango trees, growers either smoke the trees or employ chemicals.

While growers may succeed initially in having bountiful harvests, continued use of chemicals will cause the trees to collapse or dry up due to the suffocating heat produced by the chemicals, warn the specialists.

Surviving trees may continue to bear fruits, note the specialists, but fruits are of limited quantity and of poor quality. Harvest could drop to as low as one-fourth that of the normal season.

The pressure on growers to produce as much fruits as possible every year is understandable. Mangoes have posted steady gains in the export market.

Japan alone imported 550 tons worth \$750,000 in 1980. This was 10 times their purchase in 1975, when it lifted the ban on the importation of fresh mango from the Philippines. Singapore and Australia also have been importing Philippine mangoes.

With such strong market, mango growers reportedly can make as much as P200,000 from every hectare of mango orchard every harvest season.

Volume and value of mango exports could have been much more but for some trade barriers imposed by certain importing countries.

The BAE specialists say not all mango growers have been sold to the use of fruit-inducing chemicals.

In Zambales, planters induce fruiting by smoking the flowers. They believe that chemicals invite evil spirits which cause the fruits to turn bitter.

A major mango-producing area, Zambales contributes 50 million fruits for local consumption. About half of the annual output comes from three northern towns while the rest is produced by small growers spread throughout the province.

A total of 206,626 trees cover some 13,563 hectares of mango orchards stretching up to the Caraballo ranges in the towns of Sta. Cruz, Candelaria and Masinloc.

A major problem of local mango growers is the fruit rot caused by anthracnose. The disease lowers the market value of the fruit and, in many cases, results in the rejection of those earmarked for export.

Fruit rot, however, can be minimized by dipping ripe mangoes in a fungicide solution.

Experiments conducted at the University of the Philippines in Los Banos also found copper oxychloride most effective in checking fruit rot. The disease could be totally eliminated by spraying the mango orchard with the chemical from the flowering to the fruiting stage.

"Controlling the disease at the pre- and post-harvest stages holds the key to minimizing if not totally eliminating market value losses," says a report on the experiments.

### Area expanding

#### MAGUINDANAO FARMERS TRY PLANTING COTTON

Cotton has taken root in Maguindanao, where Muslim farmers have planted to 254 hectares to serve as demonstration farms, the Philippine Cotton Corp. said.

The cotton farms are financed by the Southern Philippines Development Authority. PhilCotton has fielded three Muslim cotton farm management technicians to supervise the farms.

Speaking for his fellow Muslim cotton farmers, former commander Salendab Tugaya said that with the cotton program, his people can look forward to better farm income.

Now only on the second crop year, PhilCotton's Area VII based in General Santos City and covers Maguindanao, South Cotabato and Sultan Kudarat, posted 4,712 hectares planted to cotton as of last month, the biggest among PhilCotton's nine areas of operations.

Significantly, the first cotton crop year in southern Mindanao yielded 1,963 metric tons of seedcotton from the initial area of 1,226.75 hectares. The average yield of 1.6 tons per hectare surpasses all cotton production records since cotton growing was revived in 1974.

South Cotabato and Sultan Kudarat cotton farmers realized net incomes ranging from P6,000 to P21,000 per hectare, enabling them to pay past due loans from other crop programs.

PNB collected P47,767 Masagana 99 past due loans from 82 farmers, some dating as far back as six years. In addition, some farmers paid P8,434 in land amortizations to the Land Bank.

The repayment rate of cotton loans in the area averaged 93.3%.

## HOW FLOORS HURT PIGLETS\*

By BILL SMITH

Any floor used for animals should be suitable for walking or lying on without causing injury or pain, or in any way inhibit natural behaviour, movement or comfort, it should also be easily cleaned and disinfected, and should last for at least 15 years.

That may sound a reasonable definition, but the fact remains that many floors fail to conform to these general standards, as a study of piglet injuries makes clear.

The most common piglet injuries associated with the use of an unsuitable floor are septic arthritis (joint-ill), tenosynovitis (inflammation of tendon sheath linings) and abscesses in various organs throughout the body. These problems are usually the sequel

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to, first, bruising of the tissue, followed by tissue necrosis and erosion which allows the entry of various bacteria into the body.

Let's look at injuries in more detail, starting with damage to the feet.

**Clay injuries.** — The sole of the claw is the region most commonly injured in pigs of all ages. In fact, mild bruising of the sole usually occurs in 100% of piglets within 24 hours of birth; this in itself is unimportant, but where the floor surface is unsuitable the bruising may progress to erosion, as in **Photo 1**. The erosion may involve both the soft tissue and the horny area of the sole.

On one type of expanded metal, 20% of baby pigs were observed to have erosions on the inside hind claws and 15% had erosions on the inside front claws. A similar distribution of

lesions was seen on piglets walking on what was described as 'rough' concrete.

In all cases, erosion usually reaches a peak at 5-7 days old and healing tends to occur by 14-16 days of age. Of the piglets with erosions referred to above, only 40% were observed to be clinically lame, so the owner or stockman may not appreciate that he has a problem.

**Heel damage** — Bruising and erosion may occur on both lateral and medial aspects of the ball of the heel (**Photo 2**), especially on slatted floors which allow partial penetration of the foot (that is, slats with more than 100 mm of a gap). Again, on a slatted floor such as of expanded metal with a gap greater than 10 mm, 75% of piglets may have heel injuries on the medial hind digits and 25% on the medial

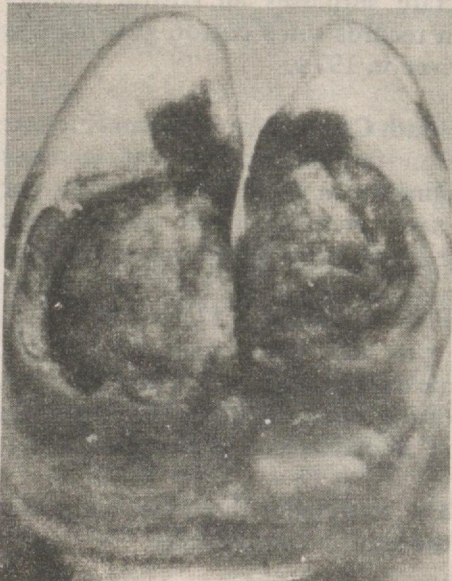


Photo 1 — Clay injuries.



Photo 2 — Heel damage.



Photo 3 — Accessory digits

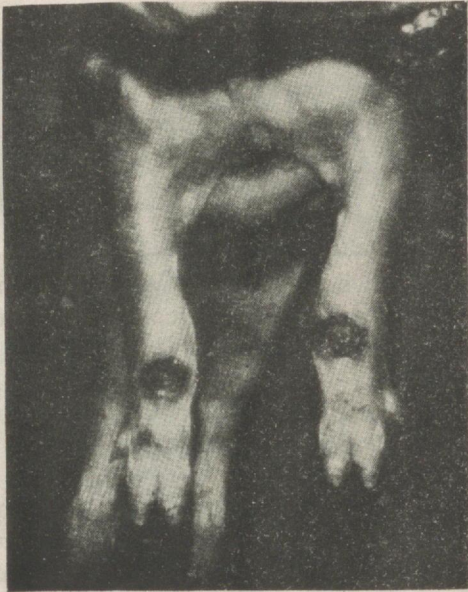


Photo 4 — Leg injuries.

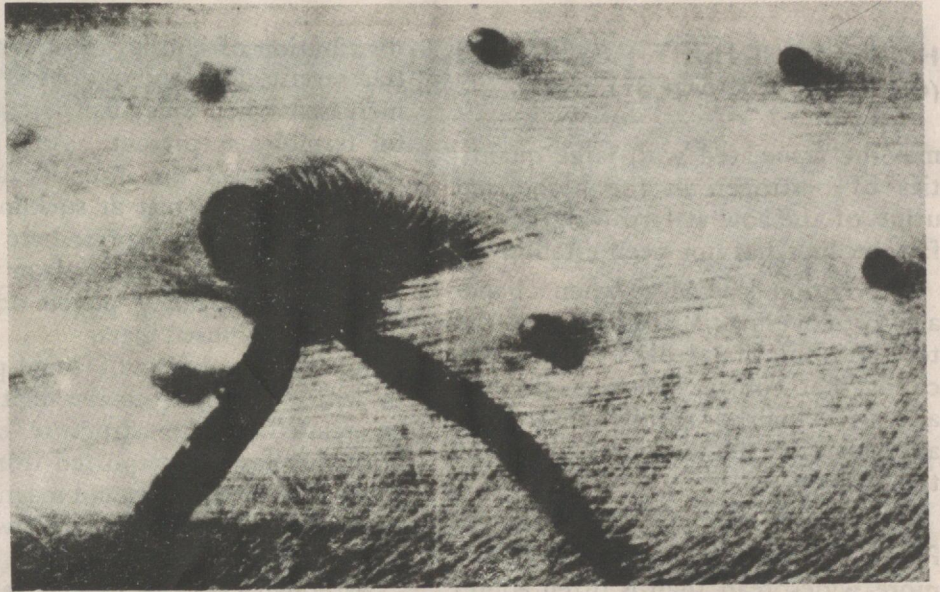


Photo 5 — Teat necrosis.

front digits. Injury to this area may also occur on concrete floors described as "very rough".

**Accessory digits.** — These appendages, on which the piglets do not usually walk, may receive severe injuries on some types of perforated metal floor which allow partial penetration of the foot. The sequel to such injury is shown in **Photo 3**.

**Leg injuries.** — Ulcerated areas of skin over the knees, fetlock, hock, elbow and tail have been observed increasingly, the common factor being the use of hard floors with little or no bedding. The most common site of injury is the knee and when both knees are affected severely it is likely that lesions on other sites will also be seen.

The initial lesion (**Photo 4**) is a dry gangrene of the skin and although the wound may be inhabited by many micro-organisms the condition is not transmissible. It may be brought about in part by abrasion and in part by pressure necrosis if the baby pigs are suckling on their knees.

I have seen knee necrosis on all types of floor, even on smooth concrete covered with a layer of straw and sawdust. Usually there is not enough bedding to prevent the lesions occurring, as the sow or piglets scrape away the bedding and leave parts of the concrete exposed.

Fortunately it can be prevented quite easily, by the application at birth of a protective covering such as a form of plastic skin or a bandage.

What will certainly not prevent knee necrosis is the use of rubber mats

or any other form of plastic or rubber treatment to metal or concrete floors. Only an extremely soft floor would prevent injury of this sort, and the difficulty in finding such a floor could be a problem if, for welfare reasons, knee necrosis became unacceptable. It is unlikely to be of economic significance unless it is severe, penetrating all skin layers; there is no evidence to suggest that bacteria entering through necrotic lesions of the knee cause joint-ill, although that is hypothetically possible.

**Teat necrosis.** — This is seen on all types of concrete and slatted floor, whether or not it is covered with some

sort of protective material such as rubber or plastic (**Photo 5**).

The condition is nearly always bilateral and its incidence is highest in females. The teats most commonly affected are the anterior or first pair, then the second and third pairs in a descending order of frequency. The condition can be of considerable economic importance where it restricts the selection of gilts for breeding.

The higher incidence in females may be linked to their slightly larger nipples at birth in some litters. In these cases the enlargement of the teat

(Continued on next page)



Photo 6 — Vulva necrosis.

## HOW FLOORS HURT...

(Continued from page 31)

may be associated with large quantities of oestrogen in the blood and urine of the sow at farrowing, but so far the link has not been established.

Prevention is achieved when a bandage or covering is applied over the teats for the first 4 days of life, indicating that contact between the teat and a very hard or abrasive floor plays a crucial role in the development of the problem.

**Vulva necrosis.** — Illustrated in **Photo 6**, this is a condition which is more widespread than is often appreciated. In one study 43% of females were noted to have a swollen vulva at birth (**Photo 7**) and 75% of these became bruised and necrotic.

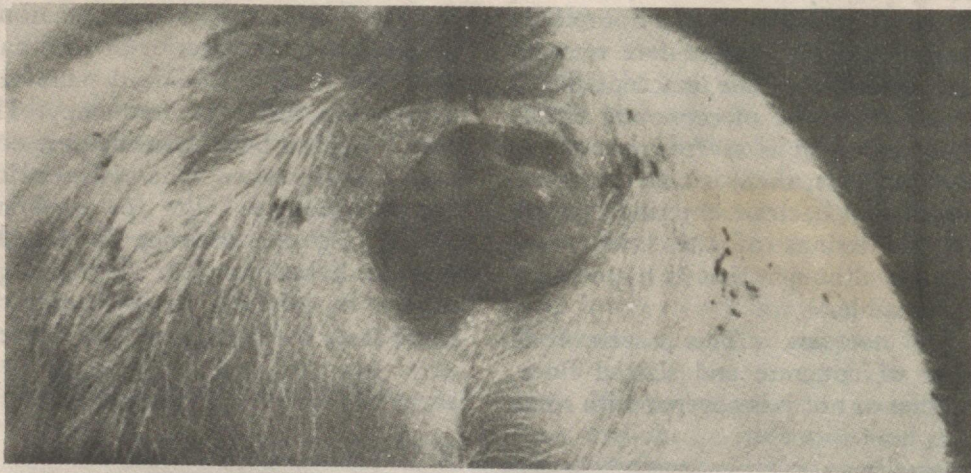


Photo 7

Damage in some cases was so severe that the healed vulva was unrecognizable as such by 14-21 days of age, leaving only a very small aperture.

I have seen this condition on all types of floor. A precondition of the lesion is certainly swelling, oedema and congestion of the vulva at birth. Again this may be linked to high oestrogen (hormone) levels in the farrowing sow. The incidence and severity is markedly influenced by splay-leg. Abrasion plays a crucial role in the lesion's development, but much more research needs to be carried out on this particular problem.

**Intercurrent disease.** — We should not lose sight of the part various disorders may play in the prevalence and

distribution of injuries. For example, the severity of foot injuries is often increased when splay-leg or congenital trembles is present. Any factor which increases the intensity of the scrabbling for a teat at suckling will also make lesions worse; here I am thinking of cases of agalactia or where there are too many piglets for the number of exposed teats.

Again, the ability of some piglets to withstand injury to the digits may be related to the structure of the horn. It has been reported from one study that the calcium and magnesium content of light-pigmented claws was less than for dark-coloured claws.

Although claw size would seem to play an important role in the development of lesions in the growing pig, there is no evidence that claw size plays a significant part in baby pigs.

This is despite the fact that most lateral claws are bigger than the medial claws in 60-80% of individuals by 14 days old.

Regrettably there remains a huge gap in our knowledge relating injuries to floor texture and type. The injuries I have described here are without doubt due to contact with a floor which has an unsuitable surface texture.

Part of the problem is one of terms. Describing a floor as smooth or rough is almost meaningless — what we need is a way of defining texture so that it makes sense to floor manufacturers. If we can then be more precise about texture and its relationship with injuries, we will be in a position to guide

## UPLAND WEED IS CURE FOR GOITER

A wildly growing weed in Kalinga-Apayao has been discovered by medical researchers as effective cure for goiter.

The plant, locally, called "Burburtak," also grows in profusion in the Cordilleras.

Living testimony to medicinal properties of the weed are the Kalinga-Apayao folk who, researchers found, seldom get affected with goiter although they have little access to seafood.

Seafood is traditionally prescribed by doctor as good source of iodine needed to prevent goiter.

The researchers were put on the trail of "burburtak" when government health personnel noted that goiter cases are rare among Kalinga-Apayaos and members of some Bondoc and Benguet tribes.

Such curiosity led into an inquiry to the daily food intake of such goiter-free citizens. The inquiry discovered the "burburtak" was a part these people's daily vegetable intake. The Bondocs call the weed "ngwad."

The weed was sent to Manila for laboratory analysis of iodine contents by Dr. Aida Agustin Padlan, head of the goiter control project of the National Nutrition Service of the health ministry, and Dr. Sadiri Malapit of the National Nutrition Council.

manufacturers rather than just criticize their products as at present.

Nevertheless, these companies will have to accept that there is a growing weight of evidence suggesting some types of floor are plainly unsuitable for baby pigs. There is reason to believe that the width of the void or gap in slatted floors should be no greater than 10 mm if injury to the heels and accessory digits is to be prevented in newborn pigs, and in addition the edge of the slat should be smooth and rounded. In my view, concrete slats are not suitable for baby pigs as they are not clean enough for the first 2 weeks of life, and usually allow complete penetration of the foot.



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*Taste, status symbol make animal protein look better than that from soybeans.*

## PLANTS CAN PROVIDE COMPLETE PROTEINS

Proteins from animals can easily be replaced in the human since these are not that much better in quality than those from plants.

This view from food experts belies the popular notion that there is nothing quite like animal proteins in point of quality.

The idea that plant protein cannot match the quality of animal protein appears to be a major factor for the slow progress in solving deficiency in this nutrient despite availability in large quantities of plant protein.

Jon-Wynne Tyson, in his book *Food for the Future*, argues that it is only because of taste and their having become status symbols that steak and hotdog, for instance, are seen as much better than soybeans and other grains.

Dismissing the idea of first or second-class protein, Kathy Hoshijo, a vegetarian cuisine expert, explains that the most important thing to consider is whether foods yield the proper amino acids to enable the body to perform its function of repairing and rebuilding tissues.

Soybeans, she suggests, come closest to being the "perfect food" particularly if combined with other low-cost items.

Even other cereal proteins lacking some essential amino acids would adequately meet man's nutritional needs if combined with other proteins containing the missing elements, says Evelyn C. Malaguit, technician and researcher of the National Food Authority (NFA).

Nathaniel Altman, author of *Eating for Life — A Book on Vegetarianism*, lists several non-animal foods capable of providing adequate supplies of

complete proteins. These include soybeans, nuts, cereals, whole grains, sunflower seeds, dried peas, wheat germ, sesame seeds, dried beans, brewer's yeast, olives, avocados, cow's milk and cheese.

What makes a vegetable-heavy diet sound even more reasonable even for those suffering from protein deficiency is the observation made by Ethel Austin Martin, author of *Nutrition in Action*.

Martin says only plants can make their own proteins. They do this by combining nitrogen from the soil and air, carbon dioxide from the air and water. The sun energizes the protein-making process.

On the other hand, it takes a protein-rich diet to make animals produce the high-quality protein so highly valued by people.

Just as man has to get his protein elsewhere, other animals, it seems, have also to rely on outside sources or their supply of the nutrient.

Thus, feeding grains, cereals and other foodstuff to animals so people can have meat for their protein requirements is a roundabout way of availing of the nutrient.

For one thing, the process' effect in bringing up the price of protein sources probably parallels that of a middleman's.

More important, however, the process deprives millions of starving people food which is being used to fatten up poultry and livestock for the consumption of the few who are more affluent and can pay their prices.

James Rachel, in his article "Vegetarianism and The Other Weight

Problem" for the book *World Hunger and Moral Obligation*, cites the following figures, using the United States as example, in batting for vegetables as protein sources:

- Animals have to be fed eight pounds of protein in the form of grain to get back one pound in the form of meat, representing a wastage of 87.5 percent.

- About 78 percent of the country's grain is fed to animals — the highest percentage of any country in the world. Given this figure, it appears that the US feeds animals 21 pounds of protein in the form of grain to get back one pound in the form of meat.

In 1968, the US fed some 20 million tons of protein to livestock to get back two million tons in the form of meat, for a net loss of 18 million tons. This loss was equal to 90 percent of the world's estimated protein deficit.

Adds Rachel, in arguing for vegetarianism:

"The meat we eat is no more nourishing than the grain the animals are fed. The only reason for preferring to eat meat is our enjoyment of its taste; but this is hardly a sufficient reason for wasting food that is desperately needed by people who are starving."

Tyson and Altman think that forecasts of the world's future need not be so pessimistic, and millions of people need not go hungry if the grandscale production of soybeans and other grains is used wisely.

All these suggest that people will have to learn to look to plants for their protein requirements and like it.

*Carabaos more valued as farm work animals.*

## IGOROTS NOW USE COWS IN RELIGIOUS RITUALS

LA TRINIDAD, Benguet — There are no sacred cows in this province — literally, that is.

In most of Benguet's 13 municipalities, residents now use the cow instead of the carabao as sacrificial animal for their traditional rituals like, tribal weddings and "canaos."

Others have turned to pigs as their offering to spirits of dead relatives and in thanksgiving rites.

The perceptible shift from carabao to cow as sacrificial animal may be partly due to the high cost of buffalo. But observers are inclined to believe this is the effect of a presidential directive raising the age limit of carabaos allowed to be butchered to seven years or over for the male and 11 years or over for the female.

The new edict also requires a certification from the provincial or city veterinarian showing that the age of the animal had been determined and that it was found to be free from any disease.

The directive amends Executive Order No. 234 which allowed the slaughter of carabaos that are three years old or over.

Agriculture officials said the new order is necessary because the current energy crisis has made carabaos indispensable to small farmers as work animals. With the high cost of fuel, these farmers have to rely on the animals rather than on machines in tilling their land.

Traditional rites in this upland province used to require the slaughter of one to three carabaos.

At present, only a few prominent and financially well-off people use the carabao for such rituals.

The high cost of a carabao, as well as the time and effort needed to get the necessary permits, is prompting more and more people to use the cow for religious and social events.

But some sectors are suggesting a way to enable the Igorots to continue using the carabao for their rituals as dictated by tradition. They propose a carabao breeding program that in the long run could meet the demand for the animals.

In another development, animal breeding experts are encouraging livestock producers here to adopt the feedlot fattening technique in raising cattle.

They think the technique will not only produce high-quality cattle but also prevent the occurrence of forest fires along the Agno river basin.

Residents have blamed cattle raisers for fires which have destroyed the vegetation in the area, including newly planted trees. They alleged that livestock producers deliberately and indiscriminately set fire to portions of the forests to encourage the growth of grasses which the cattle can feed on. Producers normally allow their animals to roam freely and forage for food.

The feedlot fattening technique requires raisers to keep the animals in an enclosure which allows them as little room for movement as possible. An area (the size depends on the number of animals being raised) is set aside for growing plants which will make up the cattle's diet. The plants are mixed with other ingredients to make a high-protein meal and then force fed to the animals.

This scheme further reduces damage to vegetation as the cattle do not have to move around, in the process treading on small plants, to find a place for grazing.

Experts said the feedlot fattening technique not only provides the farmer with extra income as he tends to both farm and animals but also gives him year-round work. It allows the full use of cheap and abundant farm

## PENA ALLOWS TUNA IMPORTS

Teodoro Q. Pena, Minister of Natural Resources, explained that Mar Fishing Corp., a subsidiary of Marcopper, has been allowed to import tuna because local fishing firms have been unable to supply the requirements of its canning plant in Zamboanga City.

Earlier, a group of tuna fishermen questioned the government's decision to permit Mar Fishing to import tuna.

Pena said that Mar Fishing has been permitted to import 3,000 tons of tuna which it uses for its plant during these lean fishing months of November, December, January and February.

According to him, the tuna problem has been "bedeviling" the company's operations since it started operations last year. To increase the supply, he said Mar Fishing is going into tuna fishing. It is purchasing two fishing vessels from B. B. Packers of Canada.

The minister noted a substantial reduction in the volume of tuna catch. A big portion of the catch, he added, is being exported by local fishing firms.

He said that there is need to conduct a survey which would assess the country's tuna stock. This would help government in formulating policy on the establishment of canneries.

Asked if the import permit granted to Mar Fishing could be extended to other canneries, he said that the other canning plants have not asked for such permit.

by-products.

Cattle-producing provinces like Batangas, Pangasinan and Tarlac in Luzon and several provinces in Visayas and Mindanao have already adopted the technique, the experts said.

They added that the feedlot fattening technique also results in better quality beef.

**BAI researchers found molluscicide elements in seven local plants.**

## PLANTS AS EFFECTIVE SNAIL GROWTH CONTROL

Seven indigenous plants have shown potential as cheaper but effective substitutes for commercial preparations in controlling liverfluke disease-carrying snails.

The plants were found to contain certain elements fatal to snails which are the main carriers of liverfluke, a dread animal disease characterized by the presence of worms in the liver.

Researchers of the Bureau of Animal Industry identified the plants as droton fruits (*croton tiglium* linn.), gogo bark (*entada phaseoloides* merr.), native tobacco midribs (*nicotiana tabacum* linn.), sambang (*coryea balsa mifora* linn.), calamansi rinds (*citrus mitis blanco*), tubang-bakod (*jatropha cureas* linn.), and labtang (*minis pernum coculus* linn.).

In many areas, control of disease-carrying snails depends mainly on commercial molluscicides. The chemicals have successfully controlled snails in certain areas of Rhodesia, Brazil, Venezuela, Egypt and Japan.

But commercial preparations are expensive, said the researchers. This prompted them to search for cheaper but effective substitutes.

A total of 150 indigenous plants were studied by the BAI experts and the seven emerged as the most likely substitutes for anti-snail chemicals.

Researchers conducted the study in three stages — preliminary, laboratory screenings and field testing.

The plants were air-dried, pulverized and immersed in water containers.

Concentration rates used in the tests ranged from 100 to 500 parts per million (ppm) of the plants. Snail mortality rates were registered from 55 to 98.5 percent.

Research findings tend to indicate that the efficacy of the concentrates increased as the concentration of the substance and time of exposure of the snail to it were increased.

At concentrations of 100 to 500 ppm and exposures of from 12 to 48 hours the droton fruit, gogo bark and native tobacco midribs, in that order, were found most effective.

Further testing also showed that the solutions derived from the plants prevented the hatching of snail eggs.

The researchers found that mortality rate of snails increased when the solution was placed in a dark spot. This seems to suggest, the experts said, that the efficacy of the solutions was affected by sunlight.

All the seven preparations, however, were found toxic to at least three species of fish.

The three plants which registered the highest snail mortality rates in the preliminary and laboratory screenings were the ones used later in the field tests.

Different amounts of the solutions using droton fruits, gogo bark and native tobacco midribs were applied in snail infested areas.

Highest mortality rate was registered when 40-50 grams of the solutions were applied per square meter. The mortality rate decreased when the amounts of the solutions were reduced.

Snail death was also faster when the amount applied was greater. Snails started to die within two hours after 40-50 grams of the solutions were applied to a square meter of land. It took about 12 hours before snails died when only 10 grams were applied per square meter.

However, the BAI experts stressed that their findings were not conclusive. Further studies, they said, should be conducted to establish definitely the characteristics of the seven plants.

The plants have also been sent to the medical research department of the National Institute of Science and Technology for chemical analysis.

## PLANT PRODUCES BIOGAS FROM HUMAN WASTE

A pilot communal biogas system which produces combustible gas (methane) from human waste has been tested successfully in Road 2, Project 6, Quezon City by the Economic Development Foundation.

The pilot unit, now serving 25 persons in a private housing compound, consists of a horizontal two-compartment, 1.5 cubic meter digester equipped with manual agitators.

Its gas collector is separate (non-integral) and is of the floating type, to eliminate the problem of pressure variations common in integral-type gas collectors.

Researchers said the system can generate as much as 10 liters (64 percent methane) of biogas per person. Ignited in an ordinary gas stove, the gas burns with a bluish flame. Its combustion products are odorless.

Development and installation of the communal biogas system was undertaken along with a survey on its social acceptance in a community.

The survey showed that 74 percent of families with combined income ranging from P240 to 800 per month, have no objection to cooking with gas generated from human waste.

The study also showed that 81 percent would not mind having a human biogas system in their vicinity and 92 percent have no qualms about using the odorless sludge from the system for fertilizer.

Funds (P276,800) for the Project 6 pilot unit and the surveys and laboratory studies linked with it were provided by the Bureau of Energy Development.

In laboratory studies, it was found that tissue paper and newspaper concentrations of up to 10,000 parts per million actually boost production of biogas.

Muriatic acid and toilet bowl cleaners were also found to have minimal effect on the digesting mass stability up to concentrations of 4,000 ppm, although at concentrations

*(Continued on page 38)*



## **YOUR SYMBOL OF SECURITY**

The Odin Security Agency symbol is a stylized design of the head and helmet of Odin, the father of the gods in Scandinavian mythology, whose palace was in the shining city of Asgard, the home of the gods.

Odin was considered as the god of the heavens, where he sat on a golden throne and directed the wind, the rains, and the seasons. On his head he wore a shining helmet. In his hand he held a spear made from the tree of life. And on his shoulders was wrapped a mantle trimmed with stars.

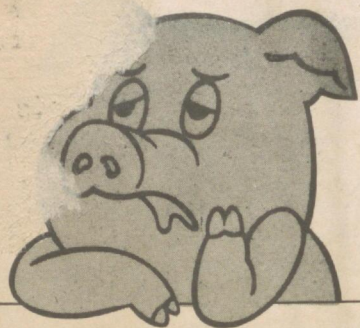
Odin ruled over the heavens, the earth and the underworld, but could not control the home of the frost giants, who waged unending wars against the gods and men. Odin longed for the wisdom that would make him greater than any of the giants and enable the gods to triumph over them and end the incessant strife. The only way to acquire this wisdom was for Odin to drink from the fountain of knowledge, but he had to pay a price. He had to give one of his eyes to the guardian of the sacred fountain. After Odin drank from the sacred fountain, there was no one in all the world who could compare with him in wisdom.

So Odin lived, ruling the world wisely and kindly. In his honor the fourth day of the week is named Wednesday, or "Woden's day." Odin is sometimes identified with the Roman god Mercury. This explains why the French call the fourth day of the week "Mercury's day" (*mercredi*).

It is in the light of the story of the wisdom and bravery of Odin that Odin Security Agency has chosen his head and helmet as its symbol – to project its objective to achieve peace and security even at the cost of making sacrifices.

# **Odin Security Agency**

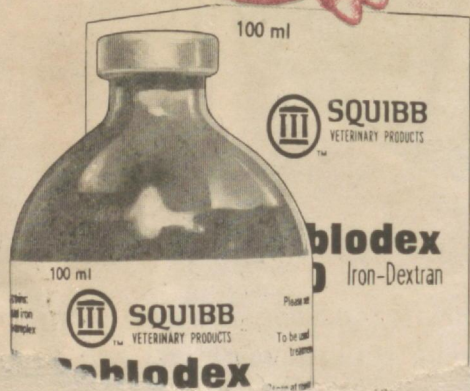
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