Four Corners

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Brazil . . . . . Dr. Roberto F. Kohlmann

Let us talk about the Brazilian outlook for the near future, as far as oilseed crops and crushing capacity is concerned.

The only fast expanding crop is soybean, while cottonseed and peanuts remain practically stationary.

Forecasts show the following figures for soybeans:

SOYBEAN CROPS

Year	Million T
1977	13.5
1978	15.0
1979	16.2

Near 1982, the 20 million ton level may be reached.

By the same token, crushing capacity increases yearly, but only in South and Central Brazil, where soybeans are grown:

CRUSHING CAPACITY ALL BRAZIL

Year	Million T
1977	21.5
1978	28.0
1979	29.0

Presently, one can find in Brazil all kind of solvent extractions, mainly in the small (100-1000 ton per day) bracket. But the definitive tendency is for large (2000-4000 ton per day) equipment, following exactly the U.S. move. Most new equipment is of the rotary type extractor.

There is much pressure by government for local construction of machinery. Import duties have become prohibitive lately, a situation which certainly will not change soon, to reduce a balance of payment deficit.

Due to the fact that most large soybean extractions and refineries are brand new, the technology used now in Brazil is the most advanced in the field, a real surprise to many foreign visitors.

Chile . . . . . Lilia Masson

RAPESEED IN CHILE

The Research Branch of the Canada Department of Agriculture was requested by the Canadian Embassy in Chile and the Instituto de Investigaciones Agropecuarias (INIA) to supply technical assistance on production and improvement of the rapeseed crop in Chile. This mission was jointly sponsored by Agriculture Canada Research Branch, INIA and the Canadian International Development Agency through their small projects fund administered by the Canadian Embassy.

Throughout the period of study, Nov. 2-26, 1975, Dr. R.K. Downey from the Canada Department of Agriculture visited Chile.

The mission was intended as a follow-up to the two-month rapeseed improvement mission conducted Oct. 18 to Dec. 17, 1969.

A summary of Dr. Downey's Report is given in the following paragraphs:

The present report deals with the current rapeseed situation in Chile and makes recommendations as to how present constraints may be overcome and the crop and its dependent industry established on a more secure and profitable foundation.

Information on the history and characteristics of the rapeseed crop in Chile is contained in the 1969 report "Production and Improvement of Rapeseed in Chile."

Chile remains a net importer of edible vegetable oils. Indeed, during the period under review, the level of imports increased substantially and domestic oil production from rapeseed, sunflower, safflower, and soybean crops decreased (Table I). Nearly all the oil imported was either soybean or rapeseed.

Much of the decrease in production which occurred between 1970 and 1974 can be attributed to the unsettled political and agrarian situation, although unfavourable weather in the 1973-74 crop year contributed to the lowest level of production since 1960.

As noted in the previous report, rapeseed is agronomically well adapted to much of the Chilean central valley and offers a viable alternative to expensive oil importation. Normally rapeseed ranks fourth or fifth in importance among the annual crops grown in Chile.

There is, however, considerable opportunity to expand and increase the production base. The hectareage and yields recorded for the 1974-75 crop and the estimated area planted to rapeseed in 1975-76 indicate a return to more normal cropping practices (Table II). There is now every reason to expect that with the additional knowledge in rapeseed agronomy and management gained over the past six years the crop could expand to the levels experienced in 1965 and 1966.

As noted in 1969, rapeseed is ideally adapted to the many climates of Chile, and the recent tour of rapeseed fields and plots only tended to confirm this earlier conclusion.

Until May 1975 the contracting, receiving, and purchasing of all oilseed crops was the responsibility of Compradora de Maravilla S.A., better known as Comarsa. This company also had the responsibility of importing edible oils to meet the short fall in domestic production. Incorporated in 1950 as a limited company, Comarsa had as its shareholders in recent years the seven Chilean oilseed processing companies (Table III).

Unfortunately, Comarsa was forced to dissolve on very short notice on May 9, 1975.

Thus the seven companies have become competitors, not only in the wholesale/retail market but also for raw materials.

At a meeting with the Association of Oilseed Processors (Asociación de Fabricantes de Aceite Comestible de Oleaginosas) on Nov. 25, at which representatives of all the processors were present, it was suggested that the problems of future research funding and field cooperative programs could be overcome through continued participation and cooperation of all the processing companies.

One of the major fatty acids of rapeseed oil is a long chain monenoic fatty acid, erucic. The presence of substantial amounts of this fatty acid (approximately 40 percent in spring rape and over 45 percent in winter rape) is

a major difference between rapeseed oil and most other vegetable oils. From 1970 onward, there has accumulated a large amount of evidence from histopathological studies of laboratory animals which indicate that rapeseed oil with low levels of erucic acid (5 to 10 percent) is nutritionally more desirable. The situation can be summarized as follows:

(a) There has never been any evidence that high erucic acid rapeseed oil is a hazard to man; however, its effect on a wide array of laboratory animals suggests that it is prudent or wise to use the low erucic oils as soon as it is economically feasible to do so. This is particularly desirable in countries where rapeseed oil constitutes a major proportion of the dietary fat intake.
(b) Most vegetable oils produce a low incidence of heart tissue changes, and feeding increased levels of low erucic rapeseed oil does not increase the incidence or severity of such changes. Low erucic acid oils are nutritionally as satisfactory as other vegetable oils.
(c) There is a distinct sex difference in reaction to erucic acid, males being highly susceptible.

About 60 percent of the vegetable oils consumed by the Chilean population come from varieties which produce high erucic acid rapeseed oil.

It is recommended that rapeseed-contracting firms phase out the present varieties and replace these with low erucic acid-producing varieties as soon as well-adapted strains become available.

Rapeseed Meal

The availability of rapeseed meal during the past five years in Chile is estimated to have varied between 20 and 33.5 thousand metric tons/year, assuming an oil extraction rate of 40 percent. A substantial proportion of this meal production is exported to Europe. Nutritional experts agree that all the meal produced could profitably be used by the domestic feed industry. The reluctance of feed manufacturers to expand the use of rapeseed meal is at least partly due to some past disappointing performances when improperly processed meal was supplied and fed. Reduced feed efficiency and animal production can occur if the glucosinolates in rapeseed are permitted to be broken down into their hydrolysis products by the myrosinase enzyme contained in the seed.

As a result of the 1969 report, meal samples from most of the rapeseed-processing plants were monitored. The results indicated that with very few exceptions rapeseed meals now being produced in Chile are of high quality since the myrosinase enzyme is inactivated at an early stage of processing. The introduction and use in 1976 of the low glucosinolate summer rape variety 'Tower' is the first step toward the ultimate goal of complete conversion to the production of low glucosinolate meal.

It is recommended that the development of low glucosinolate winter and summer rapeseed varieties adapted to the main rapeseed-growing areas of Chile be given high priority by government and university researchers.

Varieties

Although a large number of foreign varieties and strains have been evaluated since 1969, the main varieties grown continue to be the Japanese summer rape variety 'Norin 16' and the Swedish winter rape variety 'Matador.' This situation is likely to undergo a rapid change in the next few years as strains with improved adaptation begin to emerge from Chilean breeding programs and foreign varieties with improved quality features become available.

The 'Matador 70' strain, released in 1974 by the von Baer family plant breeding firm, appears to be the first advance. The second development will commence in 1976 with the gradual replacement of the summer rape variety 'Norin 16' with the low erucic, low glucosinolate Canadian variety 'Tower.'

Further improvements are attainable with continuing industry support. Discussions with researchers indicate that realistic goals for the development and introduction of improved varieties could be defined.

If this time table can be maintained, the total industry, from grower to processor, should benefit considerably.

GOALS TO BE ACHIEVED BY CHILEAN RAPESEED BREEDERS 1975 THROUGH 1984

Spring Rape

By 1975 to have evaluated and registered the low glucosinolate, low erucic variety 'Tower.'

By 1976 to have tested and ready for registration a Chilean low erucic (3 percent) variety equal to 'Norin 16' in seed and oil yield. (This strain should be superior to 'Tower' in seed yield and maturity under northern conditions.)

By 1978 to have tested and ready for registration a Chilean low erucic, low glucosinolate variety equal to 'Norin 16' in maturity, oil, and seed yield.

Winter Rape

By 1976 to have tested and ready for commercial evaluation a Chilean low erucic (10 percent) variety equal to 'Matador' in seed yield.

By 1977 to have tested and ready for commercial evaluation a Chilean anthracnose-resistant variety equal to 'Matador' in quality and agronomic performance but 20 percent higher yielding where anthracnose is severe.

By 1977 to have tested and evaluated both the early maturing low erucic (22 percent) French variety 'Primor' and a similar low erucic (10 percent) Chilean variety for use in late plantings and on the red clay soils.

By 1985 to have tested and ready for commercial evaluation a low erucic, low glucosinolate variety equal to 'Matador' in yield. (*Note:* Varieties with such quality characteristics may be available from European sources at an earlier date.)

By 1984 to have tested and ready for commercial evaluation a low erucic, low glucosinolate anthracnose-resistant variety superior to 'Matador' in yield and oil content.

It is recommended that Chilean rapeseed breeders adopt the time table outlined as immediate goals but that these goals be updated at least yearly and the industry be kept informed of changing projections.

FATTY ACID ANALYSIS

One of the major factors limiting the rate of advance toward the development of low erucic varieties is the efficiency of the test for the fatty acid, erucic.

Three basic methods are possible: gas chromatography, paper chromatography, and differential fatty acid solubility.

Thus, since access to gas chromatography is limited in Chile and automation of the present equipment is expensive, it is suggested that paper chromatography be used by most of the rapeseed breeding laboratories for rapid screening, at least until the differential solubility method can be modified for use.

Consideration should also be given to the purchase of equipment to increase the efficiency of oil content determinations.

It is recommended that the rapeseed breeding establishments evaluate the various methods of determining erucic acid levels in their breeding populations to determine the most efficient method for the resources available and that wideline NMR be obtained for La Platina as soon as resources permit.

CROP MANAGEMENT

Time did not permit observations of a large number of fields so that information concerning improved crop management and cultural practices at the commercial level was limited. However, it would appear from the fields that were seen and from talks with agronomists that the main problems continue to be the lack of effective control of grassy weeds, as well as the reluctance of growers to apply sufficiently high levels of fertilizer to obtain optimum yields.

It is recommended that a few industry agronomists be designated to work with soil fertility specialists to design and implement a program of fertilizer strip applications on some contract fields, with the ultimate objective of gradually raising the fertility of commercial fields to optimum levels.

Soil fertility studies related to the expansion of rapeseed production into some of the nontraditional rapeseed-growing areas are progressing well. It is important that these studies continue if the rapeseed production base is to be expanded and the gains already made in the foothills and red clay soils are to be consolidated and exploited.

It is recommended that researchers involved in the rapeseed improvement program meet at least once each year to discuss their results and plan for the following year. The first two days of the second week in May are suggested as a suitable date.

TABLE I

The Amount and Cost of Edible Vegetable Oils Imported into Chile and Their Percentage of the Total Edible Vegetable Oils Consumed in 1971-1975

Year	Metric tons imported	Cost C.I.F. '000 U.S. $	% of total oil consumed
1970	26,681	8,166	42.6
1971	40,358	14,117	54.5
1972	44,336	12,673	59.2
1973	57,568	19,834	75.0
1974	59,188	36,674	77.3
1975	36,000	not available	55.0

TABLE II

The Hectares of Rapeseed Contracted and the Production Obtained in Crop Years 1965/66 through 1974/75

Crop year	Hectares contracted	'000 Metric tons harvested
1965/66	76,133	67.4
1966/67	51,452	50.9
1967/68	37,455	33.9
1968/69	42,159	45.2
1969/70	59,700	57.9
1970/71	39,216	52.6
1971/72	48,359	49.5
1972/73	33,863	35.0
1973/74	29,731	33.4
1974/75	50,769	55.9
1975/76	50,000	-

TABLE III

Oilseed Processing Companies of Chile

Compañía Industrial (INDUS)
Aceites y Alcoholes Patria S.A.
Compañía Productora Nacional de Aceites (COPRONA)
Fábrica Nacional de Aceites (FANAC)
Aceitera Talca (ACEITAL)
Arrocera e Industrial Miraflores
Aceitera San Fernando

Germany . . . . . H.K. Mangold

Senior U.S. Scientist Awards

E. Heftmann, research biochemist at the USDA Laboratories in Berkeley, CA, and P.K. Stumpf, professor of biochemistry, University of California in Davis, CA, won Senior U.S. Scientist Awards for '75 and '76, respectively. They spent six months each at the Federal Center for Lipid Research in Münster. The awards, established in 1972, are administered by the Alexander von Humboldt Foundation.

Achema '76

The 18th Achema, a chemical engineering congress and exhibition, was held in Frankfurt from June 20 to 26, 1976. A chemical engineering meeting was held concurrently. Organizer was the Deutsche Gesellschaft für chemisches Apparatewesen e.V., a technical and scientific society that concerns itself with furthering chemical engineering.

As every three years, the central feature of Achema '76 were technical discussions around the products exhibited. More than 2,000 exhibitors from 27 countries showed apparatus and entire plants for chemical engineering. The exhibition completely filled the fairgrounds at Frankfurt, an area of over 100,000 square meters. With its 15 exhibition halls, six lecture halls, a cinema and a congress hall, the exhibition attracted more than 150,000 visitors. The lecture program included 295 presentations.

The "Achema Yearbook," whose three volumes are entitled "Chemical Engineering Research and Education in Europe," "Development Trends in Chemical Engineering," and "Guide to Chemical Plant and Equipment" gives information on the products exhibited.

New Publications

An "International Symposium on Lipoprotein Metab-

olism" was held at Heidelberg in September 1975. It was organized by H. Greten of the University of Heidelberg. The twenty papers read at this symposium—all in English—have just been published in the book "Lipoprotein Metabolism," which was edited by H. Greten; it has been produced by Springer-Verlag, Berlin, Heidelberg, New York.

During the '75 meeting of the German Society for Fat Science, D.G.F., in Hamburg, a symposium on "Rapeseed and Rapeseed Products" was held. The papers read at this symposium have been published by the D.G.F., and are available from the society's headquarters in Münster.

A symposium on "Lipids and Lipid Polymers in Higher Plants" was held at Karlsruhe in July 1976. The proceedings of this meeting, which will be edited by M. Tevini and H.K. Lichtenthaler, will be published by Springer-Verlag, Berlin, Heidelberg, New York.

Japan . . . . . T. Asahara

15th Annual Fall Meeting of JOCS

The 15th Annual Fall Meeting of the Japan Oil Chemist' Society was held at Kogakuin University in Tokyo Oct. 25-26, 1976. At the meeting were presented 76 papers and two special lectures. The lectures were "Crown Compounds—Their Properties and Applications" by M. Hiraoka of Nippon Soda Co. Ltd., and "Deterioration of Oils and Fats—Mainly on the TBA Reaction and it's Applications" by R.O. Sinnhuber of Oregon State University.

The 35th Annual Fall Meeting of the Chemical Society of Japan was also held at Hokkaido University in Sapporo Aug. 28-31, 1976, and voluminous papers were presented here by JOCS members.

8th Symposium of Detergency

Japan Oil Chemists' Society held the 8th Symposium of Detergency at Hatsumei Kaikan in Tokyo Oct. 6-7, 1976. One report was the result of the co-experiment on the reduction of the content of phosphorus in synthetic detergents for textiles and the testing method for detergency of those, which was conducted by the JOCS Detergent Committee with the cooperation of Japan Soap and Detergent Association as a draft work for revising Japanese Industrial Standard (JIS). According to the draft, the content of phosphorus is less than 12% as P_2O_5 and the testing method for detergency is newly added.

New Zealand . . . . . S.G. Brooker

This report is something of a landmark in that it covers the first commercial production of edible vegetable oils in New Zealand from domestic sources. In Auckland, N.Z., Starch Products has established a plant for production of maize starch with maize germ as a by-product. This is being crushed and the resulting oil refined and deodorized at Abels Limited.

Meanwhile, Fletcher Industries have produced commercial quantities of refined 'Tower' (zero-zero) rapeseed oil at their plant in Dunedin. A deodorizer is being installed and is expected to be in operation by the end of this year. There is no reason why this oil should not gain wide acceptance for edible purposes, but the meal is rather high in fiber for poultry feed, which is the main local use for it.

Experimental work on oilseed crops including mustard, sunflower, safflower, and soybean is proceeding under the auspices of the Department of Scientific and Industrial Research. Results are promising, but problems with insects, weeds, and disease have still to be solved.

The sale of polyunsaturated table margarine, which has been possible only since the necessary legislation was passed late in 1972, has continued to grow despite the fact that its price is twice that of butter. It is estimated that it has taken 10 percent of the market in this traditional dairying country and probably more could be sold if production facilities permitted. Though medical reasons may account for some of the sales, market analysts feel that spreadability of the margarine is a major factor. Research into producing a spreadable butter by fractionation of milk fat is proceeding at the N.Z. Dairy Research Institute, Palmerston North.

Workers at the NRRC, Peoria, [e.g., Mikolajczak et al., LIPIDS 5:812 (1970)] have reported cyanolipids in certain species of the Sapindaceae. Work to be reported at the IUPAC Congress on Chemistry of Natural Products at Dunedin in August, shows that in the two prominent native species from this family, one, *Alectyron excelsum*, has notable amounts of cyanogen compounds in the oil, while in the other, *Dodonea viscosa*, they are absent. The taxonomic implications of this are intriguing.

Up until now, the islands of the South Pacific that were part of the British Commonwealth, with the exception of Fiji which has processed its own copra for many years, have exported their copra to New Zealand and Europe. However, serious consideration is now being given to processing the copra in other islands where good use can be made of the residual meal, with the increasing population.

Poland . . . . . W. Zwierzykowski

On October 10-11, 1975, a meeting took place which was devoted to the 25th anniversary of the Department of Fat Chemistry and Technology of Gdańsk Technical University, as well as to the 50th anniversary of Prof. Henryk Niewiadomski's professional activity. He was head of the department for 25 years.

Dr. Niewiadomski proposed the creation of a Polish Society for Fat Research. He obtained many congratulations from representatives of the administration and of other scientific and industrial institutions.

During the meeting the following plenary lectures were delivered:

Dr. Niewiadomski – Some problems in chemurgy of fats.

Dr. W. Zwierzykowski – 25 years of activity of the Department of Fat Chemistry and Technology.

Dr. K. Bystram – Demands of the oil and fat industry concerning the education of engineers.

During the sectional meetings the following problems were discussed: new trends in the technology of edible fats, new trends in the technology of nonedible fats, and progress in the chemistry and analysis of fats.

Some 200 graduates of the department took part in the celebration. During the past 25 years some 400 students have received master of science degrees in the department. The Department of Fat Chemistry and Technology is the sole department of its kind in Poland. The graduates are now active in many areas of chemistry and food industries.

Prof. Niewiadomski, though now retired, is still active in many scientific and industrial councils. He is also in charge of some scientific investigations in the field of fat chemistry and technology. The Head of the Department of Fat Chemistry and Technology is now Wlodzimierz Zwierzykowski. ●

ASTM Proceedings available

The 1976 Proceedings of the American Society for Testing and Materials is available for $19 from ASTM, 1916 Race St., Philadelphia, PA 19103. The 560-page book is the official record of the society proceedings for 1975. ●