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FIFTEEN YEARS OF RAPESEED QUALITY SURVEYS

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With the increasing importance of rapeseed as a cash crop in Western Canada during the middle 1950's, the Grain Research Laboratory of the Board of Grain Commissioners for Canada began a quality survey of carlots of rapeseed moving to market in the 1955/56 crop year. The following year, a quality survey of the 1956 rapeseed crop was undertaken and in 1957 a survey of the quality of export cargoes of rapeseed was begun. These three surveys have been continued since that time.

The new crop survey has involved the collection of from 100 to 300 samples representative of the new crop rapeseed. The samples are cleaned, ground between rolls corrugated and dried overnight in a vacuum oven at 100°C. Oil content is determined on the dried samples with an overnight extraction in the Goldfisch apparatus and protein is determined by the Kjeldahl method on the dry oil bearing, ground seed. Results are reported as oil content, dry basis and protein content, oil free, dry basis.

The carlot survey involves the collection of a representative sample of every fifth car of rapeseed inspected by the Board's Inspection Branch. The samples are composited by grade quarterly during the crop year and oil and protein are determined on the composites. Yearly average values are calculated as weighted means from the quarterly data. This same procedure is followed for the cargo survey except that here each cargo is sampled. Beginning with the present crop year (i.e., 1970/71), oil content and protein content will be determined on each cargo sample.

The harvest survey provides the most detailed information on the Western Canadian rapeseed crop but is often biased to some extent by a lack of samples from late harvesting areas. As farmers' samples are used for this survey, the maximum variation in oil and protein occurs in this material. Figure I gives an indication of the rapeseed growing area of Western Canada in recent years. The distribution shown here is roughly representative of the areas best adapted to growing the two types of summer rape grown in Western Canada, Brassica campestris (or Polish type) and Brassica napus (or Argentine type).

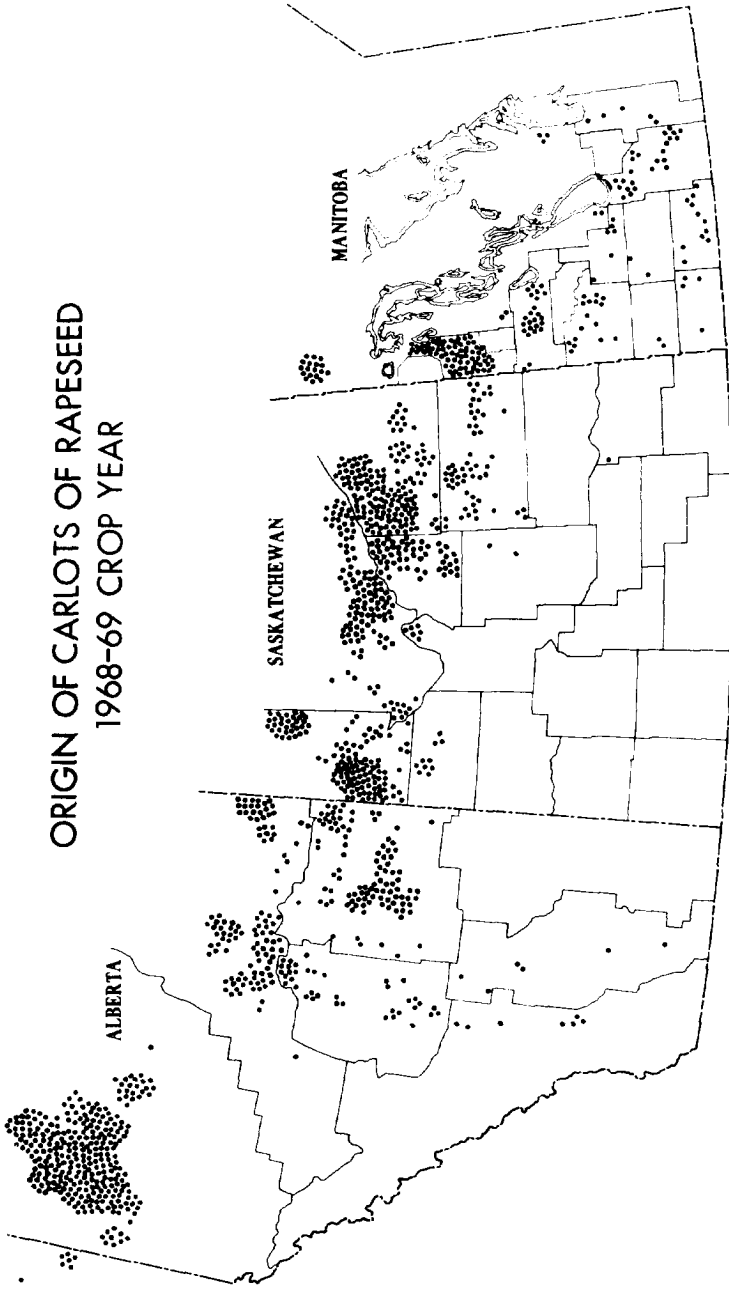


Figure 1

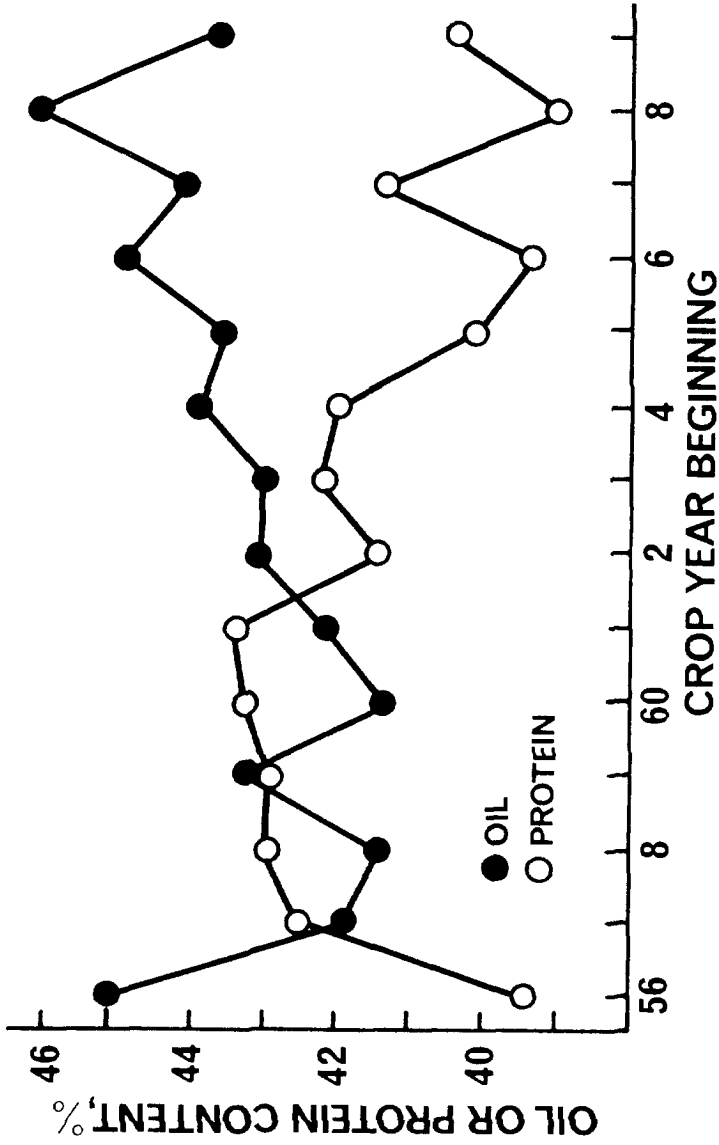


Figure 2. Average oil and protein content for New Crop Rapeseed survey, 1956-1969 Crops.

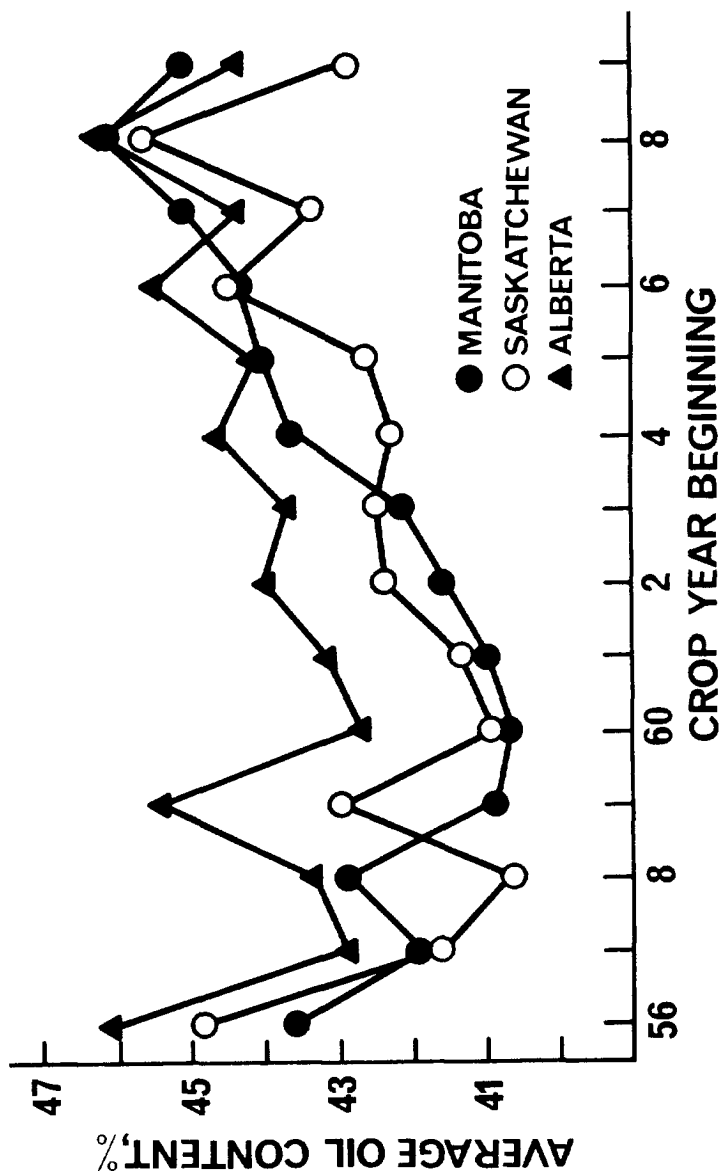


Figure 3. Average oil content of New Crop rapeseed by province, 1956-1969 crops.

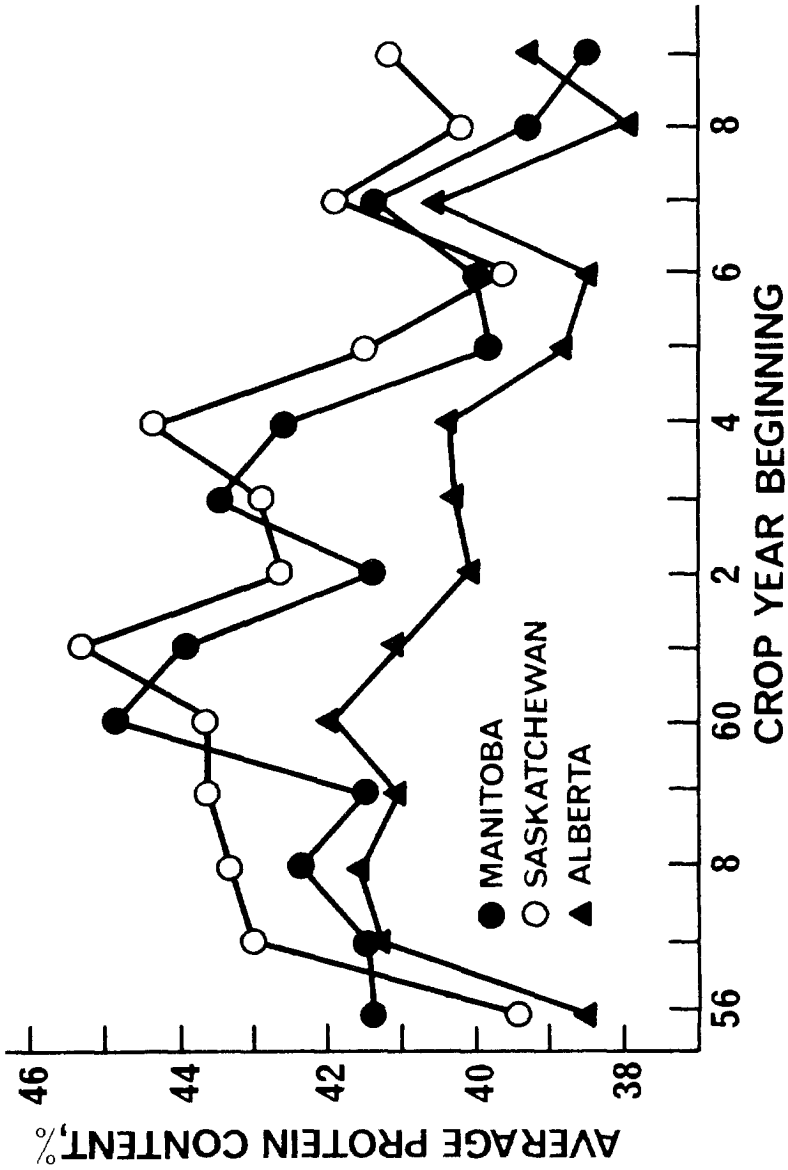


Figure 4. Average protein content of New Crop reprocessed by province, 1956-1969 crops.

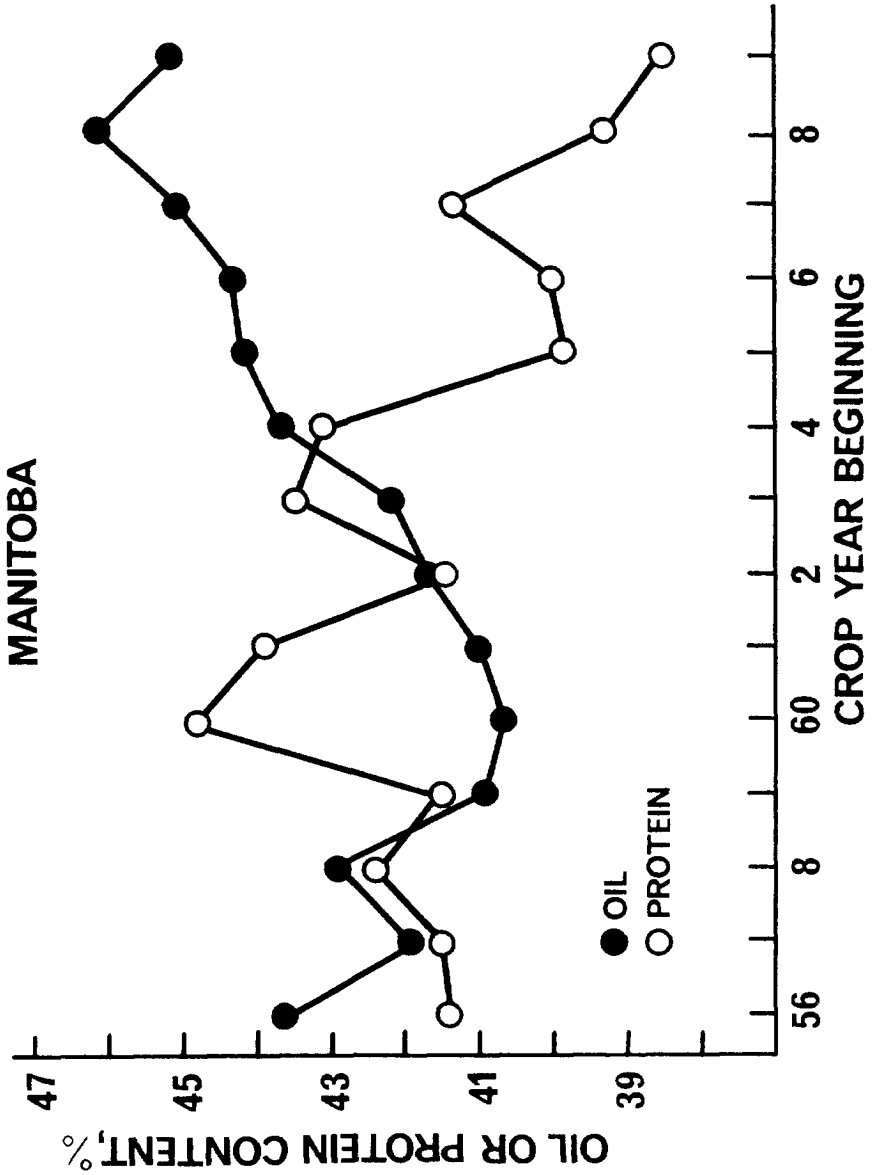


Figure 5. Average oil and protein content of New Crop rapeseed, Manitoba, 1956-1969 crops.

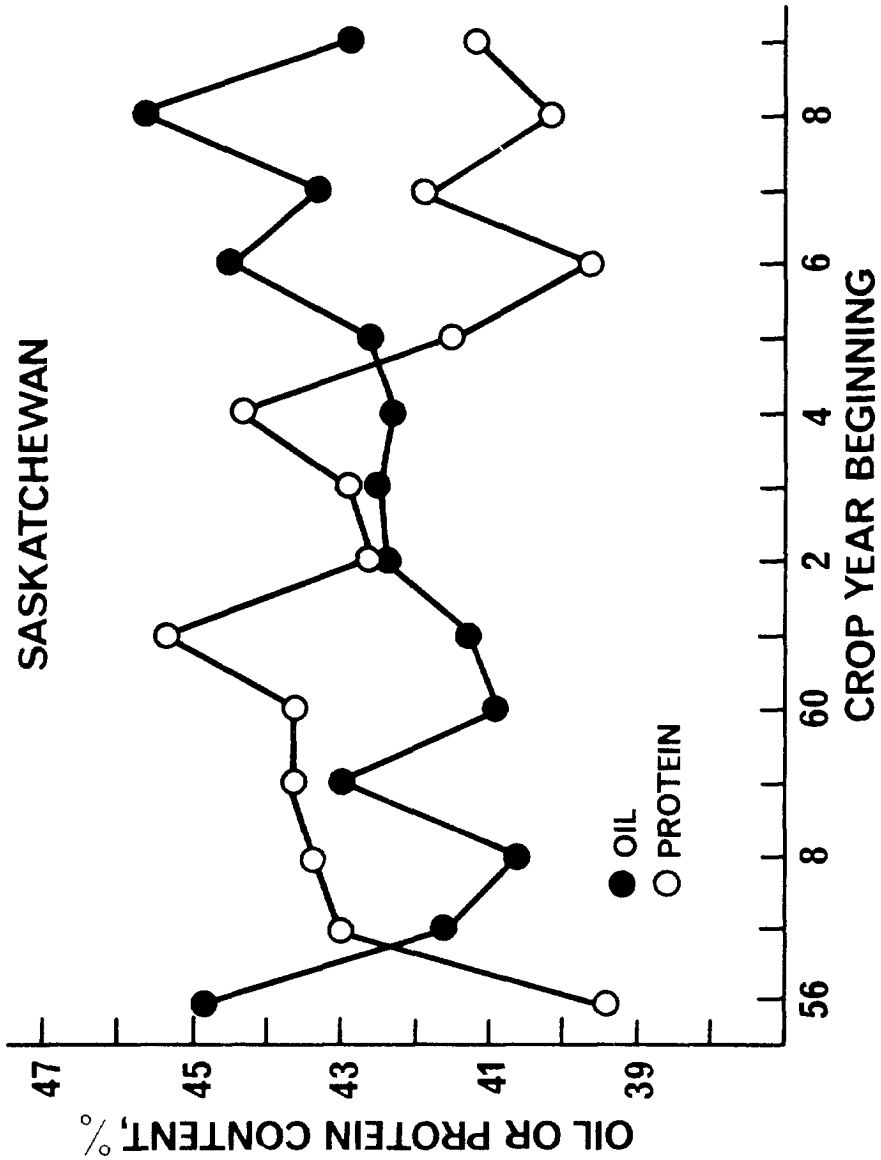


Figure 6. Average oil and protein content of New Crop rapeseed, Saskatchewan, 1956-1969 crops.

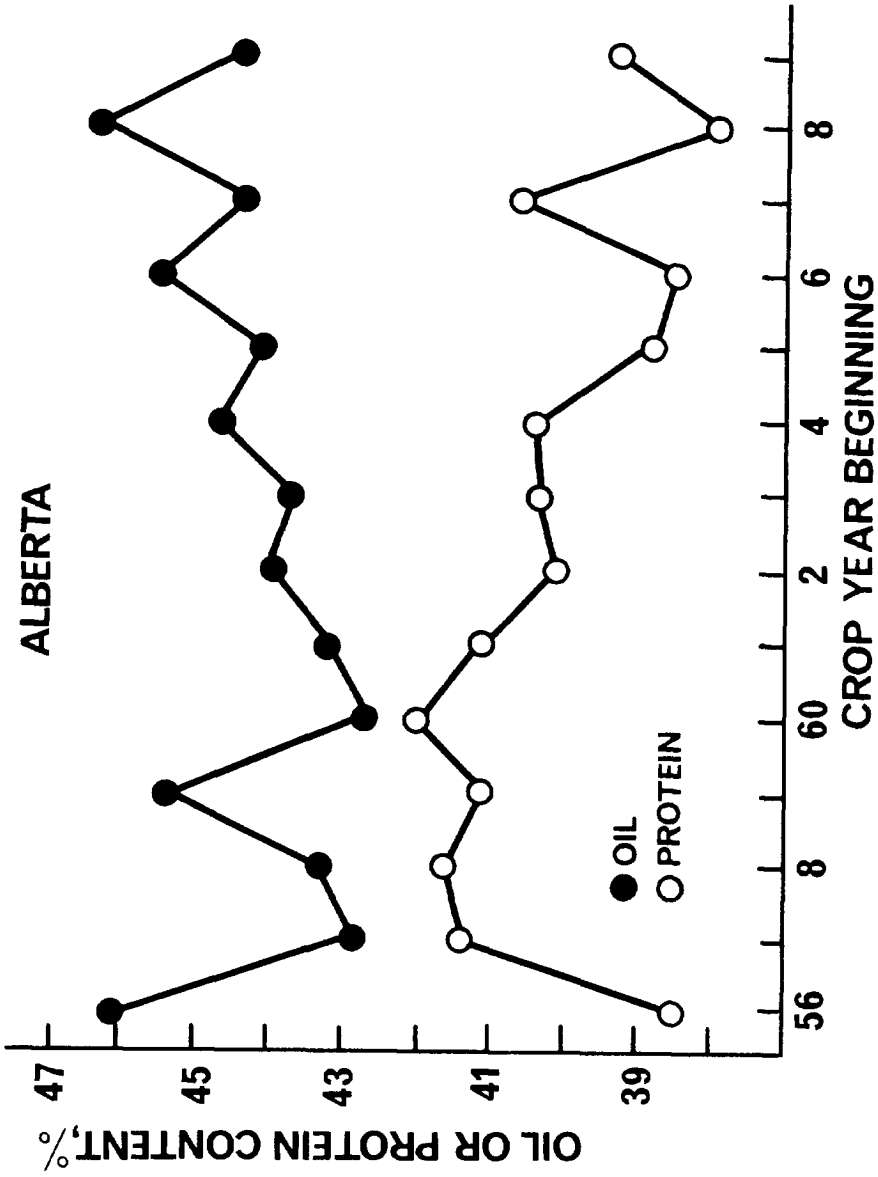


Figure 7. Average oil and protein content of New Crop rapeseed, Alberta, 1956-1969 crops.

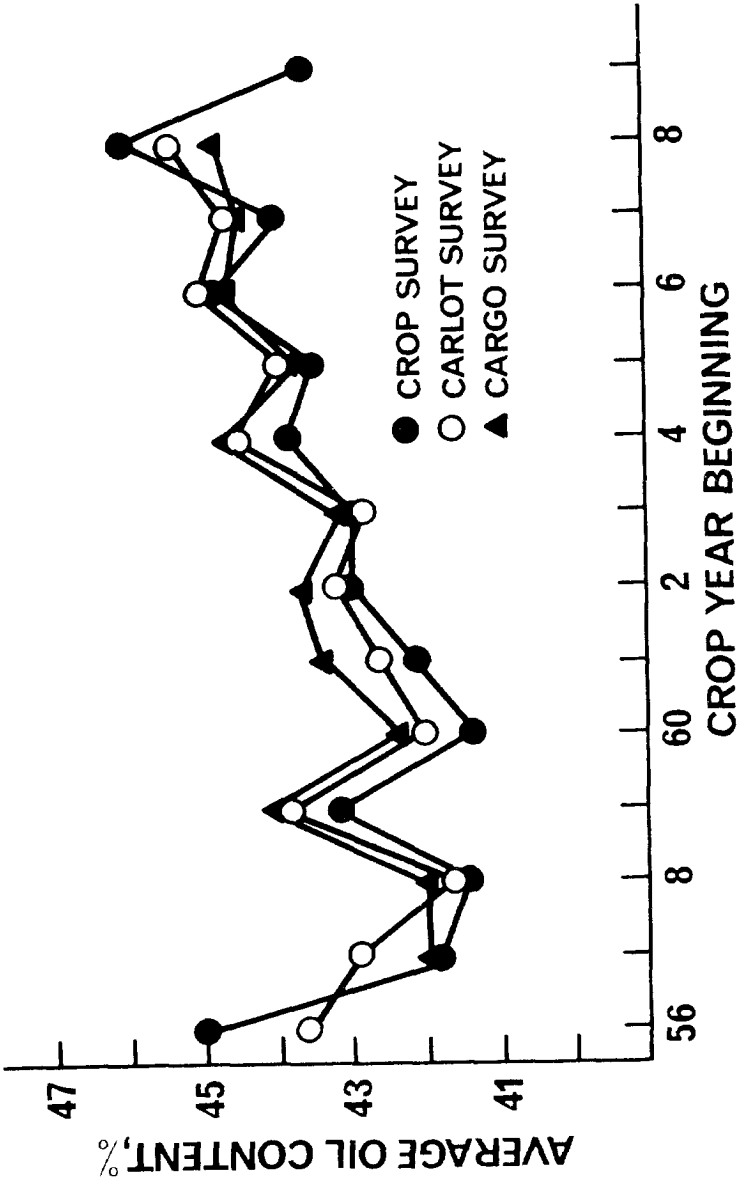


Figure 8. Average oil content of Western Canadian rapeseed based on New Crop, Carlot and Cargo surveys, 1956-1969 crops.

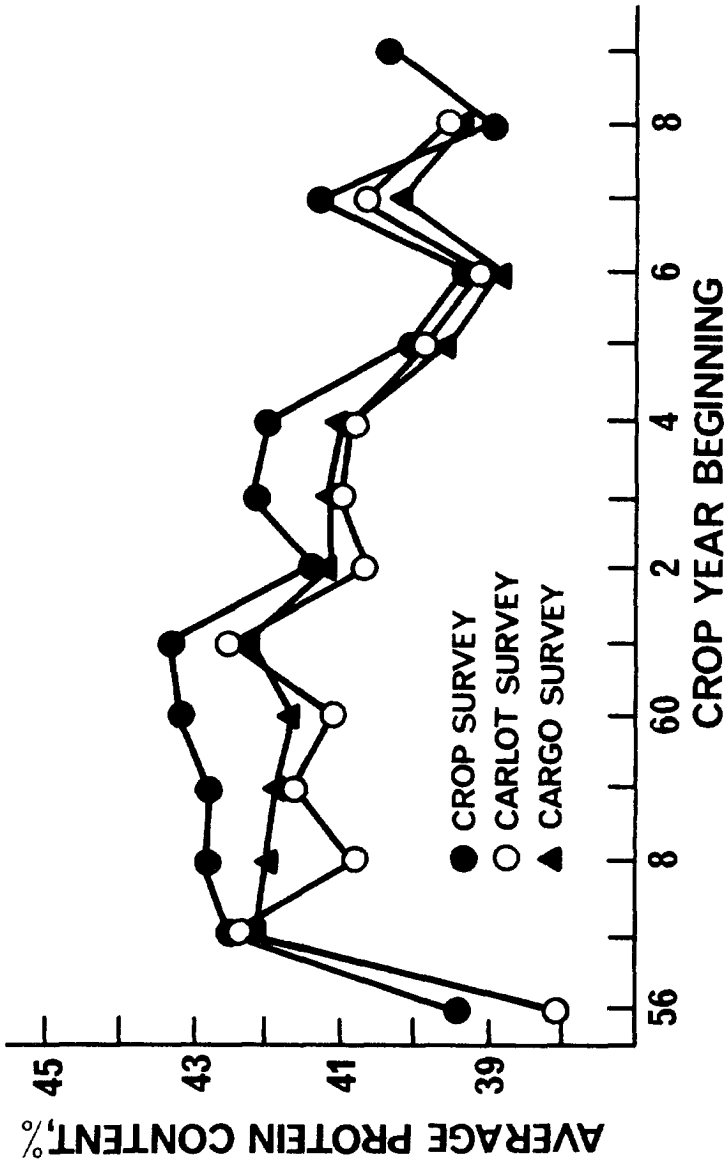


Figure 9. Average protein content of Western Canadian rapeseed based on New Crop, Carlot and Cargo surveys, 1956-1969 crops.

The agronomic characteristics of these two types complement the chemical or quality characteristics to minimize variability; as a result, rapeseed cargoes exported from Western Canada show a remarkably small variation in the two principal quality characteristics. In general, oil content is higher in rapeseed grown in the higher moisture northern park belt of the prairies. The agronomic character of the campestris varieties make them most suitable for this area. But the campestris varieties are lower in oil content than the napus varieties so that the variability in oil content from north to south is considerably diminished. In 1969 over 85% of the rapeseed acreage was sown to campestris varieties.

Average values of oil and protein for rapeseed crops from 1956 to 1969 are shown in Figure II. The long-term average values over this period are: oil content 43.3% and protein 41.4%. There is a distinct trend beginning about 1960 towards higher average oil content and lower average protein content. Variation in averages over this period is, for oil content 41.3% to 46.0%, and for protein content 39.0% to 43.3%. Within years oil content has varied from 10% of oil to 15% and protein from 13% of protein to 20%; total variation over the whole period has been 20% of oil and 21% of protein.

While for individual samples the relationship between oil and protein content is not clearcut, it is apparent from the average shown here that there is an inverse relationship between the two factors. The sum of oil and protein values tends to be constant. For these average data, the sum has averaged 84.7 and varied only between 83.6 and 86.0 in individual years.

Regional variation in oil content is shown in Figure III where provincial averages are plotted. Alberta has been consistently the highest in oil content but in recent years Manitoba has caught up and now seems to be going higher. The upward trend since 1960 has been most apparent in Manitoba; this province is the only one growing a higher proportion of napus type than campestris. Long term provincial averages for oil content are: Manitoba 43.1%; Saskatchewan 42.7%; Alberta 44.3%.

Regional variation in protein is indicated in Figure IV. Generally Saskatchewan has shown higher protein fairly consistently, while Alberta has been consistently the lowest. Long-term provincial averages for protein content are: Manitoba 41.6%; Saskatchewan 42.3%; Alberta 40.1%. The sum of oil plus protein on a provincial basis indicates the following:

	<u>Mean</u>	<u>Range of Yearly Values</u>
Manitoba	84.7	82.4 to 86.5
Saskatchewan	85.0	83.9 to 86.6
Alberta	84.4	82.9 to 86.5

thus Saskatchewan appears to produce the highest total oil plus protein, with Alberta the lowest.

The relation between oil and protein levels in each of the three provinces are shown in Figures V, VI and VII. Since 1965, all provinces show average oil content to exceed average protein content; in the case of Alberta there has consistently been a distinct difference between the two which is currently becoming larger. For a number of years both Manitoba and Saskatchewan gave average values for protein in excess of oil content values.

Generally the carryover of rapeseed during the past fourteen years has been small; accordingly the validity of the new crop survey can be checked by comparing results with the carlot survey representing the actual movement of rapeseed from the country, and the cargo survey representing cargoes exported during the crop year.

Agreement between average values for oil and protein is reasonably good as indicated in Figures VIII and IX. There is an indication however that in most years the harvest survey predicts oil content too low and protein content too high. This probably results from the fact that late harvested crops tend to be in the more northerly areas where oil content is normally higher and protein lower than the average of the crop. As the results of the survey must usually be completed by the middle of October, the new crop averages are apparently biased, in most years, by the lack of adequate representation of this portion of the crop.

Long-term averages from the three surveys are as follows:

	<u>Oil Content</u>	<u>Protein Content</u>
Crop Survey	43.3%	41.4%
Carlot Survey	43.5%	40.6%
Cargo Survey	43.6%	40.9%

The trends to higher oil content and lower protein content since 1960 are probably the result of the introduction of newer varieties with higher oil content and the shift of the greater volume of the crop into higher moisture and more

northerly areas. Generally it would appear that higher yields result in higher oil and lower protein content. Since 1958 there has been a fairly consistent trend to higher average yields and we have already noted a similar trend towards higher oil content and lower protein levels. The correlation between average yield and average oil or protein levels is by no means high enough as yet for predictive purposes but there does appear to be a significant positive relationship between average yield and average oil content and a corresponding negative relationship between average yield and average protein content.

Until this year the number of samples examined in the new crop survey has been too small to clearly establish regions of characteristically high or low oil content since adequate measurement of variability within small regions has not been possible. With the much larger crop this year, our survey is being considerably expanded and we hope to gain a greater insight into factors influencing quality patterns in rapeseed across Western Canada.

QUESTIONS AND ANSWERS — SESSION II

- 1) QUESTION: I only wanted to ask why is Canada the only country reporting oil on a dry basis? In Europe everything is done on a tel quel basis? I think that will already help considerably so that we get closer to the same figures. Secondly, it is very important how the oil content is established. We have in the Common Market at the moment a discussion among the technical people on the question how to establish the oil basis. We have now established in the Common Market the Microvoyeur method to get a similar figure for all the rapeseed. There is also the question as to the solvent used: Petroleum ether, Esso ether and hexane. It has been found out that hexane gave the best extraction and it is also used in the crushing mills at the factories. I think that we should first agree on one method of establishing oil content, secondly, I think we should base this on the tel quel seed and not on the dry basis seed. When using the dry basis, I agree with you, you have the disadvantage of the journey from the point of loading to the laboratory, but that is not so important, because if it is properly packed in a cellophane bag, there is no problem in Europe that the moisture content goes down appreciably on the trip between the cargo and the laboratory. I would like, if I may, get an answer from the experts why it is reported on a dry basis, and secondly, how it is done, and on what basis the inspection is made?

ANSWER: (Dr. N. Irvine)

Mr. Chairman, the basis for reporting on a dry matter basis is probably just the reverse in Europe. They normally report wheat on a dry matter basis, and we insist on doing it on a 13.5% moisture basis. With oils there are problems in determining moisture content, for one thing there is a great variation in the methods people use for determining moisture content. Thus, we find that the most unequivocal way of reporting it, is simply on a dry matter basis. Now there is no reason why this cannot be converted to another basis such as the total oil basis or whatever you wish. I agree, wholeheartedly that what is needed right now is a standardization of the method of determining the oil content and the method of determining moisture.

- 2) QUESTION: Since rapeseed is getting more important in the world-wide oil business, I wonder why, the Canadian Government does not want to accept the responsibility for the standardization of the oil content determination, as well as for the issuing of certificates, that the standard oil content is there?

ANSWER: (Dr. N. Irvine)

As I mentioned, we will be doing the oil content of every cargo of rapeseed leaving Canada this year. So we shall have the figure for it, done by our method of determining oil and our method of determining moisture. It would presumably, be possible to make this information available to the purchaser but as far as fixing a level of oil content in the rapeseed is concerned, this is something that would take a lot of discussion, as yet we are not ready to do that. If someone could convince the Board of Grain Commissioners that this was a reasonable thing to do, such certificate could be issued immediately upon the loading of the cargo and an oil determination would be done subsequently, so that it would presumably have to be shipped along in a letter or in a similar manner.

3) QUESTION: a) Don't you think that it is about time, in view of such a big crop, and also depending to a great extent on exports, to get out of the grain mind and getting into the oil mind? Do you think it would be a wise thing, especially when you are relying very much on the export market, to give also the importers of the other countries a security about the oil content? I think too much emphasis is put upon the admixtures. For the oil manufacturer the oil content is the ruling factor in buying rapeseed. I think it would greatly help, if we could get in some way assurance that the oilseeds we buy are really the oilseeds that we have bought, that is to say, that we get that oil out of the rapeseed that we have bought. I would like very much to have the views of the Board of Grain Commissioners and the other people on this matter, because I think it is essential that when you want to build an export market, that you find some way to meet the buyers' demands abroad.

b) I wonder why the same question is not being asked, in respect to soybeans? For years you have accepted soybeans without any oil content guarantee. And you have not had similar complaints, therefore, why complain just about rapeseed?

ANSWER: (Mr. J.H. Wijsman)

We had the same problem with the soybeans for about 4-5 years. It took us a long time in Europe and in the other parts of the world to get the United States to realize that if they wanted to sell their oilseeds abroad they had to adhere a little bit to our terms. Secondly, I may also answer the question in that form, that soybeans are mainly bought for the protein content. I quite agree that the oil plays an important role but the variations in oil content which we find in U.S. soybeans may vary one-half or one-quarter percent. But if we buy rapeseed which varies 3 percent, that makes it a completely different picture than for soybeans.

4) QUESTION: I would like to ask Dr. Irvine, what factor you use for the conversion of nitrogen to protein? Do you use 6.25 and if so, has it been established that this is the correct factor to use?

ANSWER: (Dr. N. Irvine)

The answer is yes. We use 6.25, again because this is generally accepted practice. Our own research scientists have established that the value for rapeseed is something of the order of 5.4%. It has taken the International Association for Cereal Chemistry about 15 years to change the Europeans from 6.25 for wheat to 5.7%. It will take a while to go from 6.25% to 5.4% in the case of rapeseed.

- 5) QUESTION: In discussing the matter of oil content in rapeseed shipments, I am just wondering whether the gentleman who asked above question would be satisfied with a certification of the actual oil content established by the Board of Grain Commissioners for a cargo, at least during the intermediate time between now and some point in the future, when we might change to a different basis?

ANSWER: (Mr. R. Dawson)

With regard to the reluctance of the Canadian Government to take over the responsibility for putting the oil content on the certificate, I think it is true to say, that all the exporters in Vancouver selling to Japan, do make available to all of those buyers an analysis of the oil as a part of the certificate. It is there, and it has been a part of that trade for a long time. It is not a Board of Grain Commissioners analysis, it is a private independent laboratory one. So, really we are not talking about the availability of an analysis, we are talking about who actually does it. I do not think that is going to vary very much. I do not think that there is any reason to believe that the private independent laboratories would come up with any different answers than the Board of Grain Commissioners.

The other question that I would like to ask the same gentleman, is, that if we did supply the certificates, would the Japanese buyers be prepared to pay premiums for the additional oil content that they now get free?

ANSWER: (Mr. Nikki)

Well, we Japanese want to rather have an authoritative analysis by the Canadian Government. In other words, we fully trust the handling method by private laboratories for the analysis of the oil. However, I think it will be much fairer when we have the same kind of analysis from the Government. Secondly, I consider that it is about time that the Canadian people, led by growers, the government and trading companies made a greater sales promotion effort, since you are having this huge amount of rapeseed. You have to rely more on exports, and as in the case of the United States, soybeans are already well distributed through many outlets in the world. Rapeseed must still cultivate more outlets, I believe. For that purpose you have to carry out more sales promotion. I think that the standardization of the oil content could be considered as an effort in this same direction. When we are able to get the authoritative analysis, I think the Japanese industry will consider to have a similar evaluation as the European importers. This is my personal opinion.

ADDRESS
TO THE
INTERNATIONAL CONFERENCE ON THE SCIENCE,
TECHNOLOGY AND MARKETING OF RAPESEED
AND RAPESEED PRODUCTS

BY THE
HONOURABLE OTTO LANG
MINISTER IN CHARGE OF THE WHEAT BOARD
OTTAWA