

PHYSIOLOGIC RACE SURVEYS

FINAL REPORT 1970NOT FOR PUBLICATION

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Physiologic Race Survey Committee (Cereal Pathogens)

Secretary,

N.H. Chamberlain,
N.I.A.B., Cambridge



Physiologic Race Surveys - Cereal Diseases

Final Report for 1970

Summary

General

1. Samples of diseases for physiologic race identification were collected in the U.K. again during 1970. The number of samples collected for each disease in 1970 is shown in Table 1, together with the numbers of samples for previous years for comparison.

Table 1

Disease	No. of Samples			
	1967	1968	1969	1970
Yellow Rust - Wheat	343	118	227	166
Yellow Rust - Barley	48	49	48	16
Brown Rust - Barley	-	40	289	369
Crown Rust - Oats	17	4	28	10
Mildew - Wheat	122	253	173	289
Mildew - Barley	173	283	359	469
Mildew - Oats	42	31	105	106
Rhynchosporium - Barley	227	137	512	54
TOTAL	972	915	1741	1479

2. In 1970, the early part of the summer was hot and sunny, creating ideal conditions for the development of mildew and brown rust. There was therefore a large increase in the number of samples of mildew and brown rust. Conversely the hot sunny weather was detrimental to the development of yellow rust and Rhynchosporium, diseases which develop in cooler moister conditions and there was therefore a reduction in the number of samples of these diseases. The low number of oat crown rust samples can probably also be attributed to the small acreage of oats compared with wheat and barley.

3. Testing has been completed on the majority of samples collected in 1970.

4. The following report is compiled from the results obtained at the four testing centres. Detailed results are presented in tabular form, a summary of the results is given below.

5. It is appreciated that as sampling of plots is not completely randomized, results may not reflect the true frequency and distribution of races throughout Britain.

Yellow Rust of Wheat

Of the 166 wheat yellow rust samples collected in 1970 only 77 were from sites where natural infection had occurred, the remaining 89 samples were collected from trials adjacent to inoculated plots.

Seven races were identified, 1B, 3/55 Opal, 3/55 Cleo, 3/55D, 8B, 58C and 60. The 3/55 race group was identified from 70% of the samples tested and of these, race 3/55D was most frequently identified. Race 3/55D is now as widely distributed, and more frequently identified than the previously most common race 3/55 Opal. Race 3/55 Cleo appears to be restricted to the South East of Scotland. The race 3/55 group is able to infect the majority of winter wheat varieties grown in Britain and this probably accounts for its widespread distribution. Race 1B, although not increasing in frequency, was identified from three sites different from 1969.

Race 58C, first identified in 1967, and thought to be potentially important, was identified only once, from the South East of Scotland.

The decline in the frequency with which race 60 was identified was marked, only three samples were identified as race 60. It is of interest that race 8B, last identified in 1966, was obtained from one sample collected in Cornwall.

Yellow Rust of Barley

Race 23 was identified from the one sample of barley yellow rust collected from a naturally infected plot. Samples collected from plots adjacent to artificial sources of infection tended to reflect the field situation in that race 23 was identified from samples collected early in the year and race 24 later in the year.

Brown Rust of Barley

Six race groups of barley brown rust were identified - A, B, D, E, F and G. Of these, race groups B, E and F were most frequently identified and were generally distributed throughout Britain. No varieties of barley grown in Britain exhibit major gene resistance to brown rust, but some varieties exhibit a certain amount of resistance in the field. Samples of brown rust on grasses were not able to infect barley.

Crown Rust of Oats

Only ten samples of crown rust were received in 1970, but from these five races were identified, 229, 234, 251, 275 and 296 with race 296 being most frequently identified. Race 296 is able to overcome the Bond source of resistance.

Mildew of Wheat

Seventeen races of wheat mildew were identified in 1970, 0, 3, 4, 7, 8, 13, 14, 15, 16, 18, 19, 23, 25, 26, 32, 33 and 39. Races 13, 3, 16 and 14 were most frequently identified and widely distributed, agreeing with previous surveys. Several samples of mildew were obtained which were able to overcome resistances derived from *Triticum carthlicum*, (Veih. M1, EIS,)Khapli, and *Triticum timopheevi*. These sources of resistance are used in many breeding programmes and there are now no major gene sources of resistance in Europe which maintain complete resistance to mildew.

Mildew of Barley

Thirty-eight races of barley mildew were identified in 1970 and those could be divided into four race groups, Proctor, Europa, Impala and E race groups. The frequency with which races in the Impala group were identified has declined, probably due to a decline in acreage of Impala and related varieties. The proportion of Sultan infecting races has increased considerably. Sultan infecting races have been identified from many varieties other than Sultan and there has been an increase in the proportion of Sultan infecting races in the Impala race group. Races of mildew have been obtained able to overcome the Lyallpur 3645 source of resistance.

Mildew of Oats

Of the one hundred and six samples of oat mildew collected in 1970, seventy four were identified as race 2. This race is the most frequently identified and widely distributed oat mildew race. The frequency with which race 4, the Mostyn infecting race, was identified increased. This race has been identified from several sites other than the Welsh Plant Breeding Station. Races 3 and 5, able to overcome other resistant material were found only in the oat nursery at the Welsh Plant Breeding Station.

Rhynchosporium of Barley

Race U.K. 1 was identified from all but one of the fifty four samples collected in 1970, this was identified as race U.K. 2. Race U.K. 1 can infect all barley varieties without any major gene source of resistance. Several samples able to cause slight infection on varieties with the R.H.4 gene for resistance, otherwise behaving like race U.K.1, have been provisionally recorded as race (U.K. 1)?

N.H. Chamberlain
Secretary
Physiologic Race Survey Committee
N.I.A.B., Cambridge.

14 April 1971.

Yellow Rust - Wheat

National Institute of Agricultural Botany, Cambridge.

N.H. Chamberlain

1. During 1970, 166 samples of wheat yellow rust were received by the N.I.A.B.

2. Varieties from which samples were received

Winter Wheat varieties are given in Table 2,
spring wheat varieties in Table 3.

Table 2

Winter Wheat	No. of Samples
Cappelle Desprez	16
Cana	13
Maris Beacon	13
Maris Ranger	11
Joss Cambier	8
Hybrid 46	4
Maris Nimrod	4
Nican (Cambier 28156)	4
Maris Settler	3
Tommy	3
Maris Widgeon	2
Mildress	2
Rothwell Perdix	2
Champlain	1
Heima Desprez	1
Maris Envoy	1
Maris Huntsman (TJB.32/21/8B)	1
Maris Teal	1
TJB.32/299	1
Viking	1
TOTAL	92

Table 3

Spring wheat	No. of Samples
Janus	7
Kolibri	4
Sonora 64	4
Pompe	3
Rask	3
Kleiber	2
Opal	2
Rothwell Sprite	2
Cardinal	1
Clarion	1
Koga II	1
Maris Butler	1
Svenno	1
Sappo (W.11693)	1
TOTAL	33

An additional 41 samples were received from the following varieties, mainly in rust nurseries:-

Chinese 166 (4); Harvest Queen (4); Heines VII (4); Michigan Amber (3); Triticum vulgare (3); Persian (2); Bon Fermier; Gabo; Lucas; Nord Desprez; Professeur Marchal; Rubis; Spaldings Prolific; TW.130/11; Mexican Dwarf Segregant; Penjamo 62; Thatcher - x Centenario; Frontana x Mida Kenya 117A; Lee x Frontana 2 x Crr. Stw 597497; Lee x Kenya Farmer II-52 - 52; Lee x ND34, ND138-1, Kenya Farmer Hope, Fultz 229, B41 - 4; IV C1 (C.I.12034) 2 x Comanche x Pawnee 3 x Concho, Kans 63326 and 4 from unknown varieties.

3. Race Identification

A high proportion of the samples (89, or 54%) were collected from inoculated plots. These were not included in the survey and are marked with an asterisk.

A summary of the races identified is given in Table 4 and full results in Table 5.

Table 4. Summary of race identification

Race	No. of Samples	Frequency as percentage of samples identified
3/55D	17	37.8%
3/55 Opal	9	20.0%
3/55 Cleo	4	8.9%
58C	1	2.2%
1B	10	22.2%
60	3	6.7%
3/55 Opal + 8B	1	2.2%
Failed to establish	32	Failure rate 41.6%

Race 1B

When first identified in 1969, samples of race 1B were obtained from six locations. In 1970, samples of race 1B were only obtained from field infections in three locations, Wigtoft (Lincs), March (Cambs), and Chilmarsh (Wilts) different from those in 1969. Although very few samples were obtained an increase in the distribution of race 1B is indicated in that it has been identified from nine widely scattered sites in two years.

Race 3/55

Race 3/55 has again been divided into three types depending on their reaction on differential varieties, i.e., 3/55 Opal, 3/55 Cleo and 3/55D. In 1970 there was a considerable change in the frequency of identification of these races. Race 3/55 Opal was, until 1970, the most frequently identified race in Britain. However, the new race 3/55D has increased in frequency and distribution and in 1970 it was the most common race in Britain, samples being obtained from Scotland and Wales, Cf 1969 when the race was apparently restricted to Southern England. Race 3/55D has a wider host range than 3/55 Opal and this could account for the increase in the frequency and distribution. Race 3/55 Cleo, although very similar to 3/55 Opal and 3/55D in its reactions, is apparently restricted to South East Scotland. The frequency of this race has increased slightly since 1969.

The race 3/55 group is able to infect many varieties grown in Britain and forming a large proportion of the acreage of wheat. This is probably the reason why the race 3/55 group is so widely distributed.

Race 58C

When first identified in 1967 it was thought that race 58C would spread rapidly because of its ability to infect a large number of varieties including some hitherto resistant varieties. However, the frequency has declined, only one sample was obtained in 1970 and the race is still apparently confined to S.E. Scotland.

Race 60

A further reduction in the frequency of race 60 occurred in 1970. Three samples were obtained and these from older varieties grown in very few localities. The decline of race 60 has been very rapid since 1967 and this can be associated with a reduction in the acreage of winter wheat varieties susceptible to race 60.

Race 8B

A sample was obtained from Stoke Climsland (Cornwall) from an unknown mixture of varieties. Several isolations were made from this sample and although most of them were identified as race 3/55 Opal, one was identified as race 8B. Race 8B has not been identified in Britain since 1966 and even then it was very infrequent. It is therefore probable that these older races are still present in the country but occurring so rarely that infections are often overlooked. This sample of race 8B will be compared in more detail with the standard 8B to see if any changes have occurred in its reaction types since it was first identified.

Although identified in 1969, race 2B was not found in 1970. Its occurrence has fluctuated during the past few years when it steadily declined in frequency until 1968 when it was not identified. It was thought, like 8B, to have disappeared from Britain.

Table 5 Wheat Yellow Rust - Race Identification

Location	NIAB Code No. 1970	Date of Reception 1970	Variety	Race
<u>Northern Region</u>				
Northumberland				
Cockle Park	116	15/7	Michigan Amber	FTE
	117	"	Harvest Queen	3/550pal
	137	4/8	Maris Beacon	Brown rust
	138	"	Maris Huntsman	No spores in lesion
<u>East Midland Region</u>				
Lincolnshire				
Friskney	76	6/7	Maris Ranger	FTE
Spalding	*	2	Maris Beacon	3/55D
Sutterton, Boston	*	55	Maris Nimrod	58C+3/55D
	*	56	"	Maris Ranger
	*	57	"	Cappelle Desprez
	*	58	"	Maris Beacon
	*	59	"	Joss Cambier
	*	60	"	Rothwell Perdix
	*	61	"	Triticum vulgare
	*	62	"	Tommy
Wainfleet	139	4/8	Maris Settler	3/55D
	140	"	Champlain	1B
	141	"	Maris Beacon	1B
	142	"	Cappelle Desprez	1B
	143	"	Cama	3/55D
	144	"	Cappelle Desprez	1B
	145	"	Maris Ranger	1B
	146	"	" "	1B
	147	"	" "	1B
	148	"	" "	1B
Wigtoft, Sutterton	*	21	17/6	Tommy
	*	22	"	Maris Nimrod
	*	23	"	Cama
	*	24	"	Maris Beacon
	*	25	"	Maris Ranger
Wykeham	27	22/6	Maris Beacon	FTE
	41	26/6	" "	FTE

Table 5 Cont.

Location	NIAB Code No. 1970	Date of Reception 1970	Variety	Race
<u>West Midland Region</u>				
Cheshire				
Farndon, Chester	120	20/7	Maris Beacon	3/55D
	121	"	Cama	FTE
	122	"	Rothwell Sprite	60
	124	21/7	Hybrid 46	FTE
	125	"	Tommy	FTE
Worcestershire				
Kinver	35	23/6	Janus	3/55D
Staffordshire	1	27/4	Maris Widgeon	3/55D
<u>Eastern Region</u>				
Cambridgeshire	119 (PL 285)	21/7	Maris Ranger	FTE
Benwick, March	132	28/7	Maris Ranger	1B
NIAB	*	3	Nicam	3/55D
	*	4	Michigan Amber	3/55D
	*	5	"	FTE
	*	6	Bon Fermier	3/55D
	*	7	"	3/55D
	*	8	LeexFrontana 2 x Crr.Stw 597497	FTE
	*	9	" Kenya Farmer Hope, Fultz 229, B41-4	FTE
	*	10	" IV Cl(C.1.12034)2x Comanche Pawnee 3x Concho, Kans 63326	3/55D
	*	11	" Unknown	FTE
	*	12	" "	3/55D
	*	13	Svenno	3/55D
	*	14	Sonora 64	3/55D
	*	15	LeexKenya Farmer II-52-52	3/55D
	*	16	LeexND34, ND138-1	3/55D
	*	17	FrontanaxMida Kenya 117A	3/55D
	*	18	Thatcher ⁶ x Centenario	3/55D
	*	19	" Penjamo 62	3/55D
	*	28	23/6 Joss Cambier	58C
	*	29	" "	FTE
	*	30	" "	58C
	*	31	" "	58C

Table 5 Cont

Location	NIAB Code No. 1970	Date of Reception 1970	Variety	Race
NIAB	*	36	25/6	Cama
	*	37	"	Chinese 166
	*	38	"	" "
	*	39	"	" "
	*	40	"	Sonora 64
	*	46	29/6	Spaldings Prolific
OL + CCR	*	49	1/7	Joss Cambier
	*	52	3/7	Cama
	*	80	13/7	Mildress
	*	81	"	Nord Desprez
	*	82	"	Cama
	*	83	"	Mildress
	*	84	"	Maris Beacon
	*	85	"	Professeur Marchal
	*	87	"	Opal
	*	88	"	Maris Butler
	*	89	"	Kleiber
	*	90	"	Clarion
	*	91	"	Sappo
	*	92	14/7	Heines VII
	*	93	"	Cama
	*	94	"	Hybrid 46
	*	95	"	Cappelle Desprez
	*	96	"	Joss Cambier
	*	100	"	Janus
	*	101	"	Maris Beacon
	*	102	"	Cama
	*	103	"	Heines VII
	*	104	"	Cappelle Desprez
	*	105	"	Maris Teal
	*	106	"	Kolibri
	*	107	15/7	Rask
	*	108	"	Sonora 64
	*	109	"	TW 130/11
	*	110	16/7	Unknown

Table 5. (continued)

Location	NIAB Code No. 1970	Date of Reception 1970	Variety	Race
NIAB	*	111	16/7	Sonora 64
	*	112	"	Nicam
	*	113	"	TJB.32/299
	*	114	"	Kolibri
	*	115	"	Rothwell Sprite
	*	134	30/7	Chinese 166
	*	158	13/8	Kolibri
	*	159	"	"
				NYT
PBI, Trumpington	*	63	6/7	Maris Envoy
	*	64	"	Maris Nimrod
	*	65	"	Maris Beacon
	*	66	"	Maris Widgeon
	*	67	"	Maris Ranger
	*	68	"	Cama
	*	69	"	Cappelle Desprez
	*	70	"	Rothwell Perdix
				3/55D + 3/55 Opal
Essex				60
	Dunmow	*	73	"
		*	74	"
		*	75	"
Norfolk	Docking	50	2/7	Maris Ranger
				3/55 Opal
	Morley	20	16/6	Nicam
		44	26/6	Nicam
	Terrington	42	"	Heines VII
		43	"	Heines VII (+ Champlein?)
<u>South Eastern Region</u>	71	8/7 (PL 111)	Cappelle Desprez	FTE
Berkshire				
West Woodhay	86	13/7	Cappelle Desprez	FTE
Buckinghamshire				
Stokenchurch	118	17/7	Maris Settler	FTE

Table 5 (continued)

Location	NLAB Code No. 1970	Date of Reception 1970	Variety	Race
<u>South Eastern Region (cont'd)</u>				
Isle of Wight				
Shorwell	51	1/7	Janus	3/55D
Kent				
Wye	32	24/6	Persian	3/55D
	33	"	Harvest Queen	3/55D
	34	"	Cappelle Desprez	3/55D
	47	30/6	Harvest Queen	FTE
	48	"	Michigan Amber	3/55D
	98	13/7	Rubis	FTE
	99	13/7	Maris Beacon	3/55D
	126	22/7	Janus	FTE
	127	"	Gabo	FTE
	128	23/7	Koga II	FTE
	129	"	Cardinal	FTE
Oxfordshire				
Kingston Blount	130	24/7	Janus	FTE
Wallington	45	26/6	Cana	3/55D
<u>South Western Region</u>				
Cornwall				
Stoke Climsland, Callington	77	13/7	Heima Desprez	FTE
	78	"	Viking	3/55 Opal
	79	"	Unknown-mixed	3/55 Opal + 8B
Dorset				
Forston, Dorchester	136	31/7	Janus	3/55D
Somerset				
Cannington	131	24/7	Janus	FTE
Higher Clavoshay	26	19/6	Hybrid 46	FTE
Minehead	72	7/7	Cappelle Desprez	FTE
Tedwell, Bridgewater	97	14/7	" "	3/55 Opal

Table 5 Cont

Location	NIAB Code No. 1970	Date of reception 1970	Variety	Race
Wiltshire				
Ridge, Chilmash	133	27/7	Kleiber	1B
Wales	53(PL62)	6/7	Cappelle Desprez	FTE
	54(PL63)	"	" "	FTE
Anglesey				
Hendrefor, Llansadwrn	123	21/7	Cama	Brown rust
Cardiganshire				
W.P.B.S. Aberystwyth	135	30/7	Mexican Dwarf Segregant	3/55D
Scotland				
Berwickshire				
Ladykirk	154	5/8	Cappelle Desprez	FTE
	155	"	Maris Nimrod	3/55 Cleo
	156	"	Pompe	FTE
	157	"	Rask	FTE
	161	26/8	Cappelle Desprez	FTE
	162	"	Pompe	FTE
	163	"	Rask	3/55D
E. Lothian				
Drem	150	3/8	Pompe	3/55 Cleo
Haddington	160	24/8	Cama	3/55 Cleo
Midlothian				
Boghall, Edinburgh	152	8/8	Hybrid 46	3/55D
	153	"	Opal	3/55D
Perthshire				
Invergowrie	151	7/8	Triticum vulgare	3/55 Opal
	164	27/8	Harvest Queen	3/55 Opal
	165	"	Lucas	3/55 Cleo
	166	"	Triticum vulgare	3/55 Opal
Longforgan	167	"	Cappelle Desprez	58C

FTE - Failed to establish

NYT - Not yet tested

Some of the samples received were of wheat brown rust and not included in the survey. Details of these samples are given below.

Variety	Location	Date
Cappelle Desprez	Hartham Park, Corsham, Wilts	23.6.70
Tommy	" " "	" "
Benno (Lang Doerfleur 24/65)	" " "	" "
Unknown	Codford, Wilts	27.7.70
Rask	Rosemaund, Hereford	24.7.70
West Desprez	Cockle Park, Northumberland	6.8.70
Elite Lepeuple	" " "	"
Maris Widgeon	" " "	"
Maris Beacon	" " "	"
Maris Templar (TJB55/147)	" " "(No infection)"	

Yellow Rust - Barley
National Institute of Agricultural Botany - Cambridge

N. H. Chamberlain

1. During 1970, 16 samples of barley yellow rust were received by the N.I.A.B.

2. Varieties from which samples were received

All samples were from spring barley varieties. These are shown in Table 6.

Table 6

Spring Barley	No. of Samples
Tern	4
Vada	4
Akka	1
Deba Abed	1
Guardsman	1
Hassan	1
Impala	1
Maris Concord	1
Sultan	1
Wing	1
TOTAL	16

3. Race Identification

Most of the samples were obtained from inoculated plots and these are marked with an asterisk. Although not included in the survey the results show a general trend of race 23 early in the season and race 24 later. Of the other 3 samples two failed to establish and one was identified as race 23.

Full results are given in Table 7

Table 7

Yellow Rust - Barley - Race Identification

	NIAB Code No.B/70/-	Date of Reception 1970	Variety	Race
<u>West Midland Region</u>	8(PL7)	3/7	Vada	FTE
<u>Eastern Region</u> Cambridgeshire				
NIAB	*	1	4/6	Maris Concord
	*	2	16/6	Akka
	*	3	19/6	Wing
	*	4	25/6	Guardsman
	*	5	30/6	Impala
	*	6	"	Vada
	*	10	9/7	Tern
	*	11	"	"
	*	12	"	Sultan
	*	13	13/7	Tern
	*	14	"	Vada
	*	15	16/7	Tern
	*	16	"	Deba Abed
<u>South-eastern Region</u>				
Kent Wye	7	2/7	Hassan	23
<u>South-western Region</u>	9(PL19)	8/7	Vada	FTE

Brown Rust - Barley

Welsh Plant Breeding Station, Aberystwyth

B.C. Clifford

1. 369 samples, including 5 from wheat and 8 from grasses were received by the W.P.B.S. in 1970.
2. The varieties from which the samples were collected are shown below, winter varieties in table 8 spring varieties in table 9.

Table 8

Winter barley	No. of Samples
Maris Otter	7
Trebi	3
Osiris	3
La Mesita	2
Malta	2
Senta	1
Pella	1
Astrix	1
Mirra	1
H. tetra pallidum	1
Bigo	1
TOTAL	23

Table 9

Spring barley	No. of Samples
Midas	32
Sultan	32
Zephyr	27
Proctor	25
Akka	17
Julia	15
Gerkra	14
Deba Abed	14
Vada	13
Inber	12
Berac	12
Clermont	12
Felda	11
Hassan	11
Ruby	9
Lofa Abed	9
Impala	7
Golden Promise	7
Tern	6
Ferronia	5
Mazurka	5
Wing	5
Inis	5
Maris Badger	4
Emir	3
Betina	3
Crusader	2
Cambrinus	2
Sabarlis (Bala)	2
Pallas	2
Maris Concord	1
Europa	1
Union	1
Mosane	1
Maris Canon	1
TOTAL	333

Samples were also received from the following varieties.
13198 Co, 13199 Co, 13200 Co, Abyssinian, Batna, Ricardo, Bromus
sterilis, Agropyron repens, Westerwolds ryegrass, Dactylis glomerata,
Lolium perenne, Lolium multiflorum, Festuca pratensis, Heima Desprez,
Cana, Maris Minrod, Troll, Maris Beacon.

3. Race Identification

Because of the large number of samples from cultivated barley
varieties (356) not all could be tested. Therefore, 153 samples
were selected on the basis of their geographic origin and host
variety. Of these samples, (indicated by an asterisk), 110 were
successfully transferred to plants of Maris Concord to build up
sufficient inoculum for tests on the differential varieties. 96
samples, representing 27% of the total barley samples received
and 63% of the samples selected for testing, were successfully
tested.

A summary of the results is given in Table 10, full results
in Table 11. The race groups were identified on the basis of
reactions given in Table 14 of the Final Report, 1969.

Table 10.

Race Group	No. of Samples
A	4
B	20
C	-
D	1
E	16
F	19
G	1
H	-
?	16
Mixtures	19

Those marked "?" did not give a clear cut pattern of reactions
and may represent departures from the spectrum of races detected
to date. Further tests are being carried out on these samples.
However, of importance from a breeding point of view, is the fact
that no samples including those being tested further, were
virulent on Cebada Capa and Estate.

Of interest epidemiologically was the failure of the samples
from grass species to infect barley. The ability of the sample from
Hordium tetra pallidum to infect cultivated barley would soon
to be of academic interest only.

Table 11
Brown Rust - Barley - Race Identification

Location	V.P.B.S. No. 1970	Date of Reception 1970	Variety	Race
<u>Northern Region</u>				
<u>Northumberland</u>				
Cockle Park	305	4/8	Impala	
	*	306	"	Midas
		307	"	Berac
	*	308	"	Imber
	*	309	"	Proctor
	*	310	"	Wing
	*	311	"	Hassan
	*	312	"	Mazurka
		313	"	Julia
		314	"	Akka
		315	"	Deba Abed
		316	"	Golden
				Promise
		317	"	Zephyr
		318	"	Sultan
	*	319	"	Clermont
	*	320	"	Mosane
	*	321	"	Vada
	*	322	"	Felda
	*	323	"	Lofa Abed
	*	324	4/8	Inis
	*	325	"	Gerkra
	*	326	"	Peronia
<u>Yorks and Lancs Region</u>				
<u>Yorkshire</u>				
Burton Constable	*	277	22/7	Sultan
Goole	*	112	2/7	Midas
Routh	*	182	8/7	Akka
				mixture
				B
<u>East Midland Region</u>				
<u>Derbyshire</u>				
Morley		302	27/7	Zephyr
Leicestershire	*	242	13/7	Akka
Nottinghamshire				?
Spalford		303	27/7	Sultan
<u>West Midland Region</u>				
<u>Cheshire</u>				
Farndon, Chester	*	275	21/7	Midas
		276	"	Deba Abed
				F
<u>Herefordshire</u>				
Ross-on-Wye	*	73	24/6	Proctor
	*	74	"	Zephyr
				FTE

Table 11 (continued)

Location	W.P.B.S. No. 1970	Date of Reception 1970	Variety	Race	
Ross-on-Wye	75	24/6	Sultan		
	76	"	Berac		
	77	"	Felda		
	78	"	Gerkra		
	79	"	Imber		
	*	80	"	Lofa Abed	
	*	81	"	Midas	mixture
		82	"	Clermont	
	*	83	"	Hassan	F
		84	"	Mazurka	
		85	"	Wing	
		86	"	Feronia	
		87	"	Maris Otter	
		88	"	Malta	
		89	"	Senta	
		90	"	Pella	
	*	91	"	Astrix	B
	*	92	"	Mirra	mixture
Warwickshire					
Priors Marston	236	14/7	Vada		
	*	237	"	Julia	
		238	14/7	Zephyr	
		239	"	Sultan	
		240	"	Midas	
Wellesbourne	*	70	25/6	Maris Otter ?	
Worcestershire					
Hindlip	*	177	9/7	Julia	
	*	178	"	Vada	
		179	"	Midas	
		180	"	Zephyr	
		181	"	Sultan	

Table 11 (continued)

Location	W.P.B.S. No. 1970	Date of Reception 1970	Variety	Race
Worcestershire (cont'd)				
Kinver	144	7/7	Clermont	
	145	"	Berac	
	146	"	Akka	
*	147	"	Julia	
*	148	"	Crusader	
	149	"	Impala	
	150	"	Deba Abed	
	151	"	Lofa Abed	
	152	"	Midas	
	153	"	Tern	
	183	13/7	Zephyr	
	184	"	Felda	
*	185	"	Vada	
	186	"	Inis	
	187	"	Gerkra	
	188	"	Sultan	
	189	"	Proctor	
	190	"	Impala	
*	362	8/8	Abyssinian mixture	
*	363	"	Batna	?
*	364	"	Ricardo	FTE
Eastern Region				
Cambridgeshire	*	69	27/6	Bromus sterilis
NIAB	*	93	30/6	Hordeum B tetrapallidum
		94	"	Zephyr
	*	95	"	Tern
		96	"	Akka
		97	"	Impala
		98	"	Sultan
*	361	10/8	Agropyron repens	FTE

Table 11 (Continued)

Location	M.P.B.S. No. 1970	Date of Reception 1970	Variety	Race	
<u>Eastern Region (cont'd)</u>					
Cambridgeshire, NIAB. (cont'd)	*	365	22/9	Westerwolds kyegrass	
	*	366	"	Dactylis- glomerata	
	*	367	22/9	Lolium multiflorium	
	*	368	"	Festuca pratensis	
	*	369	"	Lolium perenne	
PBI		281	22/7	Golden promise	
		282	"	Sultan	
		283	"	Proctor	
		284	"	Midas	
		285	"	Zephyr	
		286	"	Bigo	
	*	287	"	Julia	?
		288	"	Maris Concord	
		289	"	Deba Abed	
		290	"	Europa	
	*	291	"	Union	mixture
		292	"	Impala	
	*	293	"	Pallas	mixture
Essex					
Ardleigh	5	31/5	Maris Otter		
Suffolk					
Boxford	3	11/5	Proctor		
	*	57	22/6	Sultan	mixture

Table 11 (Continued)

Location	W.P.B.S. No. 1970	Rate of Reception 1970	Variety	Race
Bordford (cont'd)	*	58	22/6	Midas FTE
	*	59	"	Ruby mixture
Lowestoft	*	243	15/7	Midas FTE
Mildenhall	*	241	14/7	Zephyr mixture
Newmarket	*	294	24/7	Deba Abed
	*	295	"	Julia mixture
Sudbury	*	4	1/6	Midas
	*	143	7/7	Sultan mixture
<u>South Eastern Region</u>				
Hampshire				
Sparsholt	*	280	21/7	Vada ?
Kent				
Ashford	*	43	22/6	Feronia ?
	*	44	"	Mazurka ?
	*	45	"	Berac B
	*	46	"	Sultan B
	*	47	"	Imber B
	*	48	"	Midas F
	*	49	"	Gerkra A
	*	50	"	Wing ?
	*	51	"	Proctor F
	*	52	22/6	Felda E
	*	53	"	Clermont
	*	54	"	Hassan D
	*	55	"	Midas A
	*	56	"	Zephyr E
Wye	*	28	17/6	Midas

Table 11 (continued)

Location	V.P.R.S. No. 1970	Date of Receipt 1970	Variety	Race
<u>South Western Region</u>				
Cornwall				
Newquay	*	29	20/6	Clemont
Padstow	*	31	"	Director
Devon				
Brompton	*	30	27/7	Vada
Cheddon Fitzpaine	*	212	13/7	Clermont
Kingsbridge	*	41	20/6	Sultan
	*	42	"	Akka
	*	60	23/6	Midas
	*	61	"	Cambrinus
	*	62	"	Vada
	*	63	"	Maris Badger
	*	64	"	Deba Abed
	*	65	"	Elair
	*	66	"	Proctor
Hortehoe	*	30	20/6	Akka
Newton Abbot	*	9	10/6	13198 Co
	*	10	"	13199 Co
	*	11	"	13200 Co
	*	12	"	Maris Otter
Okehampton	*	15	16/6	Akka
	*	16	"	Golden Promise
	*	17	"	Tern
	*	18	"	Felda
	*	19	"	Berac
	*	20	"	Zephyr
	*	21	"	Hassan
	*	22	"	Emir
	*	23	"	Gerka
	*	24	"	Clermont
	*	25	"	Midas
	*	26	"	Proctor
Seale Hayne	*	40	20/6	Akka
Starcross	*	36	22/6	Vada
	*	35	"	Midas
	*	36	"	Maris Badger
	*	37	"	Deba Abed
	*	38	"	Cambrinus
	*	39	"	Proctor

Table 11 (continued)

Location	WPRS No. 1970	Year of Recognition 1970	Maturity	Race
Dorset				
Dorchester	*	211	13/7	Ruby
				B
	*	121	6/7	Berac
		122	"	Imber
		123	"	Gerka
		124	"	Clemont
	*	125	"	Betina
Durweston		194	13/7	Proctor
		195	"	Sultan
		196	"	Zephyr
		197	"	Brrac
		198	"	Zelida
		199	"	Deba Abed
		200	"	Imber
		201	"	Gerka
		202	"	Clemont
		203	"	Ruby
	*	204	13/7	Julia
				B
	*	205	"	Inis
				Mixture
	*	206	"	Vada
				"
	*	207	"	Emir
				FTE
		208	"	Hassan
		209	"	Tern
		210	"	Midas
Great Minterne		227	14/7	Ruby
	*	228	"	Golden Rose
				FTE
	*	229	"	Vada
				Mixture
		230	"	Sultan
	*	231	"	Julia
				B
		232	"	Proctor
		233	"	Akka
		234	"	Midas
		235	"	Zephyr

Table 11 (continued)

Location	WPBS No. 1970	Date of Reception 1970	Variety	Race
Wimbourne St. Giles	6	2/6	Crusader	
	7	"	Imber	
	8	"	Midas	
Gloucestershire				
Charlton Abbotts *	213	13/7	Akka	
Elberton	126	6/7	Proctor	
	127	"	Zephyr	
*	128	"	Sultan	
Frampton Mansell	214	13/7	Lofa Abed	
	215	"	Zephyr	
	216	"	Imber	
	217	"	Midas	
	218	"	Berac	
	219	"	Proctor	
	220	"	Mazurka	
	221	"	Gerka	
	222	"	Felda	
	223	"	Wing	
Gatcombe Park	224	"	Feronia	
	304	31/7	Akka	
Preston Cross *	93a	24/6	Sultah	
Stow-On-The-Wold *	278	23/7	Deba Abed	Mixture
Stroud	99	1/7	Wing	
	100	"	Imber	
	101	"	Midas	
	102	"	Berac	
	103	"	Zephyr	
	104	"	Mazurka	
	*	105	"	Sultan
	106	"	Proctor	

Table 11 (continued)

Location	WFBS No. 1970	Date of Reception 1970	Variety	Raco
Stroud	107	"	Gerka	
	108	"	Feronia	
	* 109	"	Lofa Abed	
	* 110	"	Hassan	?
	111	"	Felda	
Somerset				
Cannington	*	32	18/6	Akka
	*	33	"	Malta
		296	24/7	Heima Desprez
		297	"	Cana
		298	"	Maris Nimrod
		299	"	Troll
		300	"	Maris Beacon
	*	167	8/7	Midas
		130	6/7	Zephyr
	*	131	6/7	Midas
Dulverton		132	"	Felda
		133	"	Hassan
		134	"	Sultan
		135	"	Berac
		136	"	Imber
		137	"	Proctor
		138	"	Ruby
	*	139	"	Sabarlis
		140	"	Clermont
		141	"	Gerka
		142	"	Lofa Abed
	*	154	9/7	Julia
		155	"	Zephyr
		156	"	Sultan
Williton		157	"	Hassan
	*	158	"	Proctor
				E

Table 11 (continued)

Location	WPPS No. 1970	Date of Reception 1970	Variety	Race
Williton	159	9/7	Clermont	
	160	"	Gerka	
	161	"	Felda	
	162	"	Inber	
	163	"	Berac	
	164	"	Ruby	
	165	"	Midas	
	166	"	Lofa Abed	
Wiltshire				
Avebury	*	129	6/7	Proctor
Codford		247	10/7	Sultan
		248	"	Golden Promise
		249	"	Zephyr
		250	"	Midas
	*	251	"	Vada
		252	"	Julia
		253	"	Ruby
		254	"	Proctor
		255	"	Akka
Pewsey	*	113	2/7	Julia
		114	"	Midas
		115	"	Ruby
		116	"	Golden Promise
		117	"	Sultan
	*	118	"	Vada
		119	"	Zephyr
		120	"	Proctor
Salisbury	*	13	10/6	Sultan
	*	14	"	Proctor

Table 11 (continued)

Location	WPBS No. 1970	Date of Reception 1970	Variety	Race
Shipton Bellinger	261	10/7	Inber	
	262	"	Berac	
	263	"	Zephyr	
	264	"	Ruby	
	265	"	Sabarlis	
	266	"	Proctor	
	*	267	"	Sultan E
		268	"	Midas
		269	"	Clermont
		270	"	Gerka
		271	"	Lofa Abed
		272	"	Hassan
		273	"	Felda
St. James	*	72	25/6	Midas E
<u>Wales</u>				
<u>Anglesey</u>				
Beaumaris	*	274	21/7	Akka
Menai Bridge	191	13/7	Proctor	
	*	192	"	Sultan
		193	"	Zephyr
		244	15/7	Sultan
		245	"	Zephyr
		246	"	Proctor
Llanallgo	2	7/4	Maris Otter	
<u>Breconshire</u>				
Tal-y-Bont on Usk	169	7/7	Zephyr	
	170	"	Proctor	
	171	"	Midas	
	172	"	Sultan	
	*	173	"	Julia
		174	"	Gerka
		175	"	Deba Abed

Table 11 (continued)

Location		WPBS No. 1970	Date of Reception 1970	Variety	Race
Tal-y-Bont on Usk	*	176	7/7	Vada	F
	*	256	16/7	Julia	Mixture
		257	"	Deba Abed	
		258	"	Inber	
		259	"	Gorkra	
<u>Cardiganshire</u>					
W.P.B.S.	*	1	25/3	Maris Otter	
<u>Glamorganshire</u>					
Monknash		27	17/6	Maris Otter	?
	*	67	23/6	Zephyr	E
	*	68	"	Sultan	
Monmouthshire	*	168	7/7	Golden Promise	
<u>Scotland</u>					
<u>Berwickshire</u>					
Duns		358	5/8	La Mesita	
	*	359	"	Osiris	FTE
		360	"	Trebi	
		341	"	Aldka	
	*	342	"	Betina	A?
		343	"	Hassan	
		344	"	Deba Abed	
		345	"	Impala	
		346	"	Inis	
	*	347	"	Julia	FTE
		348	"	Lofa Abed	
		349	"	Maris Badger	
	*	350	"	Midas	F
		351	"	Sultan	
Ladykirk	*	352	"	Torn	FTE
		353	"	Zephyr	
		354	"	La Mesita	
- 27 -					

Table 11 (continued)

Location		WPBS No. 1970	Date of Reception 1970	Variety	Race
Ladykirk	*	355	5/8	Osiris	Mixture
		356	"	Trebi	
		357	"	Clermont	
East Lothian					
Drem		327	"	Akka	A?
	*	328	"	Betina	
		329	"	Doba Abed	
		330	"	Impala	
		331	"	Inis	
	*	332	"	Julia	
		333	"	Maris Canon	
		334	"	Maris Badger	
	*	335	"	Midas	B
		336	"	Sultan	
Northern Ireland	*	337	"	Tern	
		338	5/8	Zephyr	
		339	"	Trebi	
	*	340	"	Osiris	
Co. Armagh					
Loughgall	*	260	16/7	Doba Abed	FTE
	*	279	22/7	Pallas	
Location Unknown	*	71	26/6	Sultan	Mixture

FTE - Failed to establish.

Crown Rust - Oats

Welsh Plant Breeding Station - Aberystwyth

B. C. Clifford

1. Only 10 samples of oat crown rust were received by the WPBS in 1970.
2. All samples were collected from spring oats. The varieties are given in Table 12

Table 12

Spring Oats	No. of Samples
Mostyn	3
Astor	2
Condor	1
Leanda (Cebeco 6731)	1
Mero	1
Selma	1
S172	1
TOTAL	10

3. Race Identification

The results of race identifications are shown in Table 13.

Table 13

Location	WPBS No. 1970	Date of Reception 1970	Variety	Race
<u>South East Region</u>				
Kent				
Wye	4	3/9	Selma	296
	5	"	Condor	FTE
	6	"	Astor	Mixture
	7	"	Leanda	275
	8	"	Mostyn	251
	9	"	Mero	229
<u>South West Region</u>				
Cornwall				
Boscastle	3	22/8	Astor	234
<u>Wales</u>				
Cardiganshire				
Tregaron	10	1/10	Mostyn	296
Tynpynfach	2	11/8	Mostyn	296
W.P.B.S.	1	3/8	S172	296

FTE - Failed to establish
Mixture is of 2 or more races.

Of the ten samples of oat crown rust received during the 1970 season, nine were successfully cultured and assessed on the standard set of ten differential varieties. No new races were identified. The reaction of the cultures with the differential varieties was tabulated in the 1969 Final Report, page 25.

Last year a race capable of attacking the Victoria resistance was reported as the "Victoria race" (see Table 18, 1969 Final Report) as it did not correspond to a known international race. Since that time it has been assigned number 471 on the international register by Dr. Marv Simons, U.S.D.A. Plant Pathologist, Iowa State University.

Mildew - Wheat

Plant Breeding Institute
Cambridge

M. S. Wolfe

1. 289 samples of wheat mildew were collected and sent to the P.B.I. in 1970.
2. The number of samples collected from winter and spring wheat varieties is shown in Tables 14 and 15 respectively.

Table 14

Winter Wheat	No. of samples
Maris Ranger	34
Cama	31
Cappelle Desprez	30
Joss Cambier	23
Maris Beacon	20
Maris Nimrod	18
Zorba	9
Champlain	7
Mildress	7
Maris Ploughman (TJB 29/133)	5
Maris Templar (TJB 55/147)	4
Tommy	2
Hybrid 46	2
Maris Widgeon	2
Maris Huntsman (TJB 32/218B)	2
TOTAL	196

Table 15

Spring Wheat	No. of samples
Kolibri	26
Maris Ensign	19
Cardinal	12
Maris Dove	8
Rothwell Sprite	2
Sirius	2
Drabant (W11882)	2
TOTAL	71

1 isolate was obtained from each of 22 other varieties:

ABr76/Hope 2, Armentieres, Elite Lepeuple, Heima Desprez, Inia 66, Koga II, Heines Kolben, Kloka, Benno (Lang Doerfler 24/65), Maris Teal, Maris Settler, Sonora, TL363/66/1, TL365a/29/1, TL365a/29/2, TL365/37/4, TL3659/37/5, TP517, TP509, Troll, TW171/260/3, West Desprez.

Race identification

The results of all samples collected in 1970 are given in Table 21. 183 failed to establish and 34 have not yet been tested.

Table 16 indicates the races which were obtained from specific wheat varieties.

Table 16

Variety	Race	0	3	4	7	8	13	14	15	16	18	19	23	25	26	32	33	39	TOTAL
Joss Cambier	1	2				1	3	1	4	4					1				12
Cappelle-Desprez	1	3	1			1	1	1	2	2	1								10
Maris Ranger	1	4				2	1	1	1	1									9
Cama	1	1				2		1											5
Maris Beacon	1		1	1						3				1					6
Cardinal	1			1			2		1	1		1		1					6
Maris Ensign	1					2	1	1		1		1					1		6
Kolibri	1					1	1		1										5
Champlain	1					2													4
Zorba			1				2												2
Hybrid 46		1				1									1				2
Maris Nimrod							1												2
Maris Widgeon							1												1
Maris Ploughman						1		1											1
Mildress							1	1											1
West Desprez											1								2
Elite Lepeupl								1											1
Abr 76/Hope 2								1											1
Maris Huntsman								1											1
TOTAL		3	12	2	2	2	19	8	4	9	4	1	1	1	1	1	1	72	

Samples from resistant varieties

Several samples were received from resistant varieties. These have been tested for their virulence on the host variety. The results are shown in Table 17.

Table 17

Variety	No. of samples received	No. failed to establish	No. not yet tested	Reaction on seedlings of source variety	
				Avirulent	Virulent
Mildress	7	5	-	1 (race 14)	1 (race 13)
Kolibri	25	16	-	0	9(races 0, 13, 14, 16, 5NYT)
Zorba	8	6	-	0	2(races 4 & 32)
Cardinal	12	5	-	5(races 3, 13, 16, 2NYT)	2*(races 23 & 39)
Maris Dove	8	5	2	0	1 (NYT)

* Virulent on Weih. M1 and ELS (*T. carthlicum*)

In addition, a number of isolates were received from varieties derived from CI 12633, a source of mildew resistance bred from *T. timopheevii*. These are shown in Table 18.

Table 18

Variety	FTE	NYT	Races	Reaction on CI 12633		Total
				virulent	avirulent	
Maris Beacon	7	6	7, 8, 18(4), 25	4	3	20
Maris Nimrod	14	2	33(2)	1	1	18
Maris Templar	3	1	-	-	-	4
Maris Huntsman	1	-	13	-	1	2
Maris Ploughman	3	-	1, 3	1	1	5
Drabant	2	-	-	-	-	2
TL 363/365	4	-	-	-	1	5
(Maris Dove)*				(1)		
TOTAL	33	9	(7)	6	7	56

* Maris Dove possesses a different source of resistance.

The isolates virulent on CI 12633 came from the southern counties of Norfolk, Berkshire, Shropshire, Worcestershire, and Somerset. The isolates avirulent on CI 12633 came mainly from the north (Yorkshire, Lancashire, Northumberland and Scotland) with one exception (Hereford).

A further isolate of interest was obtained from Cama (Duns, Berwickshire) which was virulent on Khapli and T309, a line derived from this mildew resistance source.

Table 19 Relative frequency of races in 1968, 1969 and 1970

Races	0	2	3	4	7	8	9	10	13	14	15	16	18	19	21	23	25	26	27	32	33	35	39	Absolute Total
1968	5	2	20	3	-	-	-	26	4	4	20	1	1	-	-	-	8	1	-	-	8	-	152	
1969	-	-	15	4	-	4	1	4	29	4	1	10	1	4	2	1	-	14	-	2	1	4	-	81
1970	3	-	16	3	3	3	-	28	7	3	16	7	-	-	2	1	2	-	2	2	-	2	2	72
No. of differentials infected	0	1	1	2	2	3	3	4	2	1	2	3	3	2	2	2	3	3	3	2	5	4	4	

Table 20 Frequency of races in terms of number of differentials infected

No. of differentials infected	1968		1969		1970	
	Absolute frequency	Relative frequency	Absolute frequency	Relative frequency	Absolute frequency	Relative frequency
0	7	4.6	-	-	3	3.4
1	38	25.0	15	18.5	21	22.5
2	51	33.6	35	43.2	30	41.6
3	43	28.2	24	29.6	16	27.6
4	13	8.6	6	7.4	1	1.7
5	-	-	1	1.2	1	1.7
TOTAL	152		81		72	

Table 21

Mildew - Wheat Race Identification

Location	PBI Code No. 1970, W70/	Date of reception 1970	Variety	Race
<u>Northern Region</u>				
Cumberland				
Langwathby, Nr. Penrith	106	24/6	Cappelle Desprez	FTE
	107	"	Cama	FTE
	108	"	Joss Cambier	16
	109	"	Maris Ranger	NYT
	110	"	Maris Beacon	FTE
	111	"	Zorba	FTE
	112	"	Kolibri	FTE
	113	"	Maris Ensign	FTE
	114	"	Sonora	FTE
Northumberland				
Cockle Park	265	6/8	Joss Cambier	15
	266	"	Maris Huntsman	13
	267	"	Maris Beacon	NYT
	268	"	Mildress	13
	269	"	Maris Nimrod	FTE
	270	"	Maris Templar	FTE
	271	"	Cappelle Desprez	FTE
	272	"	Maris Ranger	13
	273	"	Cama	FTE
<u>Yorks & Lancs Region</u>				
Lancashire				
Banks, Nr. Southport	50	15/6	Maris Ensign	FTE
Bilsborrow, Preston	169	2/7	Cappelle Desprez	FTE
	170	"	Cama	NYT
	171	"	Joss Cambier	14
	172	"	Maris Ranger	FTE
	173	"	Maris Beacon	FTE
	174	"	Maris Nimrod	NYT
	175	"	Kolibri	FTE
	176	"	Maris Ensign	FTE
	177	"	Cardinal	13

Table 21 cont'd.

Location	PBI Code No. 1970, W70/	Date of reception 1970	Variety	Race
<u>Yorks & Lancs Region cont'd.</u>				
Yorkshire				
Headley Hall	190	7/7	Maris Ploughman	FTE
	191	"	Maris Beacon	FTE
	192	"	Maris Templar	FTE
	193	"	Cama	4
	194	"	Maris Nimrod	NYT
	195	"	Maris Ranger	FTE
	196	"	Joss Cambier	14
	197	"	Cappelle Desprez	FTE
	198	"	Drabant	FTE
	199	"	Cardinal	FTE
	200	"	Maris Ensign	NYT
	201	"	Kolibri	FTE
	256	29/7	TL363/66/1	FTE
	257	"	TL365a/29/1	FTE
	258	"	TL365a/29/2	FTE
	259	"	TL365a/37/4	NYT
	260	"	TL365a/37/5	FTE
	261	"	Kolibri	FTE
<u>East Midland Region</u>				
Lincolnshire				
Deeping St. James	94	24/6	Maris Ensign	DOA
	95	"	Kolibri	FTE
	96	"	Maris Ranger	FTE
Kesteven	136	26/6	Cappelle Desprez	FTE
	137	"	Maris Beacon	NYT
	138	"	Joss Cambier	3
	139	"	Maris Ranger	15
	140	"	Zorba	4
	141	"	Cama	3
	142	"	Maris Nimrod	FTE

Table 21 cont'd.

Location	PBI Code No. 1970, W70	Date of reception 1970	Variety	Race
<u>West Midland Region cont'd.</u>				
Rosemaund	12	14/5	Joss Cambier	26
	13	"	Maris Ranger	3
	14	"	Cama	FTE
	15	"	Maris Nimrod	FTE
	16	"	Maris Beacon	FTE
	62	22/6	Maris Templar	FTE
	63	"	Maris Huntsman	FTE
	121	24/6	Kolibri	16
	122	"	Cardinal	3
	123	"	Maris Ensign	NYT
	124	"	Maris Dove	FTE
	125	"	Drabant	FTE
<u>Shropshire</u>				
Harper Adams	74	23/6	Maris Ploughman	8
	75	"	Maris Nimrod	33
	76	"	Maris Beacon	18
	77	"	Cappelle Desprez	16
	78	"	Cama	13
	79	"	Kolibri	13
<u>Worcestershire</u>				
Kinver	5	7/5	Maris Ranger	FTE
	6	"	Cappelle Desprez	FTE
	7	13/5	Joss Cambier	16
	8	"	Cama	FTE
	9	"	Champlain	13
	10	"	Hybrid 46	13
	11	"	Cardinal	13
	18	21/5	Koga II	FTE
	19	"	Maris Ensign	FTE
	20	"	Heines Kolben	FTE
	21	"	Rothwell Sprite	FTE

Table 21 cont'd.

Location	PBI Code No. 1970, W70/	Date of reception 1970	Variety	Race
<u>East Midland Region cont'd.</u>				
Derbyshire				
Sudbury	254	29/7	Joss Cambier	DOA
<u>Nottinghamshire</u>				
Long Bennington	255	29/7	Maris Ranger	DOA
<u>West Midland Region</u>				
Cheshire				
Farndon, Nr. Chester	238	22/7	Cappelle Desprez	7
	239	"	Kolibri	FTE
	240	"	Maris Ensign	13
<u>Herefordshire</u>				
Bridstow	143	26/6	Cappelle Desprez	18
	146	"	Cama	FTE
	149	"	Joss Cambier	FTE
	152	"	Maris Beacon	FTE
	155	"	Maris Ranger	3
	158	"	Maris Nimrod	FTE
Bosbury	145	"	Cappelle Desprez	3
	148	"	Cama	FTE
	151	"	Joss Cambier	FTE
	154	"	Maris Beacon	NYT
	157	"	Maris Ranger	FTE
	160	"	Maris Nimrod	FTE
Collington	144	26/6	Cappelle Desprez	FTE
	147	"	Cama	FTE
	150	"	Joss Cambier	13
	153	"	Maris Beacon	8
	156	"	Maris Ranger	3
	159	"	Maris Nimrod	FTE

Table 21 cont'd.

Location	PBI Code No. 1970, W70/	Date of reception 1970	Variety	Race
<u>West Midland Region cont'd.</u>				
Kinver cont'd.	22	21/5	Tommy	FTE
	23	"	Mildress	FTE
	24	"	Janus	FTE
	25	"	Benno	FTE
	35	2/6	Maris Dove	NYT
	36	"	Maris Beacon	NYT
	161	26/6	Maris Dove	FTE
Warwickshire				
Shipston-on-Stour	49	13/6	Cappelle Desprez	FTE
<u>Eastern Region</u>				
Cambridgeshire				
N.I.A.B.	39	10/6	Maris Teal	FTE
	40	"	Hybrid 46	3
	41	"	Cama	FTE
	42	"	West Desprez	19
	43	"	Champlain	FTE
	44	"	Joss Cambier	3
	45	"	Maris Ranger	FTE
	46	"	Cappelle Desprez	3
	47	"	Maris Widgeon	NYT
	48	"	Elite Lepeuple	13
P.B.I.	27	27/5	Kolibri	FTE
	38	8/6	Abr 76/Hope 2	13
	126	25/6	TP 517	NYT
	127	"	TP 509	NYT
	189	7/7	Maris Dove	FTE
	251	24/7	TW171/260/13	FTE
	252	"	Cardinal	16
	253	"	Kolibri	NYT
Thriplow	3	5/5	Maris Ranger	FTE

Table 21 cont'd.

Location	PBI Code No. 1970, W70/	Date of reception 1970	Variety	Race
<u>Eastern Region cont'd.</u>				
Essex				
Ardleigh, Nr. Colchester	30	30/5	Champlain	FTE
	31	"	Maris Ranger	13
	34	2/6	Champlain	13
Gt. Hawkesley, Colchester	4	6/5	Cama	FTE
	37	3/6	Kolibri	NYT
St. Osyth	32	2/6	Champlain	FTE
	33	"	Maris Ranger	3
Wivenhoe	202	7/7	Cama	FTE
Norfolk				
Morley	51	16/6	Cappelle Desprez	16
	52	"	Maris Ranger	FTE
	53	"	Cama	15
	54	"	Joss Cambier	FTE
	55	"	Kolibri	NYT
	56	"	Maris Ensign	NYT
	72	23/6	Maris Nimrod	FTE
	73	"	Maris Beacon	18
Suffolk				
Barnham	26	23/5	Cappelle Desprez	13
Brampton	221	16/7	Cardinal	23
Gt. Bradley, Nr. Newmarket	28	28/5	Kolibri	0
	29	"	Champlain	NYT
	30A	"	Joss Cambier	NYT
Littlebury, Saffron Walden	247	23/7	Kolibri	14
Newmarket	2	5/5	Cama	FTE
Southwold	17	15/5	Joss Cambier	FTE

Table 21 cont'd.

Location	PBI Code No. 1970, W70/	Date of reception 1970	Variety	Race
<u>South Eastern Region</u>				
Berkshire				
Jealott's Hill	86	26/4	Cardinal	39
	87	"	Kolibri	NYT
	88	"	Cama	13
	89	"	Maris Ensign	15
	90	"	Maris Ranger	16
	91	"	Joss Cambier	16
	92	"	Maris Beacon	NYT
Hampshire				
East Tytherley	1	16/2	Maris Widgeon	13
Kent				
Plaxtol	206	8/7	Kolibri	FTE
	207	"	Maris Ensign	FTE
	208	"	Cardinal	FTE
	209	"	Maris Dove	FTE
Wye	97	24/6	Cama	FTE
	98	"	Maris Settler	FTE
	99	"	Maris Templar	FTE
	100	"	Tommy	FTE
	101	"	Armentieres	FTE
	102	"	Maris Ranger	FTE
	103	"	Heima Desprez	FTE
	104	"	Joss Cambier	FTE
	105	"	Cappelle Desprez	FTE

Table 21 cont'd.

Location	PBI Code No. 1970, W70/	Date of reception 1970	Variety	Race
<u>South Western Region</u>				
Devon				
Roborough	135	26/6	Troll	FTE
Starcross	80	23/6	Maris Ranger	NYT
	81	"	Joss Cambier	14
	82	"	Maris Nimrod	FTE
	83	"	Cappelle Desprez	3
	84	"	Cama	FTE
	85	"	Maris Beacon	FTE
Dorset				
Dorset Farm Institute	93	24/6	Cama	FTE
Symondsbury	128	25/6	Cama	NYT
	129	"	Joss Cambier	FTE
	130	"	Maris Ranger	DOA
	131	"	Zorba	FTE
	132	"	Mildress	FTE
	133	"	Cappelle Desprez	FTE
	134	"	Maris Beacon	7
Gloucestershire				
Cirencester	178	2/7	Maris Ensign	13
	179	"	Maris Ranger	FTE
	180	"	Kolibri	FTE
	181	"	Maris Dove	NYT
	182	"	Cardinal	NYT
Frampton Mansell	220	14/7	Inia 66	FTE
Somerset				
Chilmark	241	22/7	Cardinal	FTE
	242	"	Maris Ranger	FTE
	243	"	Maris Ensign	FTE
	244	"	Kolibri	FTE
	245	"	Maris Dove	FTE

Table 21 cont'd.

Location	PBI Code No. 1970, W70/	Date of reception 1970	Variety	Race
<u>South Western Region</u> cont'd.				
Higher Clavoshay	64	22/6	Maris Nimrod	FTE
	65	"	Zorba	DOA
	66	"	Cama	DOA
	67	"	Maris Ranger	FTE
	68	"	Joss Cambier	FTE
	69	"	Maris Beacon	DOA
	70	"	Cappelle Desprez	FTE
Sutton Montis	183	3/7	Maris Ensign	FTE
	184	"	Cardinal	FTE
	185	"	Maris Ranger	14
	186	"	Kolibri	NYT
	187	"	Sirius	FTE
	188	"	Maris Dove	FTE
Wiltshire				
Chiseldon	57	18/6	Cama	FTE
	58	"	Maris Ranger	FTE
	59	"	Cappelle Desprez	FTE
All Cannings	274	6/8	Kolibri	FTE
Melplash, Bridport	275	"	Kolibri	DOA
Stockton, Warminster	162	29/6	Cama	FTE
	163	"	Maris Nimrod	FTE
	164	"	Maris Beacon	FTE
	165	"	Joss Cambier	FTE
	166	"	Maris Ranger	FTE
	167	"	Zorba	FTE
	168	"	Cappelle Desprez	FTE
Hartham Park, Corsham	115	24/6	Cappelle Desprez	FTE
	116	"	Joss Cambier	FTE
	117	"	Maris Ranger	FTE
	118	"	Zorba	32
	119	"	Maris Beacon	18
	120	"	Maris Nimrod	FTE

Table 21 cont'd.

Location	PBI Code No. 1970, W70/	Date of reception 1970	Variety	Race
<u>Wales</u>				
Anglesey	217	10/7	Kolibri	FTE
Hendrefor, Llansadwrn	246	22/7	Cama	FTE
Cardiganshire				
W.P.B.S., Aberystwyth	203	7/7	Kolibri	FTE
	204	"	Cardinal	FTE
	205	"	Maris Ensign	14
Monmouthshire				
Cleppa Park E.H.S.	60	18/6	Joss Cambier	16
Glamorganshire				
Stembridge	61	19/6	Cama	FTE
<u>Scotland</u>				
Angus				
Kirriemuir	71	22/6	Maris Ranger	DOA
Letham	229	17/7	Maris Ranger	FTE
	230	"	Cappelle Desprez	FTE
	231	"	Mildress	FTE
	232	"	Cama	FTE
	233	"	Zorba	FTE
	234	"	Maris Ranger	FTE
	235	"	Maris Ensign	FTE
	236	"	Maris Ploughman	FTE
Berwickshire				
Duns	276	7/8	Maris Ranger	FTE
	277	"	Cappelle Desprez	FTE
	278	"	Mildress	FTE
	279	"	Cama	NYT
	280	"	Zorba	FTE
	281	"	Maris Beacon	25
	282	"	Maris Ensign	FTE
Ladykirk	283	"	Maris Ploughman	FTE
	284	"	Cappelle Desprez	FTE
	285	"	Maris Nimrod	NYT

Table 21 cont'd.

Location	PBI Code No. 1970, W70/	Date of reception 1970	Variety	Race
<u>Scotland cont'd.</u>				
East Lothian				
Dirleton	210	8/7	Maris Ranger	FTE
	211	"	Cappelle Desprez	O
	212	"	Mildress	14
	213	"	Cama	FTE
	214	"	Maris Ensign	FTE
	215	"	Maris Ploughman	NYT
	216	"	Maris Nimrod	FTE
Drem	262	5/8	Cappelle Desprez	FTE
	263	"	Maris Nimrod	FTE
Fifeshire				
Arnacroach	248	24/7	Cappelle Desprez	14
	249	"	Cama	FTE
	250	"	Maris Beacon	NYT
Midlothian				
Garebridge	218	10/7	Cappelle Desprez	FTE
	219	"	Maris Nimrod	FTE
West Lothian				
Kirkliston	222	16/7	Maris Ranger	NYT
	223	"	Cappelle Desprez	NYT
	224	"	Mildress	FTE
	225	"	Cama	FTE
	226	"	Zorba	FTE
	227	"	Maris Ensign	O
	228	"	Kolibri	FTE

Table 21 cont'd.

Location	PBI Code No. 1970, W70/	Date of reception 1970	Variety	Race
<u>Northern Ireland</u>				
Co. Antrim,				
Greenmount Agricultural Col.	286	7/8	Kloka	FTE
	287	"	Kolibri	FTE
	288	"	Sirius	FTE
Co. Down				
Hillsborough	264	5/8	Champlain	FTE
<u>Channel Islands</u>				
Guernsey				
Forest	237	20/7	Rothwell Sprite	DOA

FTE - Failed to establish

NYT - Not yet tested

DOA - Dead on arrival

Mildew - Barley

Plant Breeding Institute - Cambridge

M.S. Wolfe

1. 469 samples of barley mildew were sent to the P.B.I. in 1970.
2. The number of samples collected from winter and spring barley varieties is shown in tables 22 and 23 respectively.

Table 22

Winter Barley	No. of samples
Maris Otter	8
Senta	6
Malta	2
Pella	2
TOTAL	18

Table 23

Spring Barley	No. of samples
Sultan	82
Zephyr	43
Proctor	32
Vada	26
Julia	25
Midas	20
Deba Abed	19
Hassan	19
Lofa Abed	16
Impala	14
Inis	14
Golden Promise	12
Mosane	11
Emir	10
Akka	8
Berac	7
Tern	7
Maris Badger	6
Imber	4
HB551	4
Betina	4
Ruby	4
Pallas	4
Gerkra	4
Banba	4
Felda	3
Clermont	3
Maris Canon	3
Crusader	2
Wing	2
VR555B	2
Maris Concord	2
155-49	2
Ymer	2
Trebi	2
Osiris	2
La Mesita	2
TOTAL	426

4 isolates were obtained from unknown varieties, and one sample was received from each of the following varieties: EBDN 6, EBDN 14, EBDN 16, EBDN 22, EBDN 34, Freegold, 158-72, Union, Mirra, Astrix, (MC20 x Emir) x Golden Promise, Tellus, Inia, PRBL-11-11-1, RPB14-5-15N, Arabische, Lyallpur 3647, H 1063, H 1036, Algerian, Vol. 8141/44.

Race Identification

The results are given in Tables 24 and 25 where S indicates that the race is virulent on Sultan.

Table 24

Mildew - Barley - Race Identification

Location	PBI Code No. 1970 B70/	Date of Reception 1970	Variety	Race
<u>Northern Region</u>				
Cumberland				
Langwathby, Penrith	223	24/6	Proctor	C9
	224	"	Sultan	FTE
	225	"	Julia	C4
	226	"	Zephyr	C5
	227	"	Inis	FTE
	228	"	Vada	D5-S
	229	"	Impala	C5
	230	"	Deba Abed	C10
	231	"	Mosane	C5
	232	"	Emir	A7-S
	233	"	Lofa Abed	C2
	234	"	Midas	C5
	235	"	Imber	FTE
	236	"	Gerkra	C2-S
	237	"	Clermont	FTE
	238	"	155/49	C4
Northumberland				
Cockle Park	414	6/8	Vada	C2
	415	"	Impala	FTE
	416	"	Deba Abed	C26
	417	"	Proctor	D5-S
	418	"	Mosane	FTE
	419	"	Hassan	FTE
	420	"	Sultan	FTE
	421	"	Lofa Abed	FTE
	422	"	Julia	C10
	423	"	Inis	FTE
	424	"	Zephyr	FTE

Table 24 (Contd.)

Location	PBI Code No 1970 E70/	Date of Reception 1970	Variety	Race
<u>Yorks and Lancs Region</u>				
Lancashire				
Bilsborrow, Preston	264	2/7	Proctor	C5-S
	265	"	Sultan	C9-S
	266	"	Julia	C9
	267	"	Zephyr	C5
	268	"	Inis	C10
	269	"	Vada	NYT
	270	"	Impala	C26
	271	"	Deba Abed	C26
	272	"	Mosane	FTE
	273	"	Hassan	FTE
	274	"	Lofa Abed	C7
Culcheth	98	15/6	Zephyr	FTE
	99	"	Hassan	D5-S
	100	"	Sultan	FTE
	101	"	Proctor	NYT
	102	"	Vada	FTE
	103	"	Julia	C2
	104	"	Deba Abed	C10
Yorkshire				
Balne	208	24/6	Zephyr	FTE
Blacktoft	215	"	Zephyr	C2
Brough	283	3/7	Vada	NYT
	284	"	Hassan	A7-S
Driffield	212	24/6	Proctor	FTE
	213	"	Proctor	C2
Fenwick	159	22/6	Sultan	A7-S
Goole	288	3/7	Midas	C5

Table 24 (Contd.)

Location	PBI Code No 1970 B70/	Date of Reception 1970	Variety	Race
Headley Hall	294	7/7	VR 555 B	C5
	295	"	Lofa Abed	B3
	296	"	Wing	FTE
	297	"	Sultan	new B group
	298	"	Julia	FTE
	299	"	Zephyr	C9
	300	"	Inis	C5
	301	"	Vada	A7
	302	"	Impala	C4
	303	"	Deba Abed	C5
	304	"	Proctor	C2
	305	"	Mosane	C5
	306	"	Hassan	D1-S
Holme-on-Spalding Moor	253	26/6	Sultan	FTE
Knottingley	287	3/7	Zephyr	C5
Letwall	105	16/6	Sultan	A7-S
Molescroft, Beverley	241	25/6	Sultan	A7-S
	242	"	Zephyr	C26
	243	"	Hassan	C7-S
	244	"	Akka	New B group
	245	"	Proctor	FTE
	246	"	Clermont	C7-S
South Cave	285	3/7	Vada	FTE
Swanland	214	24/6	Zephyr	FTE
Walkington	86	10/6	Sultan	C2-S
Womersley	286	3/7	Vada	B3

Table 24 (Contd.)

Location	PBI Code No 1970 D70/	Date of Reception 1970	Variety	Race
<u>East Midland Region</u>				
Derbyshire				
Matlock	160	22/6	Golden Promise	FTE
	161	"	Vada	DOA
	162	"	Julia	FTE
	163	"	Midas	FTE
	164	"	Sultan	A7-S
	165	"	Zephyr	NYT
Morley	397	29/7	Zephyr	DOA
Weston-on-Trent	87	13/6	Inber	FTE
	88	"	Proctor	C10-S
	89	"	Golden Promise	A7-S
	90	"	Berac	C4
	91	"	Sultan	A0-S
	92	"	Julia	C10-S
	93	"	Zephyr	C9
	94	"	Gerkra	FTE
	95	"	Felda	C4-S
	96	"	Hassan	D1-S
	97	"	Vada	New A group
Lincolnshire	364	20/7	RPB1-11-11-1	FTE
Binbrook	365	"	RFB-14-5-15N	FTE
Mablethorpe	207	24/6	Sultan	FTE
Spalding	43	29/5	Sultan	A7-S
	44	"	Julia	C10
	45	"	Zephyr	C4
	46	"	Deba Abed	C4
	47	"	Proctor	C7
	48	"	Hassan	B3-S
	49	"	Mosane	C5
	50	"	Impala	C5

Table 24 (Contd.)

Location	PBI Code No 1970 B70/	Date of Reception 1970	Variety	Race
Nottinghamshire				
Spalford	398	29/7	Sultan	DOA
<u>West Midland Region</u>				
Cheshire				
Farndon, Chester	366	22/7	Sultan	A3-S
	367	"	Julia	C5-S
	368	"	Zephyr	FTE
	369	"	Proctor	C5
	370	"	Deba Abed	C26
	393	"	Vada	A7
	394	22/7	Proctor	C5-S
Herefordshire				
Rosemaund	139	18/6	Proctor	C5-S
	140	"	Sultan	A7-S
	141	"	Zephyr	C5-S
	142	"	Inis	C5
	143	"	Vada	D1-S
	144	"	Impala	C4
	145	"	Deba Abed	C5
	146	"	Mosane	C4-S
	147	"	Hassan	C9-S
	148	"	Lofa Abed	C5-S
	149	"	Wing	C10
Ross	254	"	Proctor	C5-S
	255	"	Zephyr	FTE
	256	"	Sultan	NYT
	257	"	Lofa Abed	FTE
	258	"	Hassan	FTE
Shropshire				
Harper Adams	195	23/6	Sultan	D1-S
	196	"	Mosane	C2-S

Table 24 (Contd.)

Location	PBI Code No 1970 B70/	Date of Reception 1970	Variety	Race
Harper Adams	197	23/6	Proctor	C10-S
	198	"	Deba Abed	C4
	199	"	Impala	NYT
	200	"	Vada	C4
	201	"	Inis	C10
	202	"	Zephyr	C26
	203	"	Julia	C10
Long Shifnal	114	17/6	Hassan	FTE
	115	"	Proctor	NYT
	116	"	Lofa Abed	NYT
	117	"	Zephyr	C2-S
	118	"	Sultan	C5
Warwickshire				
Berkswell	17	19/5	Sultan	FTE
	18	"	Maris Otter	FTE
	19	"	Sultan	B3-S
Priors Hardwick	135	18/6	Sultan	C7-S
	136	"	Sultan	A7-S
Priors Marston	130	"	Zephyr	C10
	131	"	Julia	C5
	132	"	Midas	C10
	133	"	Sultan	A7-S
	134	"	Vada	C5
	137	"	Sultan	E2-S
Wornleighton	138	"	Akka	C26-S
Worcestershire				
Hindlip	124	"	Sultan	A7-S
	125	"	Zephyr	C5
	126	"	Vada	A7
	127	"	Julia	C4
	128	"	Midas	C5

Table 24 (Contd.)

Location	PBI Code No 1970 B70/	Date of Reception 1970	Variety	Race
Kinver	24	21/5	Impala	C5
	25	"	Proctor	FTE
	26	"	Deba Abed	FTE
	27	"	Vada	FTE
	28	"	Zephyr	C10
	29	"	Sultan	D1-S
	30	"	Inis	C5
	31	"	Julia	FTE
	32	"	Midas	C4
	33	"	Emir	FTE
	34	"	Maris Concord	FTE
	51	2/6	Maris Badger	C5
	52	"	Bettina	C10-S
	53	"	Crusader	C4
	54	"	Lofa Abed	C10-S
	194	23/6	Tern	FTE
	61	7/6	Sultan	C6-S
<u>Eastern Region</u>				
Bedforshire				
Woburn	318	8/7	Akka	C6-S
	319	"	Akka	FTE
	320	"	Akka	FTE
Cambridgeshire				
Balsham	20	19/5	Vada	FTE
	21	"	Zephyr	FTE
	22	"	Sultan(Calixin)	FTE
	23	"	Sultan (Untreated)	A3-S
Boxworth	123	17/6	Sultan	D3-S
Barway, Ely	168	23/6	Sultan	C9-S
	169	"	Sultan	NYT
	170	"	Sultan	C10-S

Table 24 (Contd.)

Location	PBI Code No. 1970 B70/	Date of Reception 1970	Variety	Race
NIAB	74	10/6	Golden Promise	New E
	75	"	Sultan	group FTE
	76	"	Vada	C5
	77	"	Impala	C5
	78	"	Maris Concord	C5
	79	"	Zephyr	C5
	80	"	Maris Otter	C7-S
	81	"	Senta	C4
	82	"	Proctor	E2
	83	"	Pella	C5
PBI Trumpington	156	19/6	Arabische	FTE
	157	"	Emir	FTE
	185	23/6	Lyallpur 3647	FTE
	186	"	Hordeum 1036	C5-S
	187	"	Hordeum 1063	FTE
	188	"	Algerian	FTE
	189	"	Vol. 8141/44	NYT
	317	8/7	Golden Promise	C10-S
	353	15/7	HB551 (Milstem)	C2-S
	354	"	HB551 (Calixin)	NYT
Wicken	355	"	HB551 (Benlate)	C9-S
	356	"	HB551 (Control)	NYT
	119	17/6	Sultan	A7-S
	120	"	Unknown	C10-S
Essex	121	"	Unknown	C9-S
	122	"	Unknown	FTE
Dunmow	171	23/6	Sultan	D1-S
Peldon, Colchester	38	27/5	Sultan	C6-S
	158	22/6	Sultan	D1-S

Table 24 (Contd.)

Location	PBI Code No 1970 D70/	Date of Reception 1970	Variety	Race
Norfolk				
Docking	13	11/3	(MC20 x Emir) x MGP	A7-S
	68	10/6	Midas	C4
	69	"	Sultan	FTE
	70	"	Julia	C5
	71	"	Zephyr	C26-S
	72	"	Deba Abed	C9
	73	"	Lofa Abed	NYT
Mattishall Burgh	12	19/1	Maris Otter	FTE
	63	8/6	Sultan	C2-S
	64	"	Maris Otter	C10
Morley	172	23/6	Proctor	C5-S
	173	"	Sultan	E1-S
	174	23/6	Julia	New B group
	175	"	Zephyr	C10-S
	176	"	Inis	FTE
	177	"	Vada	New B group
	178	"	Impala	FTE
	179	"	Deba Abed	C10
	180	"	Mosane	B12
	181	"	Emir	B12-S
	182	"	Hassan	A3-S
	183	"	Lofa Abed	FTE
	184	"	VR 555B	C5
Swaffham	344	10/7	Unknown	B3-S
Suffolk				
Boxford	209	24/6	Ruby	B3-S
	210	"	Midas	C26
	211	"	Sultan	A3-S
Brampton	357	16/7	Tern	C17-S
	358	"	Sultan	A7-S

Table 24 (Contd.)

Location	PBI Code No. 1970 B70/	Date of Reception 1970	Variety	Race
Bures	41	29/5	Sultan	A3-S
	42	"	Midas	NYT
Gt. Bradley	39	28/5	Julia	C10
	40	"	Deba Abed	B3
Lakenheath	35	23/5	Sultan	A7-S
Saxmundham	1	10/12/69	Sultan (volunteers)	C7-S
	2	"	Sultan	FTE
<u>South Eastern Region</u>				
Berkshire				
Jealotts Hill	216	24/6	Julia	C5
	217	"	Sultan	C5-S
	218	"	Zephyr	C4
Surrey				
Cobham	36	26/5	Zephyr	DOA
	37	"	Golden Promise	DOA
Sussex				
Forest Row	129	18/6	Sultan	FTE
<u>South Western Region</u>				
Bristol				
Westbury-on-Trym	62	7/6	Zephyr	C5
Devon				
Bicton	190	23/6	Berac	C5
	191	"	Emir	FTE
	192	"	Sultan	New A group
Frogmore	193	"	Malta	NYT
	219	24/6	Proctor	FTE
Frogmore	220	"	Deba Abed	C4
	221	"	Maris Badger	C5
	222	"	Vada	C4

Table 24 (Contd.)

Location	PBI Code No 1970 B70/	Date of Reception 1970	Variety	Race
Roborough	250	26/6	Emir	FTE
	251	"	Berac	FTE
	252	"	Sultan	A7-S
Starcross	204	23/6	Proctor	C4
	205	"	Deba Abed	FTE
	206	"	Maris Badger	C5
Sticklepath	108	17/6	Akka	FTE
	109	"	Tern	FTE
	110	"	Zephyr	NYT
	111	"	Hassan	A7-S
	112	"	Emir	C10
	113	"	Proctor	C9
Williton	325	10/7	Hassan	FTE
	326	"	Julia	FTE
	327	"	Zephyr	FTE
	328	"	Sultan	FTE
	329	"	Proctor	FTE
Dorset				
Liscombe	321	8/7	Sultan	FTE
	322	"	Felda	FTE
	323	"	Inis	FTE
	324	"	Midas	FTE
Melplash	151	19/6	Sultan	FTE
Upwey	152	"	Sultan	A7-S
Winborne St. Giles	55	4/6	Midas	FTE
	56	"	Imber	FTE
	57	"	Julia	FTE
	58	"	Crusader	C26
	59	"	Proctor	FTE
	65	9/6	Imber	C10
	66	"	Vada	C11
	67	"	Midas	C5

Table 24 (Contd.)

Location	PBI Code No 1970 D70/	Date of Reception 1970	Variety	Race
Gloucestershire				
Bibury	16	7/5	Senta	FTE
Charlton Abbotts	346	14/7	Akka	FTE
	347	"	Inia	FTE
Chipping Sodbury	85	10/6	Sultan	A7-S
Cirencester	261	19/6	Sultan	FTE
Frampton Mansell	275	2/7	Zephyr	FTE
	276	"	Sultan	B3-S
	277	"	Proctor	A7
	278	"	Deba Abed	FTE
	279	"	Hassan	D1-S
	348	14/7	Lofa Abed	FTE
	349	"	Zephyr	FTE
	350	"	Proctor	C10
	351	"	Hassan	FTE
	352	"	Sultan	FTE
Littleton-on-Severn	3	11/12/69	Senta	C10-S
Preston Grass	240	25/6	Sultan	E1-S
Oxfordshire				
Stonesfield	153	19/6	Sultan	A7-S
Yackley	154	"	Sultan	C7-S
Somerset				
Emborough	11	19/12/69	Senta	DOA
Wells	10	"	Senta	FTE
Wiltshire				
Codford	60	4/6	Golden Promise	C10-S
	363	17/7	Zephyr	FTE
Pewsey	289	3/7	Julia	FTE
	290	"	Sultan	FTE
	291	"	Vada	FTE
	292	"	Zephyr	FTE
	293	"	Proctor	FTE

Table 24 (Contd.)

Location	PBI Code No 1970 B70/	Date of Reception 1970	Variety	Race
Tiffont	84	10/6	Berac	FTE
West Dean	4	19/12/69	Maris Otter	DOA
	5	"	Senta	DOA
	6	"	Malta	FTE
	7	"	Pella	DOA
	8	"	Mirra	DOA
	9	"	Astrix	DOA
<u>Wales</u>				
Anglesey				
Cae Isa	280	2/7	Proctor	C2-S
	281	"	Sultan	C2-S
	282	"	Zephyr	FTE
Llanallgo	14	20/4	Maris Otter	DOA
Pentre Euriannant	371	22/7	Clermont	C7
Caernarvonshire				
Llanwnda	115	19/6	Sultan	A7-S
Pwllheli	311	8/7	Vada	FTE
	312	"	Sultan	FTE
	313	"	Zephyr	FTE
	314	"	Midas	C5
	315	"	Golden Promise	FTE
	316	"	Proctor	FTE
Cardiganshire				
WPBS, Aberystwyth	15	29/4	Maris Otter	FTE
	307	7/7	Sultan	A7-S
	308	"	Vada	FTE
	309	"	Impala	FTE
	310	"	Midas	FTE
	429	6/8	EBCN 6	FTE
	430	"	EBCN 14	FTE
	431	"	EBCN 16	FTE

Table 24 (contd.)

Location	FBI Code No 1970 B70/	Date of Reception 1970	Variety	Race
WPBS, Aberystwyth	432	6/8	EBDN 22	FTE
	433	"	EBDN 34	FTE
Monmouthshire				
Cleppa Park	259	26/6	Proctor	FTE
	260	26/6	Vada	C4
Usk	247	25/6	Zephyr	NYT
	248	"	Sultan	DOA
<u>Scotland</u>				
Aberdeenshire				
Udney	239	"	Sultan	A3-S
Angus				
Brechin	150	19/6	Sultan	E1-S
Kirriemuir	166	22/6	Maris Otter	FTE
	167	"	Golden Promise	FTE
Berwickshire	448	7/8	La Mesita	FTE
Duns	449	"	Osiris	FTE
	450	"	Trebi	FTE
Ladykirk	451	"	Betina	FTE
	452	"	Hassan	FTE
	453	"	Deba Abed	FTE
	454	"	Emir	FTE
	455	"	Impala	FTE
	456	"	Inis	C10
	457	"	Julia	C10
	458	"	Lofa Abed	FTE
	459	"	Maris Canon	FTE
	460	"	Maris Badger	FTE
	461	"	Midas	FTE
	462	"	Sultan	FTE
	463	"	Tern	FTE
	464	"	Zephyr	FTE
	465	"	La Mesita	C2

Table 24 (Contd.)

Location	PBI Code No 1970 B70/	Date of Reception 1970	Variety	Race
Ladykirk	466	7/8	Osiris	FTE
	467	"	Trebi	FTE
Oxton	469	28/8	Sultan	FTE
Caithness				
Watten	399	3/8	Sultan	FTE
East Lothian				
Drem	400	5/8	Betina	A7
	401	"	Hassan	FTE
	402	"	Deba Abed	FTE
	403	"	Emir	NYT
	404	"	Impala	FTE
	405	"	Inis	FTE
	406	"	Julia	FTE
	407	"	Lofa Abed	FTE
	408	5/8	Maris Canon	FTE
	409	"	Maris Badger	NYT
	410	"	Midas	C5
	411	"	Sultan	B3-S
	412	"	Tern	FTE
	413	"	Zephyr	FTE
Dunbar	425	6/8	Sultan	DOA
Midlothian				
Edinburgh, NIAB	106	17/6	Proctor	C5
	107	"	Sultan	A3-S
	330	10/7	Zephyr	B12
	331	"	Betina	FTE
	332	"	Hassan	FTE
	333	"	Deba Abed	C5
	334	"	Emir	A23-S
	335	"	Impala	C10
	336	"	Inis	C4
	337	"	Julia	C4

Table 24 (Contd.)

Location	PBI Code No 1970 D70/	Date of Reception 1970	Variety	Race
Gorebridge	338	10/7	Lofa Abed	FTE
	339	"	Maris Canon	C10
	340	"	Maris Badger	C5
	341	"	Midas	C26
	342	"	Sultan	FTE
	343	"	Tern	FTE
Pentlandfield	468	21/8	Akka	DOA
Ross and Cromarty				
Dingwall	345	13/7	Sultan	DOA
<u>Northern Upland</u>				
Co. Antrim				
Greenmount	395	28/7	Gerkra	FTE
	396	"	Berac	FTE
	434	7/8	Golden Promise	FTE
	435	"	Mosane	FTE
	436	"	Inis	FTE
	437	"	Ymer	FTE
	438	"	Vada	B12
	439	"	Ruby	FTE
	440	"	Sultan	FTE
	441	"	Union	FTE
	442	"	Banba	FTE
	443	"	Julia	FTE
	444	"	Midas	FTE
	445	7/8	Zephyr	FTE
	446	"	Proctor	FTE
	447	"	Pallas	FTE
Ards Peninsula	359	16/7	Pallas	C10
	360	"	Golden Promise	C10-S
	361	"	Banba	C10
	362	"	Berac	C10

Table 24 (Contd.)

Location	PBI Code No 1970 B70/	Date of Reception 1970	Variety	Race
Co. Antrim				
Loughgall	262	30/6	Sultana	FTE
	263	"	Tern	B12-S
	376	22/7	Berac	FTE
	377	"	Ruby	FTE
	378	"	Pallas	FTE
	379	"	Felda	FTE
	380	"	Julia	E2
	381	"	Tellus	FTE
	382	"	Golden Promise	FTE
	383	"	Mosane	FTE
	384	"	Inis	FTE
	385	"	Banba	FTE
	386	"	Gerkra	FTE
	387	22/7	Tær	FTE
	388	"	Zephyr	FTE
	389	"	Proctor	FTE
	390	"	Midas	NYT
	391	"	Lofa Abed	FTE
	392	"	Deba Abed	FTE
Co. Down				
Crossnacreevy, Belfast	426	6/8	155/49	FTE
	427	"	156/72	A7-S
	428	"	Freegold	FTE
Co. Londonderry				
Coleraine	372	22/7	Banba	FTE
	373	"	Pallas	C5
	374	"	Ruby	FTE
	375	"	Golden Promise	

FTE = Failed to Establish

DOA = Dead on Arrival

NYT = Not yet tested

Table 25 Mildew - Barley - Race Identification

Race	Source Variety	No. of Samples
<u>Proctor Group</u>		
A0-S	Sultan	1
A3-S	Hassan, Sultan (6)	7
A7	Betina, Proctor, Vada (4)	5
A7-S	Emir, Hassan (3), Golden Promise, 158-72 Sultan (17), (MC20xEmir) x Golden Promise	24
A23	Golden Promise	1
A23-S	Emir, Vada	2
Others	Sultan, Vada	2
D1-S	Hassan (3), Sultan (4), Vada	3
D3-S	Sultan	1
D5-S	Hassan, Proctor, Vada	3
	TOTAL	55
<u>Europa Group</u>		
B3	Deba Abed, Lofa Abed, Vada	3
B5-S	Hassan, Ruby, Sultan (3), variety unknown	6
B12	Mosane, Vada, Zephyr	3
B12-S	Emir, Tern	2
Others	Akka, Julia, Sultan, Vada	4
C2	Julia, La Mesita, Lofa Abed, Proctor (2), Vada	7
Zephyr		
C2-S	Gerkra, HB554, Mosane, Proctor, Sultan (3)	2
C6-S	Zephyr	
Akka, Sultan (2)		
C7	Clemont, Lofa Abed, Proctor	3
C7-S	Clemont, Maris Otter, Sultan (4)	6
C9	Deba Abed, Julia, Proctor (2), Zephyr (2)	6
C9-S	Hassan, HB 554, Sultan (2), variety unknown	5
C11	Vada	1
C17-S	Tern	1
	TOTAL	53
<u>Impala Group</u>		
C4	Berac, Crusader, Deba Abed (3), Impala (2), Inis Julia (3), Midas (2), Proctor, Senta, Vada (3)	21
C4-S	Zephyr (2), 155-49	
C5	Felda, Mosane	2
	Berac, Deba Abed (3), Impala (4), Inis (3), Julia (3)	43
	Maris Badger (4), Maris Concord, Midas (6) Mosane (3)	
	Pallas, Fella, Proctor (2), Sultan, Vada (2), VR555D(2)	
C5-S	Zephyr (6)	
Julia, Lofa Abed, Proctor (4), Sultan, Zephyr		8
C10	Banba, Berac, Deba Abed (3), Emir, Imber	24
	Impala, Inis (3), Julia (5), Maris Canon	
	Maris Otter, Midas, Pallas, Proctor, Wing, Zephyr (2)	
C10-S	Betina, Golden Promise (3), Julia, Lofa Abed	12
	Proctor (2), Senta, Sultan, Zephyr, variety unknown	
C26	Crusader, Deba Abed (3), Impala, Midas (2)	9
	Zephyr (2)	
C26-S	Akka, Zephyr	2
C28	Midas	1
Others	H 1036	1
	TOTAL	123
<u>E. Group</u>	S	
E1-S	Sultan (3)	3
E2	Julia, Proctor	2
E2-S	Sultan	1
Others	Golden Promise	1
	TOTAL	7
	GRAND TOTAL	243

Table 25 contd.

Race	Source Variety	No. of Samples
<u>E. Group</u>		
E1-S	Sultan (3)	3
E2	Julia, Proctor	2
E2-S	Sultan	1
Others	Golden Promise	1
		TOTAL
		243
	GRAND TOTAL	

The largest change was in the proportion of Impala and Sultan virulent races. Table 26 illustrates the change in the Impala situation

Table 26

	1967	1968	1969	1970
Proportion of Impala-virulent isolates.	77	88	65	51
Proportion of those obtained from vars. with Mlg + Mla6	29	35	28	11

This is not unexpected following the decline in acreage of Impala and Inis. However, the slowness of the decrease may be some reflection of the ability of the Impala-virulent races to compete with the Europa-virulent races. In addition, the popularity of Midas may have helped to decelerate the process since this variety, with the Mla6 resistance gene, provided only Impala-virulent isolates.

The change in the identification of Sultan isolates is illustrated in Table 27: it is apparent that a much larger proportion of isolates in 1970 had combinations of Vg and Va6 virulence together with that for Sultan. This is reflected in the fact that in 1969, 91% of the Sultan virulent isolates were obtained from Sultan and related varieties, whereas, in 1970, this figure had dropped to 62%. The surprising feature is the relatively large proportion of isolates in the Impala-Sultan-virulent group.

Table 27

Proctor Group	Europa Group	Proportion of Sultan-isolates in Concord Group			Total (absol.)
		Impala Group			
1969	70	20	0	10	40
1970	46	31	0	23	103

Table 28

Varieties possessing resistance genes (other than Sultan)

Variety	No. of samples received	No FTE	Reaction on seedlings	
			Virulent	Avirulent
Akka	8	5	0	3 races C6-S, C26-S new B group.
Berac races C4,C5,C10	7	4		
Clermont 1 race C7	3	0	1, race C7-S	1
Felda race C4-S	3	2		
Gerkra	4	3	1, race C2-S	
Inber	4	2	2, race C10(1)	0

Table 28 (contd.)

Variety	No. of samples received	No FTE	Reaction on seedlings	
			Virulent	Avirulent
Midas	20	6	14, races C4 (2) C5 (6) C10 (1) C26 (2) new Impala group & 1063 (1)	0
Tern		5	1, race C17-S, also virulent on H.1063	1, race B12-S

New races

The following races were detected for the first time:-

- B70/186, ex. H.1036: Impala group, attacking Goldfoil, CP 127422, W.41/145, 37/136, Maris Concord, M.511, M.501, H.1657 and H.1036
 B70/314, ex Midas: C28, attacking H.1063
 B70/357, ex Tern: C17-S, also attacking H.1063 and Tern
 B70/192: A group, attacking 41/145, Concord, H.1657 and Sultan.
 B70/97: A group, attacking 41/145 and Sultan.
 B70/174: B group, attacks Goldfoil, CP 12744, 41/145, Concord, 1657.
 B70/177: B group, attacks Goldfoil, CP12744, E.37/136, Concord, M.501
 B70/244: B group, attacks Goldfoil, CP12744, 41/145
 B70/297: B group, attacking Goldfoil, CP12744, W.41/145, Concord, H.1657, Sultan.
 B70/74: E. group, attacks Goldfoil, W.41/145, Sultan.

P.B.I. Fungicide Trial

A survey was made of the races present on Sultan and Proctor, treated with Benlate, milsten, and untreated. The results are given in Table 29

Table 29

Race	Treatment					
	Sultan Control	Sultan Benlate	Sultan Milsten	Proctor Control	Proctor Benlate	Proctor Milsten
A0-S						
A1-S	1	1	4			1
A3-S	1	3	1			2
A4-S		1	0	1	4	1
A7-S	5	6	6	3	4	1
A19-S		2				
A21-S	1					
A23-S						
D1-S	3	1	3	1		2
D3-S		1	2		3	
D5		1				
D5-S	2	2				
B3						
B3-S				1	1	1
B4-S					1	
B12-S			1	1		
C2				1		
C2-S		2		1		1
C6-S				1		2
C7-S	2			1		
C9					1	

Table 29 (contd.)

Race	Treatment					
	Sultan Control	Sultan Benlate	Sultan Milsten	Proctor Control	Proctor Benlate	Proctor Milsten
C9-S		1	1			
C4				1		2
C4-S					1	
C5				1		
C5-S			1	1		
C10						1
C10-S						1
C26				1		1
C26-S				2		
E1				1		
E1-S	2		1			1
E2-S	2					1
new A-S	2			1		
new E-S				1	1	1
Total	21	21	20	19	16	19

The differences between the collection obtained from Sultan and that from Proctor were as expected, that is, a high proportion of A and B group races from Sultan and the majority of the more complex C group races, coming from Proctor.

In order to compare the differences between chemical treatments, the data were analysed for the number of times each differential was attacked in a particular treatment by summarising all the races. There was some variation between treatment, but this was not significant.

Table 30

Relative frequency of races, in terms of the differentials attacked.

Differential variety

	Gold foil	37/136	41/145	Concord	M511	M501	1063	1657	1036	Algerian	Sulttan
1969	78	85	97	64	48	64	0	70	0	0	25
1970	77	72	98	52	38	51	0.8	77	0.4	0	45

Table 31

Relative frequency of number of diff's. attacked.

No. of diff's. infected

	0	1	2	3	4	5	6	7	8	9
1969	1	1	3	12	12	17	27	26	1	0
1970	0	1	4	16	17	18	17	24	3	0.4
1970, PBI Fungicide trial	0	4	12	34	26	14	5	4	2	0

Mildew - Oats

Welsh Plant Breeding Station - Aberystwyth

I.T. Jones

1. 106 samples of oat mildew were sent to the W.P.B.S. in 1970.
2. Varieties from which samples were received are sown in Table 32.

Table 32

Variety	No. of Samples
Condor	20
Mostyn	13
Manod	12
Maris Quest	9
Peniarth	9
Padarn	8
Selma	6
Astor	5
Helga	3
Pendrwm	2
S172	2
9065Cn/6/3/74	2
Rosinante	2
Eero	2
Wild Oat	2
Cc.4872	1
Cc.4659	1
Cc.4146	1
Cebeco 6731	1
Stormont Sceptre	1
Mapua	1
Titus	1
Forward	1
TOTAL	105

3. Race Identification

Table 33 shows the completed results for 1970

Table 33 Mildew of Oats - Race Identification

Location	WPBS No. 1970/-	Date of Reception 1970	Variety	Race
<u>Northern Region</u>				
Northumberland				
Cockle Park	73 74 75 76 77	4/8 " " " "	Manod Condor Maris Quest Peniarth Padarn	2 2 2 2 2
<u>Yorks & Lancs. Region</u>				
Yorkshire				
Headley Hall	41 42 43 44 45	6/7 " " " "	Maris Quest Padarn Condor Peniarth Manod	2 2 2 2 2

Table 33 Continued

Location	WPBS No. 1970/-	Date of Reception 1970	Variety	Race
Lancashire Myerscough	29 30 31 32 33 34	30/6 " " " " "	Maris Quest Peniarth Padarn Condor Mostyn Manod	2 2 2 2 4 2
<u>East Midland Region</u> Nottinghamshire Longbenington	72	30/7	Wild Oat	FTE
<u>West Midland Region</u> Cheshire Farndon, Chester	56 57	20/7 "	Manod Condor	2 2
Herefordshire Kington	14 15	23/6 "	Condor Mostyn	2 2
'Radco' Kington	71	27/7	Mostyn	4
Rosemaund	16 17 18 19 20 21 22	23/6 " " " " " "	Condor Padarn Peniarth Maris Quest Condor Mostyn Manod	2 2 2 2 2 2 2
Shropshire Harper Adams (Newport)	25 26 27	24/6 " "	Pendrwm Maris Quest Peniarth	2 2 2
Warwickshire Drayton E.H.F.	67 92 93	22/7 5/8 "	Mostyn Mostyn Mostyn	FTE 4 4
Worcestershire Kinver	1 2 3 4 37 38 39	1/6 " " " 6/7 " "	Manod Condor Astor Selma 9065Cn6/3/74 Cc 4872 Cc 4659	2 2 2 2 2 FTE 2
<u>Eastern Region</u> Cambridgeshire Great Chesterford	66	22/7	Wild Oat	2
N.I.A.B.	5 6 7 8	4/6 " " "	Maris Quest Pendrwm Padarn Peniarth	2 2 2 2
Essex Great Yeldham	106	12/11	Mostyn	4
Norfolk Morley	23 24	22/6 "	Condor Manod	2 2
Suffolk Great Bradley	68	22/7	Astor	FTE

Table 33 Continued

Location	WPBS No. 1970/-	Date of Reception 1970	Variety	Race
<u>South Eastern Region</u>				
Hampshire				
Winchester	35	26/6	Selma	2
<u>South West Region</u>				
Devon				
Frogmore, Kingsbridge	12	23/6	Manod	2
	13	"	Condor	2
Staplake Mt, Starcross	10	22/6	Manod	2
	11	"	Condor	2
Gloucestershire				
Great Minterne	55	14/7	Astor	2
Somerset				
Liscombe E.H.F.	46	8/7	Astor	FTE
<u>Wales</u>				
Cardiganshire				
Trawscoed	47	9/7	Mostyn	4
W.P.B.S. CaeGwyn	89	15/6	S172	2, 3 & 4
	78	4/8	Mostyn	4 & 5
	79	"	Cc 4146	3
Morfa Mawr	36	2/7	Mostyn	4
Tynpynfarch	28	30/6	Condor	2
Ystrad Meurig	40	8/7	Mostyn	4
Denbighshire				
Ruthin	90	5/8	9065 Cn/3/74	2
	91	"	S172	2
Pembrokeshire				
Penybont, Clynderwen	105	9/8	Forward	2
Radnorshire				
Rhayader	48	8/7	Condor	2
<u>Scotland</u>				
Berwickshire				
Ladykirk	99	5/8	Condor	2
	100	"	Maris Quest	2
	101	"	Mostyn	FTE
	102	"	Manod	2
	103	"	Peniarth	2
	104	"	Padarn	2
East Lothian				
Drem	84	3/8	Condor	FTE
	85	"	Maris Quest	"
	86	"	Mostyn	2
	87	"	Manod	FTE
	88	"	Peniarth	"
	89	"	Padarn	"
Midlothian				
Gorebridge	49	8/7	Condor	2
	50	"	Maris Quest	2
	51	"	Mostyn	Sample not received
	52	"	Manod	2
	53	"	Peniarth	2
	54	"	Padarn	FTE

Based on Baddeley's sample
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Table 33 Continued

Location	WPBS No. 1970/-	Date of Reception 1970	Variety	Race
<u>Northern Ireland</u>				
Strabane Ag. Col.	80	3/8	Selma	FTE
	81	"	Helga	2
	82	"	Rosinante	2
Antrim				
Greemount Col.	69	29/7	Selma	2
	70	"	Helga	2
	94	4/8	Selma	2
	95	"	Condor	2
Armagh				
Loughgall P.B.D.	58	21/7	Astor	FTE
	59	"	Helga	"
	60	"	CEB 6731	"
	61	"	Rosinante	"
	62	"	Samson	2
	63	"	Condor	FTE
	64	"	Selma	"
	65	"	Mero	"
	83	4/8	Stormont	2
			Sceptre	
Co. Down				
Crosnacreevy P.T.S.	96	5/8	Mero	FTE
	97	"	Mapua	2
	98	"	Titus	2

FTE - Failed to establish

Of the 106 samples of oat mildew obtained in 1970, 74 were identified as Race 2, this race being again the predominant race, throughout the country. (Table 34).

A total of 14 Mostyn samples were received compared with 9 in 1969 (Table 35) Of the 12 successfully cultured and tested three gave Race 2 reaction and were avirulent on Mostyn seedlings. The other 9 isolates, however, were identified as Race 4 virulent on Mostyn seedlings, and the notable feature of this years' survey is that for the first time 8 of these samples came from locations outside the W.P.B.S. nursery area.

Three of these were from Cardiganshire, one each from Kington, Herefordshire, Preston, Lancashire and Great Yeldham, Essex, and two from the same plot at Drayton Warwickshire.

The mildew from a sample of Mostyn from W.P.B.S. nursery gave both races 4 and 5.

Two isolates from W.P.B.S. nursery were identified as Race 3 and were obtained from Samples of S.172 and Cc 4146.

It appears that Mostyn virulent isolates are emerging in a few areas in Wales and also England, but so far none have been detected in samples from Scotland and Ireland.

Table 34

Summary of oat mildew race identification

Race	Variety	No. of samples
2	Manod (11) Pendrum (2) Padarn (6) Peniarth (3) Maris Guest (8) Condor (16) Astor (2) Selma (4) Mostyn (3) 9065 Cn 6/3/74 (2) Cc 4659 (1) Samson (1) Wild Oat (1) Helga (2) Rosinante (1) Storemont Sceptre (1) S.172 (1) Mapua (1) Titus (1) Forward (1)	27 30 7 5 4 <u>73</u>
3	Cc 4146 (1)	1
2,3 & 4	S.172 (1)	1
4	Mostyn (8)	8
4 & 5	Mostyn (1)	1
	Total no. of samples tested	<u>84</u>
	Mostyn reported resistant, no sample received but information allocated a sample number	1
	No. of samples which failed to establish	21
	Total number of samples received	106
	" " " races isolated	109

Table 35

Samples received from varieties or genotypes with known major genes which are still effective generally to the predominant Race 2

Variety	Sample no.	Location	Race
Mostyn	15	Kington, Hereford	2
	21	Rosemaund, Hereford	2
	33	Preston, Lancs.	4
	36	Morfa Mawr, Cards.	4
	40	Ystradmeurig, Cards.	4
	47	Trawscoed, Cards.	4
	51	Gorebridge, Midlothian (Sample not received as no mildew)	Resistant
	67	Drayton, Warwick	Failed
	71	Kington, Hereford	4
	78	W.P.B.S. Nursery	4 and 5
	86	Drem, East Lothian	2
	92	Drayton, Warwick	4
	93	" "	4
	101	Ladykirk, Berwickshire	Failed
	106	Great Yeldham, Essex	4
9065 Cn 6/3/74	37	Kinver, Worcs.	2
	90	Ruthin, Denbigh	2
Cc 4146	79	W.P.B.S. Nursery	3

Table 36

Numerical summary of 1970 results

Year	Physiological races identified				Total no. identified	Total no. of samples tested
	2	3	4	5		
1970	73 + 1*	2*	8 + 2*	1*	87	84

* From W.P.B.S. nursery

Rhynchosporium - Barley

University of Reading

R.B. Clothier

1. During 1970, 54 samples were received by the University of Reading.

2. Varieties from which samples were received.

Winter barley varieties are given in Table 37 spring barley varieties in Table 38.

Table 37

Winter Barley	No. of Samples
Maris Otter	8
Senta	4
Malta	1
TOTAL	13

Table 38

Spring Barley	No. of Samples
Proctor	8
Deba Abed	7
Tern	3
Clermont	2
Julia	2
Lofa Abed	2
Sultan	2
Zephyr	2
Berac	1
Felda	1
Gerka	1
Inis	1
Mazurka	1
Midas	1
Mosane	1
Ruby	1
Tellus	1
Vada	1
Wing	1
TOTAL	39

A further 2 samples were received from the following varieties:-
Arla, CCXVII.

3. Race Identification

14 samples were in poor condition and isolates were not obtained from them.

Results of the 40 isolates tested are shown in Table 39.

Table 39 Rhynchosporium Barley - Race Identification

Location	Reading Code No.	Date of Reception 1970	Variety	Race
<u>Yorks & Lancs Region</u>				
Lancashire				
Bilsborrow	2765	14/5	Maris Otter	U.K.1
	2766	"	Proctor	U.K.1
<u>West Midland Region</u>				
Herefordshire				
Rosemaund	2782	26/6	Malta	FTE
	2783	"	Maris Otter	FTE
	2784	"	Proctor	U.K.1
	2785	"	Senta	FTE
Worcestershire				
Stourbridge	2758	6/5	Deba Abed	U.K.1
	2759	"	Maris Otter	U.K.1?
	2760	"	Senta	U.K.1?
	2762	12/5	CCXVII	U.K.1
<u>Eastern Region</u>				
Cambridgeshire				
NIAB	2757	6/5	Arla	U.K.1
	2773	10/6	Maris Otter	U.K.1
	2774	"	Proctor	U.K.1
Essex				
Ardleigh	2744	2/4	Maris Otter	U.K.1
	2745	"	Proctor	U.K.1?
	2761	11/5	Senta	U.K.1?
	2763	13/5	Proctor	U.K.1?
	2764	"	Senta	U.K.1
Suffolk				
Sudbury	2771	29/5	Midas	FTE
<u>South Eastern Region</u>				
Hampshire				
Sparsholt	2746	7/4	Maris Otter	U.K.1?
	2747	"	Proctor	U.K.1?
<u>South Western Region</u>				
Cornwall				
Penzance	2777	23/6	Deba Abed	U.K.1
	2778	"	Sultan	FTE
	2779	"	Wing	U.K.1
Devon				
Bampton	2805	29/7	Clermont	FTE
	2806	"	Deba Abed	U.K.1
	2807	"	Lofa Abed	FTE
	2808	"	Nazurka	FTE
	2809	"	Vada	U.K.2

Table 39 Rhynchosporium Barley - Race Identification

Location	Reading Code No.	Date of Reception 1970	Variety	Race
<u>South Western Region</u>				
Exmouth	2780	23/6	Deba Abed	U.K.1
	2781	"	Clermont	U.K.1
Somerset				
Cannington	2776	22/6	Tern	U.K.1
<u>Wales</u>				
Anglesey				
Cae Isa	2802	23/7	Proctor	U.K.1
	2803	"	Sultan	U.K.1
	2804	"	Zephyr	U.K.1
Llanallgo	2750	9/4	Maris Otter	U.K.1
Glamorgan				
Monknash	2775	19/6	Maris Otter	U.K.1
<u>Northern Ireland</u>				
Co. Armagh				
Loughgall	2786	6/7	Tern	U.K.1
	2787	22/7	Berac	U.K.1
	2788	"	Deba Abed	U.K.1
	2789	"	Felda	FTE
	2790	"	Gerka	FTE
	2791	"	Inis	FTE
	2792	"	Julia	FTE
	2793	"	Lofa Abed	U.K.1
	2794	"	Mosane	U.K.1
	2795	"	Proctor	U.K.1
	2796	"	Ruby	U.K.1
	2797	"	Tellus	FTE
	2798	"	Zephyr	U.K.1
	2813	3/8	Deba Abed	FTE
Co. Londonderry				
Coleraine	2799	22/7	Deba Abed	U.K.1
	2800	"	Julia	U.K.1
	2801	"	Tern	U.K.1

Few samples have been received compared with 1969, and only one isolate was identified as race U.K.2.

Seven isolates are recorded in Table 39 as race U.K.1(?). These, in addition to causing typical race U.K.1 reactions, had also caused some sheath lesions and small lamina lesions on Osiris and La Mesita which carry the Rh4 gene and are resistant to races U.K.1 and U.K.2. The tests on these isolates were repeated several times, and the results were consistently as before. Tests were also carried out on a wide range of European Barley Disease Nursery varieties, and these tests suggest that there are indeed differences in virulence between U.K.1 (?) and typical U.K.1 isolates, and these differences are being investigated further. Nevertheless, the relative mildness of the symptoms produced by U.K.1 (?) on Osiris and La Mesita are taken to indicate that these varieties are resistant though not immune to these isolates.

Three isolates from samples of Senta were found to be race U.K.1 or U.K.1(?). The two samples from Ardleigh, Essex, were later reported to come from plots with rogue plants of a 2-rowed variety, and possibly this was the case with the other sample of Senta.



