

THE MORLEY FARM

A Report for Members of the Norfolk Agricultural Station

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CEREAL FOLIAR DISEASES

1974 was a year of extremes of weather conditions at Morley and this affected various crops and diseases in different ways. Autumn sown crops were sown in mild conditions and the winter followed the same trend so that by early spring crops were well grown. These conditions favoured foliar diseases so that *Septoria* was well established on the lower leaves of winter wheat and mildew, yellow rust, brown rust and *Rhynchosporium* were easily found on winter barley.

The change to extremely dry conditions together with good crop growth meant that the diseases made little or no progress during the spring and none proved to be of great significance on winter barley. The *Septoria* on the wheat was reduced to such a level that it was not observed again until late in June when rainfall returned to normal and the disease spread rapidly on susceptible varieties such as Maris Ranger. However it only reached significant levels late in the season and probably had little effect on yields of most varieties. The changes in the level of infection during the 1974 season show how dependent foliar diseases are on weather conditions. If the weather is suitable and susceptible varieties are being grown only small pockets of infection are necessary to initiate an explosion of the disease. Conversely, a heavy infection can suddenly decline if climatic conditions are no longer conducive to fungal growth.

Winter Wheat—Yellow Rust

Some yield losses were recorded following the use of certain fungicides in 1973 when there was little disease present and the crop was under stress at the time of spraying. It was therefore decided in 1974 to use Maris Templar as a variety susceptible to yellow rust and Maris Huntsman was included as a variety unlikely to be affected by disease. The effects of the chemical in the absence of disease could then be measured on Maris Huntsman. In the event Maris Huntsman became infected by brown rust so that its original purpose in the trial was not fulfilled but information on brown rust has been obtained and will be discussed later.

Yellow rust was first found in the trial area on 1 May but in the absence of cool damp weather to encourage its spread its development was slow. The first application of fungicides was applied on 17 May when the disease was still at a very low level. A late spray application was applied on 12 June so that trial plots had received early, late or double applications. By mid-June the ears had fully emerged and traces of yellow rust were found on the flag leaves of Maris Templar but the disease was still not very active because of the dry weather conditions.

The change to more normal weather in the second half of June allowed more rapid development but the unsprayed plots never became as badly infected as whole fields of the same variety in the area. This appears to have been due to the buffering effects of the surrounding crops of Maris Ranger and the interspersed plots of Maris Huntsman which did not succumb to the race of yellow rust present. By 15 July when a full disease assessment was carried out the unsprayed plots had 15% infection on the second leaf. A single application of *Calirus* (BAS 3170F), *Calixin + Polyram* or *Calixin + Calirus* at either date of application reduced the infection on the second leaf to 2.5 - 4.3% while a double application reduced it still further to 0.3 - 0.6%.

The yield of the unsprayed plots was 58.2 cwt/acre and increases of 4.3, 4.6 and 6.9 cwt/acre were recorded following the application of *Calixin + Polyram*, *Calirus* and *Calixin + Calirus* respectively. As well as increasing yield, the fungicides resulted in an improvement in grain size. There was little difference in disease control between the two dates of application and the double application although checking the disease still further did not improve yields over those given by single sprays. However if climatic conditions had been more favourable to the disease it seems likely that two applications may have been necessary to give adequate control on a susceptible variety like Maris Templar particularly in the case of *Calixin + Polyram* which is less persistent than mixtures containing *Calirus*.

Brown Rust

Although brown rust requires a certain amount of moisture on the leaf to become established, warm days favour its development. The disease was first observed on wheat in mid-June on a commercial crop of Maris Huntsman and appeared in the trial area described above at the end of the month. Development was quite rapid in the Morley area on the susceptible variety Maris Huntsman. Plots had already been sprayed on 17 May and 12 June with fungicides for the control of yellow rust and it was found that their residual activity provided useful control of brown rust. The infection of yellow rust on Maris Huntsman was negligible so that responses observed were purely due to brown rust.

Unsprayed plots averaged 13% brown rust on the second leaf by 12 July and 31% by 30 July. The application of *Calixin + Polyram*, *Calirus*, or *Calixin + Calirus* gave some preventative action even where the fungicides were applied as early as 17 May. The applications on 12 June resulted in considerably reduced levels so that by 30 July when the untreated plots were suffering a 31% infection the sprayed plots had infections as low as 4.7% following the use of *Calixin + Calirus*.

The average yield of unsprayed plots of Maris Huntsman was 57.3 cwt/acre. This was increased by 1.3, 1.6 and 4.4 cwt respectively when *Calixin + Polyram*, *Calirus* or *Calixin + Calirus* were applied. Although disease control did not persist as late following the application of fungicides on 17 May as when they were applied on 12 June yields were somewhat better following the earlier applications. This could indicate that by the end of July the flag leaf was no longer contributing greatly to yield and that brown rust infection in early July is the more critical. It must be emphasised that the fungicides in this trial showed a preventative action and as yet no information is available on their ability to control an established infection.

In both rust trials the *Calixin + Polyram* showed unexpected persistence and this is thought to be due to the abnormally low rainfall allowing some chemical to remain on the leaf for a considerable period. Hoe 6052 was included in the rust trial and again appeared to have caused some depression of crop growth as had previously been observed in 1973. In spite of reasonable control of both rust diseases no improvement in yield was recorded from the use of this material.

Septoria

The work on *Septoria* which was started in 1973 was continued on a crop of Maris Ranger grown as the second wheat crop after potatoes. Although the disease was widespread in the crop in early spring, the dry weather reduced it to a very low level until late June when rainfall again became normal. The fungicides tested were mainly of the broad spectrum type such as *Benlate + maneb* and *Bavistin*. *Calixin + Polyram* was also included as was BAS 3000F which is believed to be active only against mildew and may have enabled us to separate the response to mildew control from the response to *Septoria* control if they had both been significant. In the 1974 trial a reduction in the low level of mildew did not improve yields.

During July *Septoria* increased very rapidly in the trial crop so that when assessments were made on 20 July, 52% of the second leaf appeared to be infected or killed. The early application (14 May) of *Benlate + maneb* or *Bavistin* reduced the *Septoria* infection to 38% while a late application (3 June) was marginally more effective. The application of *Calixin + Polyram* also gave satisfactory control. A double application of the fungicides did not appear to be any more effective than the single application on 3 June.

The average yield of the unsprayed crop was 45.7 cwt/acre. The best single treatment was when *Benlate + maneb* was applied on 14 May giving a yield of 52.9 cwt/acre. This was reduced to 51.5 cwt when the application was made on 3 June. *Calixin + Polyram* gave yields which approached this level at the early date of application. This mixture was quite effective in preserving green leaf and appears again to have benefited from the lack of rain to wash it off the leaves. *Bavistin* increased the yield but did not appear to have performed as well as in 1973.

New materials were tested on single plots as a preliminary to their possible inclusion in the main trial next year. At the same time one plot was sprayed repeatedly every two weeks from mid-April with *Benlate* + maneb to try to achieve a high level of disease control. The repeated applications reduced *Septoria* to 10% and gave a single plot yield of 52 cwt/acre. The most promising new fungicide mixture (*Milcap*) gave slightly better disease control and yield than this after only two applications. This must obviously be checked thoroughly in the main trial in 1975.

Spring Barley—Mildew and brown rust control

The Agricultural Development and Advisory Service barley foliar disease survey for 1973 showed that, as in previous years, the most widespread disease was mildew. This disease was observed on all samples examined and was more severe than in some of the more recent surveys although in the Eastern region it was less severe than in most parts of the country. The national yield loss attributed to mildew was estimated at 13%. Brown rust affected 78% of the crops surveyed and it was the second most severe disease in most regions though the national loss was estimated at only 2%. In the light of these survey results it was opportune that the two trials started in 1972 were continued for a third year.

In the first trial the variety Proctor—which is regarded as being susceptible both to mildew and brown rust—was sown either as untreated seed or with one of the two seed dressings—*Milstem* or R-28921. Initially, crop establishment was very poor as a result of poor penetration of the seedbed by the drill and the subsequent very dry weather when only 1.7 mm of rain fell in the month after drilling. In spite of further late emergence and subsequent tillering the crop stand was still rather thin although this was similar for all treatments.

As in 1973, the two chemicals used in an attempt to control brown rust were *Calirus* (BAS 3170F) and Hoe 6052 which were applied as foliar sprays on 24 June when the crop was at growth stage 10.2.

Mildew developed steadily during May and June so that by 25 June the mean level of infection on the third leaf of untreated plots was 20.2%. This was reduced to 6.3% where *Milstem* seed dressing had been applied, R-28921 being intermediate with 15.2% infection.

Brown rust increased during late June and early July so that by 18 July the 2nd leaf of untreated plots carried a 15% infection. While Hoe 6052 reduced this to 9.3% the most successful spray application was that of *Calirus* which reduced infection to 4.3%.

The untreated crop produced a yield of only 19.8 cwt per acre and this was increased to 22.4 cwt when the seed had been dressed with *Milstem*. Where *Calirus* only was applied the yield was increased to 22.7 cwt per acre. When both *Milstem* and *Calirus* were used, yield was increased to 25.0 cwt per acre, representing a 26% increase over the untreated crop.

In the second trial, *Calixin* and *Calirus* were applied to Proctor and Julia on 24 May or 24 June. The development of mildew on Proctor was similar to that described in the previous trial while Julia showed about half the level of disease infection found on Proctor. The application of *Calixin* markedly reduced the level of mildew on both varieties.

Brown rust gradually built up during late June and early July so that by mid-July a 12% infection was found on the 2nd leaf of Proctor with only 4.7% on Julia. Control was most successful with *Calirus* especially on Proctor where infection was reduced to only 3.1% when application was made on 24 June.

The greatest response to *Calixin* was achieved from an application on 24 May and this amounted to 0.6 and 3.9 cwt per acre from Julia and Proctor respectively. The best responses to *Calirus* alone were from applications on 24 June when 0.6 and 1.4 cwt per acre were the comparable figures. The most successful combination of treatments on both varieties was *Calixin* on 24 May followed by *Calirus* on 24 June when responses of 2.7 and 5.2 cwt per acre over the untreated crop were achieved. The application of these fungicides also improved the boldness of the grain sample by increasing the proportion of large grains—over 2.8 mm.

Both these trials have been in progress for three years and are now considered as being completed. Results from the three years will be summarised in due course and will be presented in the *Annual Report*. Briefly however it would appear that the greater or more predictable yield response comes from the control of mildew whether by seed dressing or foliar spray, the former being more easily managed. It is perhaps dangerous to generalise as much will depend on weather conditions but it appears that a foliar applied mildewicide is most likely to show its full potential when application is made in the second half of May or very early in June. Brown rust on the other hand—because it is favoured by warm dry weather conditions—develops later in the season and consequently the time available for any yield response is limited. An economic response may only be achieved on the most susceptible varieties particularly if grown in close proximity to an infected winter barley crop. Mid-June application has proved most satisfactory in our experience.

CEREAL HUSBANDRY TRIALS

Time of applying nitrogen to winter wheat

For the third year the effects of different rates of nitrogen top dressing and different times of application have been investigated on three varieties of winter wheat at Sprowston. This year the trial was grown as a second wheat crop and in view of the extremely dry spring it was not surprising to find that the highest level of nitrogen tested gave the highest yield.

The varieties, Maris Huntsman, Maris Widgeon and West Desprez were the same as those used in 1973 and were sown on 30 October. Top dressing totalled 60, 80 or 100 units of nitrogen per acre and it was applied on 9 April or 15 May, or split equally between the two dates. Growth was slow in the spring and the crop gave the appearance of needing some nitrogen quite early during the growing season.

The average yields were 31.3, 26.9 and 29.4 cwt per acre from Maris Huntsman, Maris Widgeon and West Desprez respectively. The highest yields—39.1 cwt per acre in the case of Maris Huntsman—were generally obtained from 100 units of nitrogen at the earlier date of application. Since varieties generally behaved in the same way the average yields for all three varieties are shown in the table below. In the dry conditions of 1974 there was a good response to the use of 100 units of nitrogen rather than 60 or 80 units per acre. The apparent lack of response to 100 units of nitrogen applied late is due to the poor yield from Maris Huntsman in these circumstances and did not appear in the other two varieties.

YIELD OF GRAIN (cwt per acre at 85% d.m.)

NITROGEN (units per acre)	TIME OF APPLICATION			MEAN
	9 April	15 May	Split	
60	29.5	24.8	26.9	27.0
80	30.6	28.0	30.0	29.5
100	34.1	27.5	31.5	31.0
MEAN	31.4	26.7	29.5	

Contrary to last years experience, increasing the level of nitrogen top dressing did not reduce grain size and once again the time of application had little effect on this factor. The analysis of the grain to determine protein levels and milling quality is not yet complete but will be reported in the 1975 *Annual Report*. In view of the continental work on extremely late top dressing to increase protein levels a new trial series evaluating this and other cultural techniques on the variety Flinor has been laid down for the 1975 season.

Time of applying nitrogen to winter barley

The requirements of an acceptable sample of malting barley are many but they invariably include a suitable variety, a relatively uniform size of grain and an absence of cracked or split grains and weed seeds. Perhaps the most important requirement however is that of a low grain nitrogen content. This may be influenced by the level of soil nitrogen, the amount of rainfall in the previous autumn and of course by the amount of inorganic nitrogen applied in the spring.

In a trial using Maris Otter, 40, 80 or 120 units of nitrogen were applied at three growth stages in February, March or April respectively.

YIELD OF GRAIN (cwt per acre at 85% d.m.)

NITROGEN (units per acre)	TIME OF APPLICATION			MEAN
	February	March	April	
40	33.7	31.5	34.7	33.3
80	39.7	37.9	38.2	38.6
120	41.1	39.9	39.5	40.2
MEAN	38.2	36.5	37.4	

Although timing had only a slight and variable effect on yield there was a response up to the highest level of nitrogen application (120 units) and this was apparent at each of the three dates of application. This was perhaps understandable in the extremely dry spring of 1974 with a complete absence of lodging. It is in complete contrast to the more normal 1973 trial in which responses were limited to 40-80 units from the two earlier applications because a heavy nitrogen top dressing applied in April caused severe lodging and reduced the yield by up to 6 cwt per acre.

As in the previous year, grain size was reduced by increasing the nitrogen level and so the higher yield must therefore have come from an increase in the number of grains either from more tillers per plant or an increase in the number of grains per ear. Unlike the previous year though, grain size was better following the two later dates of application. There was evidence that the reduction in grain size was more marked when the higher levels of nitrogen were applied early.

Grain nitrogen data from the 1974 crop is not yet available but all past experience has shown that increasing the nitrogen level and delaying its application will tend to increase the nitrogen content of the grain and so reduce its value as a malting sample.

After the very wet autumn of 1974 it is probable that the nitrogen content of the soil in 1975 will be lower than has been experienced recently. For next years crop therefore, more nitrogen may be needed to produce an optimum yield giving rise to the problem of equating any yield response with a possible rise in grain nitrogen content. From past experience this may best be achieved by a relatively early nitrogen top dressing of the order of 60-80 units of nitrogen per acre depending on past cropping and the fertility level of the field in question.

Time of sowing winter wheat

Sowings of six varieties of winter wheat were made on 4 October, 26 October and 19 November 1973. The same varieties were tested as were used in the previous year but the 1974 crop followed winter beans while in 1973 it was a second wheat crop.

Disease levels were generally quite low but the early sown Maris Huntsman did have 7% of the second leaf covered by brown rust when assessments were made on 10 July. The later sowings had less than 3% infection. Yellow rust was confined to Maris Ranger, Maris Freeman and Cappelle-Desprez reducing from 3.8% at the early sowing to 2% on the latest sown plots. Lodging which particularly affected Cappelle-Desprez was also more severe in the early sown plots and seems to have been the main factor reducing yields from the earliest sowing. Mildew was most severe on Cappelle-Desprez (12%) and Atou (11%) but there was a difference in the behaviour of this disease in that it was worse on the later sowings.

The yields followed the same trends as last year in that the sowing in the second half of October gave the highest yield and the varieties were in a very similar order of yield. The loss of yield at the early sowing in 1974 was much greater than in 1973 and the lodging of the early sown plots is thought to be the main reason for this.

YIELD OF GRAIN (cwt per acre at 85% d.m.)

VARIETY	TIME OF SOWING			MEAN
	4 October	26 October	19 November	
Cappelle-Desprez	36.4	45.1	41.8	41.1
Maris Ranger	45.0	48.5	48.1	47.2
Maris Huntsman	34.9	54.2	55.9	48.3
Bouquet	42.3	49.4	47.9	46.6
Atou	40.4	50.2	47.5	46.0
Maris Freeman	41.7	51.3	49.3	47.4
MEAN	40.1	49.8	48.4	

It is not yet clear if the lodging is a regular feature of early sowings or whether the crop was at a more susceptible stage of growth at the time of the summer storms.

N.I.A.B. CROP VARIETY TESTING

The winter wheat trial of twenty varieties was drilled in mid-October with good establishment. Mildew was recorded in late spring, but infection remained at a low level until late June. Levels of 40-50% were eventually recorded on Cappelle-Desprez, West Desprez, Maris Ranger and Maris Nimrod, and levels of 20-30% were seen on several other recommended varieties. Maris Huntsman remained free, while only traces occurred on Mega and Maris Fundin. *Septoria* was first seen in April, with a maximum of 5% on Maris Fundin, but the subsequent dry weather was not conducive to the development of this disease and it fell to a negligible level.

Despite the dry early summer, yellow rust reached high levels on the occasional very susceptible variety. Worst affected was Maris Templar with an overall level of 20% and foci of up to 50%. Unexpectedly high levels were recorded on Chalk with an overall level of 10% and patches of 40%. Although this disease was present on several other varieties, the levels were generally well below 10%.

A disturbing feature of the winter wheat crop this summer was the incidence of brown rust, a disease associated with hot weather and of sporadic occurrence on wheat in this country. Infection was first noted in June on Maris Huntsman. By mid-July it had reached a level of 15% on this variety with higher levels on Score and Maris Nimrod, and up to 10% on several others. Some recommended varieties, including Maris Ranger, Mega and Maris Widgeon, had very low levels.

In contrast to the previous season, little lodging occurred, and the trial was harvested under good weather conditions on 22 August. Yields were high, with a variety average of 57 cwt. The controls Cappelle-Desprez and Maris Ranger gave respective yields of 55 and 54 cwt. Maris Huntsman produced 59 cwt, 109% of the control mean, and was itself outyielded by three varieties, these being Chalk (113%), Val (110%) and Maris Fundin (110%). Bouquet and Champain were only marginally below Huntsman. Yields of 55 cwt or over were obtained from Mega (101% of controls), Atou (105%), Clement and Maris Nimrod (both 106%).

The winter barley trial was drilled on 6 October, and only slight frost damage occurred during the winter months. In early February yellow rust was noted on some varieties, the earliest that this disease has ever been recorded on barley at Morley. By the end of the month all but one variety was infected, while brown rust was present on every one, although both diseases remained at a low level. Traces of *Rhynchosporium* were found on Maris Otter, while low levels of mildew were seen on most varieties. By mid-March the rust infections had largely died out, but mildew had increased markedly, with levels of 10% or more on several selections which included Maris Otter, Senta, Astrix, Sonja and Maris Trojan.

During late spring the crop grew away from the earlier disease infections, but by June mildew and both brown and yellow rust were on the increase again. Mildew levels of 40-50% occurred on Senta and Cossack, and 25% on Maris Otter and Maris Trojan.

The overall infections of yellow rust were mostly low, although over 5% was recorded on Astrix and one new variety. Only 3 varieties remained completely free however, and foci of 10% or higher occurred in Astrix, Cossack and Sonja.

There was less damage to the ripening crop than seen in some past seasons, with no lodging on Maris Otter, Cossack or Sonja. Moderate lodging did occur in plots of Senta and the recently recommended Maris Trojan. This two-row variety although weaker and later than Maris Otter necked badly just before harvest with some ear loss.

Although ear emergence was unusually early, the cool July weather delayed ripening and the trial was harvested at the end of July. The control varieties Maris Otter and Senta produced 36 and 37 cwt respectively. Astrix was 1% above the control mean with 37 cwt. The newly recommended two-row Sonja gave 41 cwt, (11% above the controls) while the more recent two-row Igrı gave the top yield of over 42 cwt, (15% above the controls). The yield of Maris Trojan was virtually identical to that of Maris Otter.

The winter oat trial was of six varieties only, the four recommended ones with two new selections, and was drilled in late October. The only disease occurring was mildew and this did not develop until well into summer. Infection levels did eventually become high, with 25% or above on all varieties except Pendrwm. Widespread lodging occurred in the trial when the crop was approaching maturity, and was severe in Pendrwm and quite bad in Peniarth.

Grain yields were very high with a trial mean of 50 cwt. Peniarth yielded 50 cwt and Maris Quest 47 cwt. Maris Osprey produced 49 cwt while a new variety in its first season of testing gave the unusually high figure of 57 cwt.

Spring cereals

All three trials were drilled in mid-March on very dry seedbeds. As a result of the prolonged very dry weather emergence was slow and during the first half of the growing season growth was seriously affected.

The spring wheat trial appeared to suffer most from the dry conditions having poor emergence and with low tillering the crop remained very thin throughout the season. Mildew was recorded on most of the 12 varieties in this trial, although infections did not reach very high levels. A level of 25% on Cardinal was the maximum seen, with just over 10% on Kolibri, Maris Dove and Flınor. Low levels of yellow rust were recorded on most varieties with Maris Pinion, Flınor and SR112/79 remaining clear. The heaviest of just under 10% was on Kleiber, with foci of 40% while a focus of 40% was also seen on one plot of Cardinal. Harvesting was delayed by wet

weather until 9 September by which time the gales experienced in early September had caused widespread shedding of grain. This was most serious in Maris Pinion, Sappo and Sirius. Yields were the poorest from spring wheat for several years, with a trial average of around 28 cwt. The controls Kolibri and Maris Dove produced 23 and 29 cwt respectively. Maris Butler gave 35 cwt, 34% above the control mean with Sappo slightly lower at 32 cwt, 126% of the controls. Flinor, in its first trial as a spring sown variety at Morley, yielded 29 cwt, thereby demonstrating its alternative character, but this relatively good performance was not repeated at other NIAB centres.

The spring barley trial of sixty-one varieties included all those on the current Recommended List plus new varieties at all stages of testing. Mildew was the most important disease during the early summer although at this stage it did not reach more than a low level. Infection increased during and after ear emergence, eventually reaching 50% on Imber and 30% or more on several other varieties which included Berac, Julia, Midas and Zephyr. Relatively low levels occurred on Maris Mink and Universe.

Yellow rust was first seen in early June, on three new varieties. By early July infection could be found on several varieties, but was mostly confined to small foci with very low overall infections. Varieties with foci of 10% or more included Deba Abed, Lami and Vada but even here the overall levels were 5% or less.

Little brown rust was seen until late in the season. The heaviest levels were on Midas (50%) and Gerkra (40%) while a number of varieties suffered from 25% or more. Recommended varieties showing a high tolerance included Aramir, Armelle, Abacus, Hassan, Julia and Lofa Abed, all with infections of 5% or less. The development of this disease was probably too late to affect yields to any extent.

Wet weather and high winds when the crop was approaching harvest ripeness caused appreciable leaning and brackling but there was little lodging. One result of the low emergence in spring barley was the high incidence of secondary tillers and late germinating seeds. By mid-August there was a high number of late green ears, creating difficulty in getting moisture levels low enough for harvesting. Necking was widespread throughout the trial, with many varieties badly necked. Varieties which exhibited only a low incidence included Armelle, Lofa Abed and Universe. Although little actual ear loss occurred before harvest, the brackling habit of some varieties resulted in their ears being lost at the combine knife. Varieties suffering particularly in this manner included Abacus, Harkra and Maris Mink. The trial was cut on 19-20 August at a reasonable moisture level. The variety mean yield of 33 cwt was better than expected earlier in the season in view of the drought experienced. The controls Proctor and Zephyr gave respective yields of 28 and 29.5 cwt. Julia produced 31 cwt (109% of control mean), while the highest yielding of the 1974 recommended varieties was Lofa Abed with 35.5 cwt

(123%). It was closely followed by Armelle with 35 cwt, (121%). The newly recommended varieties Aramir and Varunda gave respective yields of 37 cwt (129%) and 33 cwt (113%). Other varieties outyielding the controls by over 10% were Mazurka (120%), Abacus (113%), Hassan (113%), Wing (118%), Maris Mink (118%) and Universe (116%).

The spring oat trial was also drilled in mid-March. Establishment was rather better than in the other spring crops. Mildew developed very slowly, with only low levels until the end of May. Although infection did increase during June the maximum levels recorded were not particularly high. The highest levels recorded were 20% on Condor and Selma, with slightly less on Astor. A relatively low level was seen on Mostyn and Maris Tabard, and Maris Titan remained free until late in the growing season. Moderate lodging occurred before harvest in some varieties, more particularly in Nelson, Mostyn and Selma, but was insufficient to cause difficulty at harvest.

Yields were high in the light of the drought experienced earlier. The variety average of 39 cwt was well above that from the spring barley and spring wheat crops, with the controls Condor and Astor giving respective yields of 37 and 34 cwt. Mostyn and Maris Tabard were well above these, their yields of over 39 cwt being around 10% above the control mean. Nelson at 40 cwt, was 12% above the controls, while even higher yields were attained by Maris Oberon 46 cwt (127%) and Maris Titan 46.5 cwt (130%). It should be pointed out however, that the experimental error of this trial was high, with only yield differences of 15% or over being significant.

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