# PHYSIOLOGIC RACE SURVEY

### FINAL REPORT

#### 1968

### NOT FOR PUBLICATION

### INDEX

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Final Summary	Rhynchosporium - Barley (Rhynchosporium secalis) .	Mildew - Oats (Erysiphe graminis - avenae) .	Wildew - Barley(Erysiphe graminis - hordei) .	Mildew - Wheat (Erysiphe graminis - tritici) .	Crown rust - Oats (Puccinia coronata).	Brown rust - Barley(Puccinia hordei) .	Yellow rust - Barley(Puccinia striiformis)	Yellow rust - Wheat (Puccinia striiformis)	Introduction	
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Secretary, Physiologic Race Survey Committee ( Cereal Pathogens)

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

### Introduction

During 1968 five centres agreed to continue with the investigation of pathogens causing the major foliar diseases of cereals, and the identification of physiologic races of these pathogens. In 1968 the Department of Agriculture for Scotland, East Craigs, Edinburgh, found it necessary to discontinue their testing programme. Therefore there are no results for identification of mercury tolerant isolates of Pyrenophora avenue (previously Drechslera avenue) for samples sent to Edinburgh during 1968. Pyrenophora will also be omitted from the 1969 race survey. to dis-

to the five centres was 932. The total number of disease isolates collected during ne five centres was 932. This total is slightly less t g 1968 and dispatched than 1967 (Table 1)

Table 1

### Mumbers of disease isolates collected for

### race identification

932	1034	TOTAL	
17	62	- oats	Leaf spot
137	227	un - barley	Rhynchosporium - barley
31	42	· oats	Mildew
283	173	- barley	Wildew
25 <b>3</b>	122	- wheat	Mildew
4	17	l oats	Crown rust
- <del>-</del>	Į	- barley	Brown rust
49	48	- barley	Yellow rust
118	34-3	~ - wheat	Yellow rust
1968	1967		
;olates	No, of Isolates	წ	Disease

of isolates are small. However a racé pattern is beginning to emerge from the results obtained during 1968. The small number of crown rust isolates has prevented assessment of the race spectrum in Britain. Barley brown rust has recently been included in the survey and numbers

Co-operation in the collection of isolates was provided by participants throughout Britain (Table 2) and we are grateful to all participants who contributed samples during 1968.

growing conditions which have prevented spore multiplication. Therefor some isolates could not be tested on differential varieties in time for the result to be included in this report. Each centre has provided the completed results which are collectively presented in the following manner: is either due to the pressure of work at a particular centre, or to adverse completed This report contains the results of identifications that have been on the 1968 isolates. Not all isolates have been tested. Therefore

- Number of isolates received.
- 2 The varieties from which isolates were collected,
- Ş Locations from which isolates were collected,
- + Race identifications.
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### Yellow rust wheat. Botany, National Cambridge. Institute of Agricultural

### N.H. Chamberlain

- 1. by A the total of N. I. A. B. 118 samples of wheat yellow rust was from the following varieties, during received 1968.
- 2. Varieties from who winter wheat varieties are given in which isolates were received. ies are given in Table 3, spring wheat in Table 4.

### Table 3

Cappelle Desprez Hybrid 46 Champlein Joss Cambier Mildress Cama Maris Ranger West Desprez Elite Lepeuple Maris Widgeon Zorba (Engelen 565) Advance (LAE 8/8) Margin Bouquet (FDA.15) TOTAL	Winter Wheat
5 1111000F5700 5 1111000F5700	No. of Is
○ マンシャトマンの⊗ 2 マンシャトランのの	Isolates

### Table 4

TOTAL	Kloka Kolibri Opal Pompe (W9248) Clarion Janus Rothwell Sprite	Spring Wheat
24	- NMMt-WM	No. of Isolates

An additional 36 isolates were received from other varieties, many of them in yellow rust nurseries. These varieties were:-Apollo, Belloy, Bon Fermier (2), Chinese 166, Eclipse, Falco, Apex (2), Harvest Queen (2), Heines VII (3), Himalayan, Lucas (2), Maris Beacon, (TJB32/219), Maris Butler, Maris Dove, MGH.6264, Nord Desprez, Orca, Fersian (2), Rothwell 355, Rubis, Tadorna, Triticum vulgare (2), Viking (2), Trou, Michigan Amber, Maris Settler (TB396/37), Heima-Desprez (FD2406).

Jocations from which the wheat yellow rust isolates were collected Isolates were collected from 31 locations in the British Isles. The location from which each isolate was collected and the variety from which it was collected is shown in the following table:-

Table 5

VII, M Cambie Lepeup Advanc Well 3 N. Beltan (E.Lothian) N. Murie (Perths.) Spaxton (Bristol) Cappel Hybrid Widgeo Bouque Joss C Ranger	Cotton (Perths)  Cotton (Perths)  Cotton (Perths)  Cotton (Perths)  Copal, I  Desprez  Clarior  Clarior  Clarior  Heines  (W9248)  Cappell  Hybrid  Dorchester (Dorset)  Dosprez  Chample  Edinburgh  Edinburgh  Chample  Kloka,  Edinburgh  Cappell  Harper Adams  (Newport, Salop)  Headley Hall (Yorks)  Llanhamlech (East Lothian)  Kinver (Worcs.)  Llanhamlech (Brecs.)  Morley (Norfolk)  Morley (Norfolk)  N.I.A.B., (Cambridge)  Nogal (2  Opal (2	Bemersyde (Perwicks) Cappell Hybrid Bwlch (Brecs.) Cappell Chester Cockle Park (North- umberland) Hybrid Desprez	,	
Maris er (3 91e, 1 9255, (1 925, (1 925, (1 925, (1 925, (1 93	MGH6264, Kolibri, Rothwell Sprite, Kloka, Opal, Margin, Heima- Desprez (FD2406), Clarion, Viking, Janus, Heines VII, Pompe (W9248) Cappelle Desprez, Cama, Hybrid 46 Belloy Champlein, Cappelle Desprez, Kloka, Hybrid 46 Cappelle Desprez, Kolibri Champlein (2), Opal, Champlein (2), Opal, Heines VII, Bon Fermier, Heines VII, Bon Fermier, Hubis, Persian, Chinese 166, Lucas, Cappelle Desprez, Harvest Offeen Hybrid 46 Cappelle Desprez 11 Joss Cambier Cappelle Desprez Joss Cambier Cappelle Desprez Hybrid 46 Cappelle Desprez 11 Joss Cambier Cappelle Desprez 12 Joss Cambier Cappelle Desprez 11 Joss Cambier Cappelle Desprez 12 Joss Cambier Cappelle Desprez 11 Joss Cambier Cappelle Desprez 12 Joss Cambier Cappelle Desprez 11 Joss Cambier Cappelle Desprez 12 Joss Cambier Cappelle Desprez 11 Joss Cambier Cappelle Desprez 12 Joss Cambier Cappelle Desprez 11 Joss Cambier Cappelle Desprez 12 Joss Cambier Cappelle Desprez 11 Joss Cambier 1	Cappelle Desprez, 2 Hybrid 46 2 Cappelle Desprez 1 Himalayan 1 Hybrid 46, Cappelle Desprez, Champlein, Troll, Cama (2),	lein lle	Source Variety Isolates

118	TOTAL	Processor and the special processor and the
224	Trou, Clarion	Yeovil (Somerset)
	Hybrid 46, Zorba (Engelen 565), Maris Beacon	
	Rothwell Sprite, Maris Ranger (2),	
	e Desprez	Wye (Kent)
	Pompe (W9248), Clarion	Winchester (Hants.)
•	Maris	Ħ
- N	Hybrid 46, Kloka Cappelle Desprez	Starcross (Devon)
No. of Isolates	Source Variety	Location

# 4. Race Identifications

Results for 1968 are not complete, although the majority of isolates have been tested and the race identified. Failure to complete the identification of the isolates is due to poor spore germination and infection, with the result that spore multiplication has been considerably hampered. Thus the quantities of spores produced have not been sufficient to inoculate the differential varieties. 20 isolates from 1968 failed to produce spores at the initial inoculation; there is no result for these isolates.

During 1968 89 isolates were suc and tested on differential varieties. identifications are shown in Table 6. successfully multiplied es. The results of

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انة. مانية	Honor of	orba(王	170	=	8/2
	`		7	==	8/2
	3/55	Maris Ranger	=	=	8/2
3/55	•	Hybrid 46	3	=	8/2
•	Failed	aris Rang	15	3	8/2
Failed	No result	Rothwell Sprite		22	1/8
-	3/5	Champlein	***	~4	8/1
	Ġ	aris Be		-0	1/8
	3/55	U	Wye	/6/68	68/16
	ct	Kloka	Starcross	5/6/68	8/1
		Joss Cambier	Kinver	=	8/1
	3/55	ello	Dorchester	28/5/68	8/1
	5	Opal	-	=	1/8
	60		=	3	8/1
		iticum vulgar		=	8
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	3/55	Chámolein	Abergavenny	/2/6	8
	Treboo	Variety	Location	Date	NO
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Date Location    Date Location   Cham   Cham   Cham   Salope,	## Race  ## Pariety  Adams   Variety  Adams   Champlein   Web Peculity  ## Peculity			1	1		
Date Location Variety    Continuation   Variety   Race	Adams Champlein Race  Adams Champlein Wariety  Adams Champlein Ware result  Adams Champlein Himaleyan  Adams Champlein Himaleyan  Fersian Cappelle Desprez  Appelle Desprez  App	اعملوه		Cama	<b>:</b>	end)	•
Date Location Variety    Date Location Variety   Race	Adams Champlein Cappelle Desprez Cappelle Cappelle Capelle Cappelle Capelle Cappelle Capelle Cappelle Capelle C		3/55	Troll	11	**	`
Date Location Variety  Date Location Variety  Date Location Variety  10/6/68 Harper Adams Champlein  10/6/68 M.1.4.B.  10/6/68 M.1.4.B.  10/6/68 Harder Adams Champlein  10/6/68 Harder Adams Champlein  10/6/68 Harder Adams Himalsyan  10/6/68 Haddey Hall Harvest Queen  10/6/68 Haddey Hall Persian  10/6/68 Dunnow Champlein Hot rested  10/6/68 Dunnow Champlein Desprez  10/6/68 Bounnow Champlein Desprez  10/6/68 Bounnow Cappelle Desprez  10/6/68 Haddey Fen Cappelle Desprez  10/6/68 Haddey Fen Cappelle Desprez  10/6/68 Harder Hot Harvest Queen  10/6/68 Harder Hot Hot Hot Hot Harvest Queen  10/6/68 Harder Hot Hot Harvest Queen  10/6/68 Harder Hot Hot Hot Hot Harvest Queen  10/6/68 Harder Hot Hot Hot Hot Hot Harvest Queen  10/6/68 Harder Hot	Adams Champlein  Alichigan Amber  Champlein  Cappelle Desprez  Cappelle Desprez  Aybrid 46  Cappelle Desprez  Hybrid 46  Cappelle Desprez  Adams Cappelle Desprez  Adams Cappelle Desprez  Aybrid 46  Cappelle Desprez  Cappelle Desprez  Aybrid 46  Cappelle Desprez  Cappelle Desprez  Aybrid 46  Cappelle Desprez  Cappelle Desprez  Apex  Apex  Apex  Falied		ス グ グ	bespre	<b>2</b>		· ·
Date Location Variety  Date Location Variety  Fig. 10/6/68 Harper Adams Champlein  10/6/68 Harper Adams Champlein  11/6/68 N. I.A.B.  11/6/68 Harper Adams Hanalayan  12/6/68 Bunmow Champlein  12/6/68 Bunmow Champlein  13/55  18/6/68 Bunmow Champlein  18/16/68 Bunmow Champlein  18/16/68 Bunmow Champlein  18/16/68 Bunmow Champlein  18/16/68 Bunmow Cappelle Desprez  18/16/68 Harper Adams Haris Widgeon  18/16/68 Harper Adams Harvest Queen  18/	Adams Champlein  Adams Amber  Champlein  Cappelle Desprez  Cappelle Desprez  Cappelle Desprez  Adams Bouquet (FDA.15)  Joss Cambier  Harvest Queen  Adams Cappelle Desprez  Cappelle Desprez  Boon Fermier  Adams Cappelle Desprez  Cappelle Desprez  Adams Cappelle Desprez  Cappelle Desprez  Adams Cappelle Desprez  Adams Cappelle Desprez  Adams Apex  Apex  Angex  Falco  Falco  Falco  Falco  Braco  Adams Cappelle Desprez  Adams Apex  Apex  Apex  Falco  Falco  Falco  Falco  Falco  Falco  Falled  Apollo  Joss Cambier  Advance (LAE 8/8)  Falled	and the second	3/55		Cockle Park	2/7/6	
Date Location Variety  Date Location Variety  [Newport, Salop:]  [1,76,68] M.I.A.B. [1,76,76] M.I.A.B. [1,76,76] M.I.A.B. [1,76,76] M.I.A.B. [1,76] M.I.A.	Adams Champlein  Adams Cappelle Desprez  Bouquet (FDA.15)  Joss Cambier  Adams Champlein  Adams Chamber  Adams Champlein  Ada	3/55	7.	Despre	Bridgets EHF	8/7/6	_
Date Location Variety    Date   Location   Variety   Race	Adams Champlein  rt,  pp.)  Nord Desprez  Adams Himaleyan  Hall Kloka  Gappelle Desprez  Cappelle Desprez  Maris Ranger  Hybrid 46  Colarion  Cappelle Desprez  Heines VII  Bon Fermier  Cappelle Desprez  Gapelle Desprez  Failed  Bracos  Cappelle Desprez  Gappelle Desprez  Gapelle Desprez  Failed  Joss Cambier  Cappelle Desprez  Gappelle Desprez  Failed  Failed  Failed  Joss Cambier  Advance (LAE  Apollo  Gapelle Syl  Failed	ar again ad filtera	~ ~	a canada	= :	= :	` '
Date Location Variety  Date Location Variety    10/6/68   Harper Adams   Champlein   Nord Desprez   3/55     11/6/68   Harper Adams   Champlein   Horsell     11/6/68   Harper Adams   Himself   Horsell     11/6/68   Harper Adams   Himself   Horsell     11/6/68   Hall   Frial   Ground   Harvert   Queen     11/6/68   Dunmow   Cappelle Desprez     11/6/68   Parrington   Harts Ranger     11/6/68   Parrington	ation Variety  Adams Champlein  rt, pp.)  Nord Desprez  Found Champlein  Hindsyan  Hindsyan  Hot tested  Champlein  Hot tested  Champlein  Rolibri  Holden  Rolibri  Gappelle Desprez  Hybrid 46  Cappelle Desprez  Hybrid 46  Ston Fermier  Clarion  Adams Champlein  Rolibri  Houquet (FDA. 15)  Fone  Fonge (W 9248)  Fones  Harvest Queen  Adams Cappelle Desprez  Joss Cambier  Adams Champlein  Adams Champlein  Fonge (W 9248)  Foron  Adams Cappelle Desprez  Joss Cambier  Adams Cappelle Desprez  Harvest Queen  Adams Cappelle Desprez  Gappelle Desprez  Harvest Queen  Apex  Gappelle Desprez  Gappelle Desprez  Harvest Queen  Apex  Gappelle Desprez  Gappelle Desprez  Gappelle Desprez  Gappelle Desprez  Harvest Queen  Apex  Gappelle Desprez  Gappelle Desprez  Gappelle Desprez  Gappelle Desprez  Failed  Gappelle Desprez  Go  Heines VII  Apex  Gappelle Desprez  Go  Go  Gappelle Desprez  Go  Heines VII  Apex  Go  Go  Frailed  Go  Frailed  Go  Frailed  Go  Frailed  Go  Advance (LAE 8/8)  Frailed  Go  Go  Go  Go  Go  Go  Go  Go  Go  G	Failed		West Desprez	P 147	e er	` `
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Date    Date   Location   Variety	Adams Champlein  Tet,  James Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Himalsyan  Y Hall Champlein  Kloka Fersian  Golibri  Cappelle Desprez  Hybrid 46  Waris Ranger  Hybrid Wolden  Fonder  Golibri  Fonder  Golibri  Fonder  Waris Ranger  Hybrid Wolden  Adams Champlein  Champlein  Champlein  Fonder  Golibri		60	Elite Lepeuple	=		`
Date Location Variety    Date   Location   Variety	Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Himaleyan  Adams Champlein  Adams Champlein  Himaleyan  Adams Champlein  Adams Cappelle Desprez  Aj55  Maris Widgeon  West Desprez  Aj55  Maris Ranger  Maris Ranger  Maris Ranger  Maris Ranger  Maris Ranger  Adams Champlein  Adams Champlein  Maris Persian  Chinese (W 9248)  Formic Chinese 166  Waris Desprez  Adams Opal  Helnes VII  Bon Fermier  Tadorna  Adams Cappelle Desprez  Jo55  Heines VII  Bon Fermier  Tadorna  Adams Cappelle Desprez  Jo55  Heines VII  Bon Fermier  Tadorna  Jo55  Maris Dove  Tadorna  Jo55  Jo56  Jo56  Jo57  Jo5	-	60	Joss Cambier	= 010	=	`
Date Location Variety    Date   Location   Variety	Adams Champlein  Himaleyan  Yeall Kloka  Persian  Gother Champlein  Mot tested  Adams Champlein  Harvest Queen  Colibri  Cappelle Desprez  Doss Camplei  Hybrid 46  Maris Widgeon  West Desprez  Hybrid 46  Maris Ranger  Hybrid 46  Fompe (W 9248)  Fompe (W 9248)  Forou  Chinese 166  Cappelle Desprez  Cappelle Desprez  Harvest Queen  Colibri  Fompe (W 9248)  Forou  Chinese 166  Cappelle Desprez  Cappelle Desprez  Harvest Queen  Chinese 166  Cappelle Desprez  Harvest Queen  Mot result  Adams Champlein  Forou  Forou  Chinese 166  Cappelle Desprez  Failed  Failed  Falco  Maris Dove  Bon Fermier  Tadorna  Falco  Maris Dove  Bon Soff  Maris Dove  Forou  Maris Dove  Forou  Maris Dove  Forou  Joss  Forou  Joss  Forou  Joss  Forou  Joss  Forou  Joss  Forou  Joss  Joss  Forou  Joss  Forou  Joss  Joss	****		e a a a a a a a a a a a a a a a a a a a	rial grounds	.,	
Date Location Variety    Date   Location   Variety	Adams Champlein  Himalpyan  Kloka  Geround Harvest Queen  Kolibri  Champleile Desprez  Champleile Desprez  Champleile Desprez  Cappelle Desprez  Apprid 46  Ground Heines VII  Bon Fermier  Chinese 166  Cucas  Cuppelle Desprez  Joss Cambis  Forou  Maris Ranger  Hybrid 46  Cuplelle Desprez  Joss Cambisr  Forou  Kloka  Heines VII  Bon Fermier  Chinese 166  Cucas  Cappelle Desprez  Joss  Apex  Falled  Falled  Falled  Falled  Falled  Cappelle Desprez  Joss  Gooppelle Desprez  Joss  Gooppelle Desprez  Joss  Falled  Falled  Falled  Falled  Falled  Falled  Cappelle Desprez  Joss  Gooppelle Desprez  Joss  Gooppelle Desprez  Joss  Falled		60		I.A.B.	17/6	8/70
Date Location Variety    Date   Location   Variety	Adams Champlein  Adams Champlein  Tt,  Sp.)  Nord Desprez  Ground Champlein  Adams Himaleyan  Y Hall Kloka  Fersian  Cappelle Desprez  Joss Cambier  Maris Widgeon  West Desprez  Bouquet (FDA.15)  Joss Cambier  Maris Ranger  Hybrid 46  Kolibri  Fompe (W 9248)  Fompe (W 9248)  Fompe (W 9248)  Fersian  Opal  Chinese 166  Harvest Queen  Adams  Champlein  Fersian  Opal  Chinese 166  Harvest Queen  Apex  Cappelle Desprez  Joss  Cappelle Desprez  Joss  Gappelle Desprez  Joss  Failed  Cappelle Desprez  Failed  Fail		3/55	e Despre	anhamlech	/7/6	8/69
Date Location Variety    Date   Location   Variety   Race	Adams Champlein  Adams Champlein  rt, ground Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Himalgyan  Kloka  Fersian  Goff mixed  Goff		3/55	e Despre	Brecs	-	œ.
Date Location Variety    Date   Location   Variety   Race	Adams Champlein  Adams Champlein  Tt,  pp.)  Nord Desprez  Ground Champlein  Adams Champlein  Fersian  Fersian  Goppelle Desprez  Cappelle Desprez  Cappelle Desprez  Cappelle Desprez  Cappelle Desprez  Cappelle Desprez  Gappelle Desprez  Gappelle Desprez  Joss Gambier  West Desprez  Bouquet (FDA. 15)  Joss Gambier  Maris Ranger  Hybrid 46  Fompe (W 9248)  Fompe (W 9248)  Fompe (W 9248)  Fersian  Chinese 166  Chinese 166  Chinese 166  Chinese 166  Chinese 166  Cappelle Desprez  Mo result  Clarion  Adams  Kiloka  Harvest Queen  Mo result  Gappelle Desprez  Joss  Goo  Failed  Failed  Failed  Failed  Failed  Failed  Failed  Failed  Failed		60	$\sim$	=	=	68/67
Date Location Variety    Date   Location   Variety   Race	Adams   Variety   Race    Adams   Champlein   We result    Adams   Champlein   We result    Adams   Champlein   Roce    Adams   Himaleyan   Roce    Adams   Himaleyan   Roce    Adams   Himaleyan   Roce    Adams   Himaleyan   Roce    Adams   Roce   Roce    Adams   Camplein   Roce    Adams   Cappelle Desprez    Bouquet   FDA. 15    Joss Cambler    Adams   Champlein    Adams   Champlein    Adams   Roce    Adams   R		3/55	Falco	77	=	$\infty$
Date Location Variety    Date   Location   Variety   Race	Adams Champlein  Adams Champlein  Tr,  pp.)  Nord Desprez  ground  Champlein  Himalgyan  Hall Kloka  Harvest Queen  Kolibri  Cappelle Desprez  Champlein  Cappelle Desprez  Hybrid 46  Maris Widgeon  Waris Widgeon  Waris Ranger  Hybrid 46  Fompe (W 9248)  Fompe (W 9248)  Fompe Rubis  Fompe Trou  Clarion  Adams  Chinese 166  Cappelle Desprez  Hybrid 46  Clarion  Adams  Charvest Queen  Adams  Cappelle Desprez  Joss Cambier  Fompe (W 9248)  Fompe (W 9248)  Fompe (W 9248)  Fompe Trou  Clarion  Adams  Clarion  Adams  Chample Desprez  Joss  Cappelle Desprez  Joss  Failed  Failed  Failed  Failed  Failed  Failed		60	Tadorna	eril eril	=	00.1
Date Location Variety    Date   Location   Variety   Race	Adams Champlein  Forsian  Golibri  Cappelle Desprez  Joss Cambier  West Despez  Bouquet (FDA.15)  Joss Cambier  Weris Ranger  Hybrid 46  Clarion  Clarion  Clarion  Chinese 166  Chinese 166  Chinese 166  Cappelle Desprez  Cappelle Desprez  Cappelle Desprez  Cappelle Desprez  Cappelle Desprez  Adams  Failed  Failed  Failed  Failed		3/55	nie	<b>3</b>	<b>S</b>	$\infty$
Date Location Variety  Face Date Date Desprez  J/56/68 N.I.A.B.  Face Damper Adams Champlein  Harvest Queen Good Champlein  Harvest Queen Good Champlein  Harvest Queen Good Champlein  Harvest Queen Good Champlein  Face Dambow Cappelle Desprez  J/55  Phybrid 46  Face Damiow Cappelle Desprez  J/55  J/7/68 Morley Face Hybrid 46  J/7/68 Terrington Face Cappelle Desprez  J/55  J/7/68 Morley Face Cappelle Desprez  J/55  J/7/68 Morley Face Cappelle Desprez  J/55  J/7/68 Harper Adams Cappelle Desprez  J/55  J/56  J/7/68 Harper Adams Cappelle Despre	Adams Champlein  Adams Champlein  rt, opp.) Nord Desprez  ground Adams Himaleyan Himaleyan Harvest Queen Rollibri Champlein Champlein Cappelle Desprez Maris Widgeon West Desprez Hybrid 46 Kolibri Clarion Chinese (W 9248) Heines VII Heines VII Chinese 166 Chinese 1				rial gr	1)	
Bource of Isolate  Date  Location  Variety  7 11/6/68 Harper Adams  10/6/68 Harper Adams  10/6/68 Harper Adams  11/6/68 N.I.A.B.  Trial ground  11/6/68 Dunmow  11/6/68 Dunmow  11/6/68 Dunmow  11/6/68 Dunmow  11/6/68 Harper Adams  12/6/68 Dunmow  12/6/68 Dunmow  13/55  14/6/68 Dunmow  15/5/68 Harper Adams  1600  17/6/68 Harper Adams  18/6/68 Dunmow	Adams   Champlein   Race   Adams   Champlein   Race   Persian   Race   Adams   Champlein   Re result   Adams   Champlein   Re result   Adams   Himaleyan   Re result   Adams   Himaleyan   Re result   Adams   Himaleyan   Re result   Adams   Harvest Queen   Rolibri   Rolibri   Cappelle Desprez   A/55   Maris Widgeon   Rest Desprez   Cappelle Desprez   A/55   Maris Widgeon   Rest Desprez   Maris Ranger   Hybrid 46   Rolibri   Gappelle Desprez   A/55   Frou   Pompe (W 9248)   Rubis   Persian   Opal   Heines VII   Bon Fermier   Rubis   Persian   Cappelle Desprez	-	60	Lucas	IA	15/7/6	68/63
Date Location Variety    Date   Location   Variety	Adams   Champlein   Race   Adams   Champlein   We result   Persian   Champlein   We result   Adams   Champlein   Himalgyan   Adams   Himalgyan   He result   Adams   Himalgyan   He result   Fersian   Himalgyan   Fersian   He result   Fersian   Fersian   He result   Fersian   Fersian   He result   Fersian   F			,	$\vdash$	10/7/6	68/62
Date Location Variety    Date   Location   Variety	Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Himalgyan  Y Hall Kloka  Bround  Harvest Queen  Kolibri  Cappelle Desprez  Joss Cambier  Hybrid 46  Kolibri  Fompe (W 9248)  Fompe (W 9248)  Heines VII  Adams Opal  Chinese 166  Lucas  Cappelle Desprez  Joss Cambier  Rubis  Fersian  Adams Opal  Chinese 166  Lucas  Cappelle Desprez  Joss	-		elle Despre	Aldeburgh	**	68/61
Date Location Variety    Date   Location   Variety   Race	Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Adams Himalsyan  Fersian  Word Desprez  3/55  Ghamplein  Adams Champlein  Adams Champlein  Adams Cappelle Desprez  Bouquet (FDA.15)  Joss Cambier  Waris Ranger  Hybrid 46  Kolibri  Fompe (W 9248)  Fompe (W 9248)  Fompe Clarion  Adams Clarion  Adams Chinese 166  Rubis  Cappelle Desprez  J/55  Good  Fersian  Chinese 166  Chinese 166  Chinese 166  Rubis  Cappelle Desprez  J/55  Good  Adams Champleile Desprez  J/55  Good  Adams Champlein  Race  Race  Roceult  Colarion  Adams Combier  J/55  J		3/55	d L	₹,	47	68/60
Date Location Variety    Date   Location   Variety	Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Adams Himalsyan  Adams Himalsyan  Fersian  Champlein  Kloka  Fersian  Coppelle Desprez  Cappelle Desprez  Bouquet (FDA.15)  Joss Cambier  Waris Ranger  Maris Ranger  Maris Ranger  Frou  Fompe (W 9248)  Heines VII  Bon Fermier  Chinese 166  Cappelle Desprez  3/55  Go  Fompe (W 9248)  Mo result  Clarion  Adams Opal  Chinese 166  Cappelle Desprez  3/55  3/55  Cappelle Desprez  3/55  3/55  Cappelle Desprez  3/55		3/55	ξD	rayt	=	68/59
Date Location Variety    Date   Location   Variety	Adams Champlein  Adams Cappelle Desprez  Cappelle Desprez  Cappelle Desprez  Cappelle Desprez  Cappelle Desprez  Adams Cambier  Bouquet (FDA.15)  Joss Cambier  Bouquet (FDA.15)  Joss Cambier  Adams Clarion  Adams Opal  Fennes VII  Heines VII  Heines VII  Bon Fermier  Clarios  Adams Cappelle Desprez  Joss  Adams Opal  Chiness 166  Cappelle Desprez  Joss  Joss  Adams Opal  Chiness 166  Joss  J		.60	st Quee	77	=	68/57
Date Location Variety  Date Location Variety  6 10/6/68 Harper Adams Champlein  Salop.)  7 11/6/68 N.I.A.B. Salop.)  7 11/6/68 N.I.A.B. Salop.)  7 11/6/68 N.I.A.B. Salop.)  Nord Desprez  3/55 17/6/68 Harper Adams Himalsyan  1 17/6/68 Harper Adams Himalsyan  1 17/6/68 Harper Adams Himalsyan  2 17/6/68 Harper Adams Harvest Queen  6 0  7 17/6/68 Dunmow Cappelle Desprez  5 18/6/68 Dunmow Cappelle Desprez  6 18/6/68 Harlendony Fen Cappelle Desprez  7 19/6/68 Harlendony Fen Cappelle Desprez  8 24/6/68 Spaxton  1 1	Adams Champlein  Adams Champlein  Yeriety  Adams Champlein  Champlein  Rolibri  Rolibri  Cappelle Desprez  Cap		3/55	lle Despre	***	11	68/56
Date Location Variety    Date   Location   Variety	rce of Isolate  ation  Variety  Adams  Champlein  Champlein  Rolibri  Michigan Amber  Champlein  Cappelle Desprez  Adams  Maris Widgeon  West Desprez  Bouquet (FDA.15)  Joss Cambier  Maris Ranger  Maris Range		3/55	Lucas	99	•	68/55
Date Location Variety    Date   Location   Variety   Race	Adams Champlein  Adams Champlein  Pert,  Sp.)  Nord Desprez  Ground  Adams Champlein  Adams Champlein  Adams Champlein  Himalsyan  Fersian  Fersian  Folibri  Cappelle Desprez  Cappelle Desprez		,60	se 16	17	?	68/54
Source of Isolate  Date  Date  Date  Location  Variety  Salop.)  7 11/6/68 Harper Adams  Champlein  Salop.)  Nord Desprez  Josephan  Champlein  Horeadley Hall  Champlein  Horeadley Hall  Fersian  Trial ground  Champlein  Horeadley Hall  Fersian  Trial ground  Harvest Queen  60  Trial ground  Harvest Queen  60  Champlein  Coappelle Desprez  Josephan  Rolibri  Cappelle Desprez  Josephan  Cappelle Desprez  Josephan  Maris Widgeon  Maris Widgeon  Horeadley  Horeadley  Harvest Queen  60  Rolibri  Cappelle Desprez  Josephan  Cappelle Desprez  Josephan  Maris Widgeon  Horeadley  Hore	Adams Champlein  Adams Champlein  Pert,  Adams Champlein  Fersian  Fersian  Foroin  Champlein  Champlein  Coappelle Desprez  Cappelle Desprez  Ca		3/55	ian	17	11	68/53
Source of Isolate  Date  Date  Date  Location  Variety  V	Adams Champlein  Fersian  Fersian  Fersian  Colibri  Cappelle Desprez  Ca	- 1400	.00	ე.	11	ā3	68/52
Date Location Variety    Date   Location   Variety	Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Himalgyan  Y Hall Kloka  Persian  Colibri  Cappelle Desprez  Joss Cambier  West Desprez  Bouquet (FDA.15)  Joss Cambier  Waris Ranger  Joss Cambier  Waris Ranger  Joss Cambier  Waris Ranger  Joss Cambier		3/55	ermie	77	3	68/51
Date Location Variety    Date   Location   Variety	Adams   Champlein   Nord Desprez   3/55    ground   Champlein   Not besult    Adams   Champlein   Not besult    Adams   Champlein   Not besult    Adams   Champlein   Not bested    Adams   Champlein   Not bested    Yersian   Amber   Coppelle Desprez    Cappelle Desprez   3/55    Cappelle Des		60	rn .	918	=:	00/50 00/50
Date Location Variety    Date   Location   Variety	Adams   Champlein   Ho result    Adams   Champlein   Ho result    Poppo   Nord Desprez   3/55    ground   Champlein   Ho result    Adams   Himaleyan   Ho result    Adams   Champlein   Ho result    Adams   Adams   Adams    Adams   Champlein   Ho result    Adams   Adams   Adams    Adams   Adams    Adams   Adams   Adams    Adams   Adams   Adams    Adams   Adams   Adams    Adams   Adams   Adams    Adams   Adams   Adams    Adams   Adams    Adams   Adams   Adams    Adams   Adams   Adams    Adams   Adams   Adams    Adams   Adams   Adams    Adams   Adams   Adams    Adams   Adams   Adams    Adams   Adams   Adams    Adams   Adams   Adams    Adams   Adams   Adams    Adams   Adams    Adams   Adams   Adams    Adams			- (	בת קיקי	7/1/7	201/20 201/00
Date Location Variety  Date Location Variety    Date Location Variety   Race	Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Himaleyan  Y Hall Kloka  Bersian  Ground Harvest Queen  (Kolibri  Cappelle Desprez  Cappelle Desprez  Cappelle Desprez  Cappelle Desprez  Bouquet (FDA.15)  Joss Cambier  Maris Ranger  Hybrid 46  Moris Ranger  Maris Ranger  Hybrid 46  Kolibri  Bouquet (FDA.15)  Joss Cambier  Maris Ranger  Hybrid 46  Kolibri  Fompe (W 9248)  Na ranit	Failed		J,	Veovil	7/1/0	00/ 40
Date Location Variety  Date Location Variety  10/6/68 Harper Adams (Newport, Salop.)  7 11/6/68 N.I.A.B.  10/6/68 Harper Adams (Champlein Himalgyan Himalgyan Kloka Headley Hall Kloka Himalgyan Him	Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  Adams Himaleyan  Y Hall Kloka B. Persian  Ground Harvest Queen  Kolibri  Cappelle Desprez  Cappelle Desprez  Cappelle Desprez  Cappelle Desprez  Cappelle Desprez  Bouquet (FDA. 15)  Joss Cambier  Waris Ranger  Hybrid 46  Kolibri  Kolibri  Koss Cambier  Forma (W 2018)  Race	T E	Ţ	(	Woomin	7/1/0	7 / 00/ 4/
Date Location Variety  Date Location Variety  10/6/68 Harper Adams (Newport, Salop.)  7 11/6/68 N.I.A.B.  10/6/68 Headley Hall Finalgyan Himalgyan Kloka Chester Kloka Trial ground Harvest Queen 60 17/6/68 Dunmow Cappelle Desprez 3/55  1 18/6/68 Dunmow Cappelle Desprez 3/55  1 18/6/68 Sparton Maris Widgeon West Desprez 3/55  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Adams Champlein  Fersian  Fersian  Ground Harvest Queen  Kolibri  Michigan Amber  Champlein  Cappelle Desprez  Cappelle Desprez  Cappelle Desprez  Cappelle Desprez  Cappelle Desprez  Cappelle Desprez  Adams  Joss Cambier  West Desprez  Bouquet (FDA. 15)  Joss Cambier  Hybrid 46  Maris Ranger  Action  Race  R				1910	7/4/7	047/00
Date Location Variety    Date   Location   Variety	Adams Champlein  Adams Himalsyan  Y Hall Kloka  Bound Harvest Queen  Kolibri  Michigan Amber  Champlein  Cappelle Desprez  Adams  Bouquet (FDA. 15)  Joss Cambier  Waris Ranger  Adams  Ale result  60  60  3/55  3/55  Joss Cambier  Waris Ranger  3/55  Varia Ranger  3/55			TO TING	; } <b>+</b>	1 / 1 / 1	62/t5
Date Location Variety    Date   Location   Variety	Adams   Variety  Adams   Champlein   He result    Adams   Champlein   He result    Adams   Champlein   He result    Adams   Champlein   Himalsyan    Y Hall   Kloka   Persian    ground   Harvest Queen    Kolibri   Michigan Amber    Champlein   Cappelle Desprez    Cappelle Desprez   3/55    Cappelle Desprez   3/55    Hybrid 46    Maris Widgeon   He result    Mot tested    3/55    3/55    Maris Cambier   3/55    Joss Cambier   3/55    Joss Cambier   3/55    3/55    Joss Cambier   3/55    3/55    Joss Cambier   3/55    Joss Ca		ル <u>ノ</u> ハ スフ スフ	ייע בייזיאס		2 :	100/E
Date Location Variety    Date   Location   Variety	Adams   Champlein   He result   Adams   Champlein   He result   Adams   Champlein   He result   Adams   Champlein   Himalsyan   Y Hall   Kloka   Persian   Bround   Harvest Queen   Kolibri   Michigan Amber   Champlein   Cappelle Desprez   Cappelle Desprez   Cappelle Desprez   3/55   Hybrid 46   Bouquet (FDA. 15)   3/55   Bouquet (FDA. 15)   3/55   Toggrafic   Himalsyan   He result   He re		и <b>ў</b> Л.С.			· ·	74/00/45
Date Location Variety    Date   Location   Variety	Adams   Champlein   Race   Adams   Champlein   Ho result   Adams   Champlein   Ho result   Adams   Champlein   Ho result   Adams   Champlein   Himalsyan   Y Hall   Kloka   Persian   Ground   Harvest Queen   Kolibri   Michigan Amber   Champlein   Cappelle Desprez   Cappelle Desprez   3/55   Hybrid 46   Maris Widgeon   Hor result   Maris Widgeon   Maris Widgeon   Hor result   Maris Widgeon   Amor result   Maris Widgeon   Hor result   Maris Widgeon		<b>1</b> (1) (1) (1) (1) (1) (1)	Cambier Estati	=	\$ 7	71/07
Date Location Variety    Date   Location   Variety	Adams   Champlein   Race    Adams   Champlein   Me result    Adams   Champlein   Me result    Adams   Champlein   Himalsyan    Y Hall   Kloka   Persian   Not tested    Scound   Harvest Queen   60    Kolibri   Michigan Amber   60    Champlein   Cappelle Desprez   3/55    Cappelle Desprez   3/55    Cappelle Desprez   3/55    Maris Widgeon   Me result    Not tested   3/55    Adams   Cappelle Desprez   3/55    Maris Widgeon   Me result    Not tested   3/55    Not tested   3/	i	ス <u>ト</u> の5			-0 B	11/89
Date Location Variety    Date   Location   Variety   Race	rce of Isolate  ation  Variety  Adams  Champlein  Adams  Champlein  Adams  Champlein  Himaleyan  Fersian  Fersian  Rolibri  Colppelle Desprez  Cappelle Desprez	Failed	יני /ני	Maris widgeon	=======================================	9 4	04/89
Date Location Variety  6 10/6/68 Harper Adams Champlein  7 11/6/68 N.I.A.B.  Trial ground 10/6/68 Headley Hall Kloka 11/6/68 N.I.A.B. Trial ground 11/6/68 M.I.A.B. 17/6/68 Headley Hall Kloka 11/6/68 M.I.A.B. Trial ground 2 17/6/68 M.I.A.B. 17/6/68 M.I.A.B. Trial ground 2 17/6/68 Harper Adams Cappelle Desprez 3/55 18/6/68 Dunmow Cappelle Desprez 3/55 3/55 3/55 3/55 3/55	Adams   Champlein   Pace   Adams   Champlein   Persult   Adams   Champlein   Persult   Adams   Champlein   Persian   Y Hall   Kloka   Persian   Ground   Harvest Queen   Kolibri   Michigan Amber   Champlein   Cappelle Desprez   Cappelle Desprez   3/55		2/50	Hybrid 46		: =	68/39
Date Location Variety  6 10/6/68 Harper Adams Champlein (Newport, Salop.)  7 11/6/68 N.I.A.B. Nord Desprez 3/55  8 10/6/68 Harper Adams Champlein Himalsyan Champlein Himalsyan 5/55  17/6/68 Headley Hall Kloka N.I.A.B. Persian Trial ground Harvest Queen 5 18/6/68 Dunmow Cappelle Desprez 3/55  18/6/68 Dunmow Cappelle Desprez 3/55  7 19/6/68 Halconby Fen Cappelle Desprez 3/55	Adams   Champlein   Race  Adams   Champlein   Me result  rt, pp.)   Nord Desprez   3/55  ground   Champlein   He result  Adams   Himalsyan   Hot tested  y Hall   Kloka   Persian   Hervest Queen    ground   Kolibri   Michigan Amber   Champlein   Cappelle Desprez   3/55  Ocappelle Desprez   3/55		10/00	Õ		4/6/68	8
Date Location Variety    Date Location Variety   Race	Adams   Champlein   Race  Adams   Champlein   Me result  pp.)   Nord Desprez   3/55  ground   Champlein   Himalsyan   Himalsyan   Himalsyan   Hot tested   3,55   Fersian   Harvest Queen   60    ground   Kolibri   Michigan Amber   5/55   Champlein   Champlein   60   Champlein   Champlein   60		2/25	Ø	Fen	9/6/68	37
Date Location Variety    Date Location Variety   Race	Adams   Champlein   Ho result    Adams   Champlein   Ho result    rt, op.)   Nord Desprez   3/55    ground   Champlein   Hot tested    Adams   Champlein   Hot tested    y Hall   Kloka   Persian    ground   Harvest Queen   60    Kolibri   Michigan Amber   3/55    Other   Champlein   Mot tested    Chample		5/55	espre)	Dunmo₩	8/6/68	9
Date Location Variety    Date Location Variety   Race	rce of Isolate  Adams   Variety  Adams   Champlein   Ho result    rt,  pp.)   Nord Desprez   3/55  ground   Champlein   Himalsyan    y Hall   Kloka   Persian    ground   Harvest Queen   Kolibri    Michigan Amber   3/55	Failed	, <del>teste</del>	٢	Dunmow	8/6/68	ω'n.
Date Location Variety    Date Location Variety   Race	rce of Isolate  ation Variety  Adams Champlein  rt, pp.) Nord Desprez  ground Adams Champlein  Himalsyan y Hall Kloka 3,55 Bround Kloka Ground Harvest Queen Kolibri  Race  Race  Race  Race  Race  Race  Race  Race  Result 60+? mixed 60	:	3/55	Ambe		7/6/6	٦, ر ا
Date Location Variety    10/6/68   Harper Adams   Champlein   He result	rce of Isolate  Adams   Variety  Adams   Champlein   Mo result    rt,  pp.)   Nord Desprez   3/55  ground   Adams   Champlein   Mo result    Adams   Champlein   Mo result    Adams   Himalsyan   Mot tested    y Hall   Kloka   3/55    ground   Harvest Queen   60		60		=	7/6/6	) K 1 K
Date Location Variety    Date Location Variety   Race	Adams   Champlein   Ho result    Adams   Champlein   Ho result    S.		60	rvest Quee	():  -	7/6/68	Ŋ
Date Location Variety    Date Location Variety   Race	Adams Champlein  Adams Champlein  Adams Champlein  Adams Champlein  The population Adams Champlein		1	C F	3 0	1/0/00	16/0
Date Location Variety    Date Location Variety   Race	Adams Champlein Adams Word Desprez  ground Adams Champlein  Himalsyan  Z/ES		mi xe	2 0 2	у нат	1/6/68	0/30
Date Location Variety  6 10/6/68 Harper Adams Champlein  7 11/6/68 N.I.A.B.  10/6/68 Harper Adams Champlein  8 10/6/68 Harper Adams Champlein  We result  10/6/68 N.I.A.B.	Adams   Champlein   Ho result    Spool   Nord Desprez   3/55    Adams   Champlein   Ho result    Adams   Champlein   Nord Desprez   3/55    Adams   Champlein   No result    Adams   Champlein   No re	Take	7 5 6 C C	amr Smr	רו ק	2/6/68	8/29
Source of Isolate  Pate Location Variety  6 10/6/68 Harper Adams Champlein  (Newport, Salop.)  7 11/6/68 N.I.A.B. Nord Desprez  3/55	Adams   Champlein   Word Desprez   3/55	Tollar L	e <del>gult</del>	han	Harper Adams	0/6/68	Φ
Source of Isolate    Date   Location   Variety	Source of Isolate  Race  Location Variety  per Adams Champlein  wport, Salop.)  A R	-	,	\$ \$ \$ \$ \$ \$	Trial ground	1/ 0/	17 /0
Date Location Variety  6 10/6/68 Harper Adams Champlein  No result of Isolate  Race	Source of Isolate  Race  Location Variety  per Adams Champlein  Wport,		\	ord Despre	T A B	27/2/5	7
Source of Isolate    Date   Location   Variety	Source of Isolate  Location Variety  Per Adams Champlein  Race			agains a	ftrodw,		
Source of Isolate Rac  Date Location Variety	ource of Isolate  Rac cation Variety	failed	result	<b>  -</b>	arper	0/6/68	0
Source of Isolate Rac	ource of Isolate Rac			ariet	catio	at	<b></b>
Source of Isolat	ource of Isolat		Race				NO
)			det total	solat	ource of		NIAB

20000000000000000000000000000000000000		NIAB
28/7/68 28/7/68 28/7/68 28/7/68 29/7/68	Date	
Cockle Park  """"  """"  """"  """"  """"  Boghall  N. Belton  """  """  Bemerwick  Terrington  """  """  Bemersyde  """  Cotton  Glencarse  Balmirner  North Murie  Balmirner  Cockle Park  """  Edinburgh  Cotton  """"	Location	Source of :
MGH. 6264 Kolibri Rothwell Sprite Rloka Maris Settler (TB396/37) Opal Margin Heima-Desprez (FD2406) Clarion Pompe (W9248) Viking Cappelle Desprez Rloka Hybrid 46 Maris Butler Pompe (W9248) Clarion Cappelle Desprez Fybrid 46 Cappelle Desprez Apex Cappelle Desprez Champlein Mildress Cama Janus Heines VII Kolibri Cama	$\cdot$ $\mid$ $\leq$	Isolate
##NO		Race
Feited Seited	-	

#### 5 Summary

Table 7 shows during 1968. the number 3 0£ races and isolates identified

### Table 7

	118	TOTAL
£ 5	, 20 & 0	No result Not tested
	F	Mixed
	23	7.00 1.00
	57	3/55 34
11: 33-7	No. of Isolates	Race

Race 3/55 was the most frequent race identified from the 1968 isolates. There are, however, variations in reaction on the differential varieties, between isolates of race 3/55 and the race could perhaps be considered as a race group consisting of a number of biotypes, which exhibit variable pathogenicity on varieties in the field. Race 60, frequently identified since 1966, was identified relatively few times from the 1968 isolates e.g. - 23% c isolates tested in 1968 cf 40% in 1969. identified .g. - 23% of

Many 0 commercial wheat varieties isolates identified as ny of these samples were collected from varieties adjacent plants artificially inoculated with race 60. A number of plants also came from yellow rust nurseries which contain rieties very susceptible to race 60. Very few isolates entified as race 60 were collected from naturally infected varieties.

wheat varieties resistant to race 60. Also, Joss Cambier and Elite Lepeuple which are Recommended List varieties susceptible to race 60 have very good field resistance to yellow rust. An interesting development in the yellow rust race spectrum is the appearance of a physiologic race giving reactions similar to race 58. Race 58 was previously identified in the glasshouse in 1960 (Mader - 1967. Trans. Brit. Mycol. Soc. 50(2) 305-310) and had not been recorded in the field. Results indicate that the isolates obtained in 1968 and provisionally identified as race '58' gave reactions on the differential varieties slightly different from those obtained by Macer. Because of these variations the 1968 isolates may be a new physiologic race. Samples have been sent to Dr. Eva Fuchs at theBiologisch&undesanstalt für Land-und Forstwirtschaft, Braunschweig, Germany, for confirmation. perhaps wheat ve ps be attributed varieties resis number Of, to the isolates increase in acreage identified as 0 winter 60 could

indicate that the race is capable Thus of the 118 isolates received 60 and '58' were identified. No: wheat plants are in progress, indicate that the race is can recorded. race Tests or race цo the **,** 48 virulenceof this two races which were previously frequently and provisional isolates were of infecting many during 1968 only : race on seedling and adult sional seedling tests only races identified varieties. races 3/55,

### Mildress

in variety trials in S.E. Scotland. Examination of these isolates have now been completed. The isolate has been tested on Mildress, screened through differential varieties and repeatedly tested on differential varieties. In all instances the race has been identified as race 60. It was therefore concluded that the Mildress isolates were race 60, and that under certain conditions, possibly involving cool temperatures adult Mildress plants could become infected with yellow rust. 1967 Low levels Of. yellow rust were recorded on Mildress

# Yellow rust - barley. National Institute of Agricultural Botany,

### Cambridge.

### N.H. Chamberlain

1. A total of 49 samples of barley yellow rust was received by the N.I.A.B. from the following varieties.

# 2. Varieties from which isolates were received.

Winter barley varieties are shown in Table 8 spring barley varieties in Table 9.

#### Table 8

11	TOTAL
	Leon
2	Maris Otter
N	Dura
72	Dea
4	Malta
No. of Isclates	Winter barley

TOTAL	· · · 1 each	Zephyr, Abed, 416	Tellus, Vada,	Mosane, Swallow,	Maris Druid,	Isola, Julia,	Gerkra, Impala,	Delisa, Europa,	Maris Concord,	CIV.490/4, Ciro,	Cambrinus,	Inis	Akka	Felda (Schweiger 755/63)	Sultan	Proctor	Deba Abed	Tern	Spring barley
38	17	-										2	2	N	3		4	<b>ত</b>	No. of Isolates

# Ÿ Locations from which the barley yellow rust isolates were collected.

The isolates were received from 13 localities in the British Isles and the source of each isolate is shown in Table 10.

### Table 10

1

### 4. Race identification

Many isolates failed to infect susceptible plants to produce spores for inoculation onto differential varieties. Of the 49 isolates sent to M.I.A.B. only 23 were successfully inoculated. Spore multiplication of these isolates however has been difficult and so far few isolates have been tested on differential varieties. The results obtained are shown in Table 11.

24	Felda (Schweiger	3		D/00/79
	Gerkra	KTE FRIK	70 /0 /1	B/68/Z0
	, t		2/8/68	B/68/38
	Ma] ta		-	B/68/37
Not tested	Ciro	East Craigs	31/7/68	B/68/36
24	Inis	=	77	B/68/35
Not tested	Tern	Loughgall	30/7/68	B/68/34
24	C.I.V.490/4	3	` =	В/68/33
24	Cambrinus	=	=	B/68/32
24	Concord		en en	В/68/31
24	Europa	2	P3	B/68/30
Not tested	Tellus	=	=	B/68/29
24	Mosane	=	3	B/68/28
24?	Zephyr	<b>3</b>	2	B/68/27
	Tern	2	=	B/68/26
No result	Proctor	<b>3</b>	=	B/68/25
24	Julia	2	28	B/68/24
24	Dea	H	=	B/68/23
24.9	Deba Abed	=	73	B/68/22
24	Impala	Cockle Park	22/7/68	B/68/21
Not tested	Inis	2	3	B/68/20
12	Sultan	Cockle Park	22/7/68	В/68/19
No result	Swallow	Bridgets E.H.F.	18/7/68	B/68/18
24?	Deba Abed	Flintshire	16/7/68	B/68/17
No result	Dura	=	10/6/68	B/68/16
24	Malta	Dunnow	18/6/68	B/68/15
No result	Tern	Wye	13/6/68	B/68/14
Not tested	Abed 416	3	=	B/68/13
24	Delisa	=	=	в/:68/12
3	Isola	=	æ	B/68/11
3	Deba Abed	=	12	B/68/10
2	Maris Druid	=	=	B/68/9
ACI -	Maris Otter	Chester	12/6/68	B/68/8
2	Leon	:: ::	3	B/68/7
No result	Malta	=	3	B/68/6
Not tested	Dura	11	=	B/68/5
mg mg	Maris Otter	11	3	B/68/4
ers had been	Dea	Harper Adgns	3	B/68/3
No result	Akka	NIAB Trial Grounds	10/6/68	B/68/2
23	Malta	Harper Adans	20/4/68	B/68/1
касе	Variety	Location	Date	- 11 C
d ) )	ite	Source of Isolate		NTAB No.

Table 11 (contd.

2	Maris Otter	Wayland	.· ¥	B/68/53
Brown Rust	$Z$ ephy $oldsymbol{r}$	West Mersea	4/12/68	B/68/52
3	Proctor	2	2	B/68/51
##	Akka	2	2	в/68/50
=	Deba Abed	**	=	B/68/49
=	Tern	=	=	B/68/48
No result	Sultan	Tulloch Gribben	14/8/68	B/68/47
Brown Rust				B/68/46
Brown Rust				B/68/45
:	755/63)	# # # # # # # # # # # # # # # # # # #	1	
=	Polde (Schuroi con	Fidinbursh	12/8/68	B/68/44
=	Sultan	Linlithgow	6/8/68	B/68/43
=	Tern	11	29	B/68/42
FO 49	Proctor	=	=	B/68/41
No result	Vada	Bast Craigs	5/8/68	B/68/40
касе	Variety	Location	Date	0 NT (TREETER
j	olate	Source of Isolate		NTAR NO

### 5. Summary

race 24, only the first isolate received was identified as race 23. The prevalence of race 24 could perhaps be explained by the fact that the majority of barley varieties are susceptible to varying degrees to this race. It is difficult to speculate on the barley yellow rust spectrum in Britain because of the few results obtained. One of the main restrictions of race identification is the lack of a good set of differential barley varieties capable of separating the races effectively. Some barley varieties are resistant to race 23 and susceptible to race 24 but varieties are susceptible to race 23 and resistant to race 24. Few varieties are resistant to both races. Therefore a large number of varieties are being examined to obtain a set of differential varieties capable of differentiating between the known races, and also any new races which may arise in future years should new varieties resistant to The majority of barley isolates successfully tested were identified as

# Brown rust - barley - Welsh Plant Breeding Station. Aberystwyth.

### B. Clifford

- 40 isolates of barley brown rust were received by W.P.B.S. during 1968 from the following varieties. the
- $\sim$ Winter barley Varieties barley varieties are shown varieties in Table 13. from which nword rust isolates were in Table <u>2</u> spring collected

### Table 12

5	TOTAL
	Pella
_\	Maris Otter
_\	Dea
_\	Dura
	Malta
No. of Isolates	Winter Barley

### Table 13

35	TOTAL
13	1 each
	Lofa Abed (Abed 0317) Imber (G 136/22)
	Maris Canon(HB 380/22)
	Druid, Ciro, Akka,
	Vada, Maris Badger CIV.136/22, Maris
	Tern, CIV.490/4
2	Midas (117/10/2)
N	Inis
+	Deba Abed
4	Impala
Vī	Sultan
5	Proctor
No. of Isolates	Spring Barley

3. Locations from which the barley brown rust were collected. isolates

The isolates were British Isles, and the was collected, and the is shown in Table 14. received from 9 locations location from which each variety from which it was from which each : from which it was is in the isolate collected,

40	TOTAL	
Uī	Malta, Pella, Dura, Dea, Maris Otter.	Zeals (Wilts)
	Maris Concord	W.P.B.S. (Aberystwyth)
	Sultan	Renfrewshire
J.	Proctor, HB.380/22, CIV.490/4, Midas(117/10/2)(2), Deba Abed(2), Vada, Inis, Maris Badger, Impala, CIV. 136/22, Lofa Abed (Abed 0317), Imber (G.136/22), Maris Druid	N.I.A.B. (Cambridge)
_	Sultan	Linlithgow (W. Lothian)
لات	Ciro, Akka, Proctor(2) Impala	East Craigs (Edinburgh)
_	Sultan	Dunbar (E.Lothian)
0,	Deba Abed, Proctor, Sultan, Impala, Tern, Inis	Cockle Park (Northumberland)
ហ	Proctor, Julia, Impala, Sultan, Deba Abed	Beverley (E.Yorks)
No. of Isolates	Source Variety	Location

# 4. Race Identification

Of the 40 isolates received, 20 were successfully cultured and identified. The 11 differential varieties employed for race determination consisted of 6 of the 9 North American differentials and 5 "supplemental" varieties selected because of their importance in European breeding programmes. It is felt that this set will allow reference to North American race groups but will also be more meaning-ful to European research workers and breeders.

Reaction types used are as follows

W	N	<b>د</b>	ಡ೦	0 <b>c</b>	01
ı	ì	i	1	ı	ı
Small pustule surrounded by chlorosis	Larger pustule surrounded by necrosis	Small pustule surrounded by necrosis	Necrotic fleck	Chlorotic fleck	Immune

7

Large

pustules

with little

or no

chlorosis

were condensed into 3 classes To obtain major race groupings these categories

Susceptible (S)	Intermediate (I)	Resistant (R)			
ı	ì	1			
3, 4	2+ <b>,</b> 3-	0, 1, 2			

The intermediate class was non critical in race determination.

Detailed results of race identification are given in Tables 15 & 16.

Table 15

004 8664 877	このことできるよう	v 28 7	20 0700 0000	22008	1 000 1 000	113	111 210987	ろいせる	BRS-68-1 2	Isolate No.
9/8 29/7 18/9	5/8 22/7	31/7				30/7	6/8	22/7	25/6	Date
Dunbar Renfrewshire W.P.B.S. Aberystwyth	Beverley(Yorks)	East Craigs (Edinburgh)				(W.Lothian) N.I.A.B.Trial grounds Cambridge	Linlithgow	Cockle Park	Zeals(Wilts)	Location
bed Concord	Proctor Proctor Impala Proctor Julia Impala Sultan	Imber (G 136/22) Ciro	Impala CIV 136/22 Lofa Abed (Abed 0317) Maris Druid	(117/10/2) Deba Abed Vada Inis Maris Badger	CIV 490/4 Midas (117/10/2)	Proctor Maris Canon (HB 38/22)	Proctor Sultan Impala Tern Inis Sultan	Dura Dea Maris Otter Deba Abed	Walta Fella	Variety
 No result		No result	C A D E No result	A No result No result B No result	B No result	B No result	A A No result B	Mo result A No result	ıθα	Race

THE RESERVE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COL	The second	-	The second second		The same and the s		
identification	rsce	JOJ	pəsn	categories	pure	pAbea	Reaction

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	,A	_1, <sub>n</sub> 0	nO A	r <sub>e</sub> n0 A	γ•αO Η	_t,nO	± +↓⁴¤0	S 7	+ S 7	пО Я	2 <b>،</b> ا ع	пО Я С <b>,</b> S	٤١	11
	Я	r.no A	и0 Я	1 H	2 <b>.</b> 1	. r.a0 . A	ε.ς Ι	S 7	5 7	пО Я	2 <b>.</b> n0 A	uO ↓•uO	11	u
	A	r.no A	иO	-1,50 A	1, nO A	£0 .A	Z E	2 7	S 7	n0 A	H uO	uO H	6	"
	,A	n on A	ਪ u0	_ r. 00 A	пO Я	oio A	7,2 1	S E	8 †	пО Я	t.n0 A	иO Я	8	ii
! 	Å	_ 1, nO ∏ ∏	nO A	r.no A	r, nO A	_r,nO	1 R	E S	+ ¿	Ocn H	+ r•ao	nO A	۷	41
0	A	1. no	πO /	2 <b>.</b> ↑ A	ι·α0 Ή	O.i.	1,2 <sup>-</sup> 7	E	S 7	r•αO Я	r.nO A	r.nO A	G	tt
	B	Z Z	пО Я	S.↑ A	S. I A	O.i. H	δ 2	S S	S †	ΞĘ	O°1+	S A	٤	44
	D	ξ.	^- Gn <b>o</b> ≀	.Ι _ <u>ς</u>	S.I A	<b>00</b> Я	1 <b>,</b> 2 €	+ E	1 H	5+ I	S S	1 °5	2	11
	Q	S ξ	иO Я	S S	ς <b>.</b> ς	<b>1</b> R	+ ξ S	+ Z 2	1 H	-Ę I	E	S H	l -	BF3-68
đno.	касе Ст	Aicardo 11	Cebada capa Ol	6 Bernvian	Batna 8	etstaä 7	e FCAbe 4	Gold G	<sup>†7</sup> uspng	£ uuţnô	Reka 1 2	Bolivia Y	•oN	eamtud
			·			ties	eirsV Lsitn	Dillere						

1 ( c )

	B	1,5 R	п0 Я	+2 ∏	R	FO E	I	S	I	ר2 ∓	੍ਰਬ	Я		
	В	A	ਬ	I	H.	Я	ع 5 <sup>+</sup> 2	۵ + چ	a ₹ <sup>+</sup> s	Я +2	н , по	1 + E	04	Ħ
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	H	ξ	uO	٤	+ 5	Ţ()	$\aleph$	+ <sub>E</sub>	č Z	Ţ Z	۱, nO A	آ ت	ZZ	44
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	D	S 	ਬ uo	S S	F 1	оо Я	1+ 1+	τ. 2	I.	S _†7	S S	no) الم	57	u
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<u> </u>	ລ	ε. Σ. Σ	H UO	S A	S.I A	по 0 Я	S S	ξ g	S.↑ F	P, nO	S	2 <b>.</b> 1	22	41
1	В	i u0	пО Я	S•nO A	r.nO H	пО Я	S 7	ج 2	S 7	۰, nO A	пО Я	nO A	SO	11
	A	t.nO A	nO A	<b>1.</b> 00 ∏	۱, aO	iO Α	2 R	+ς 2	+ξ 2	۱, nO A	۱. do A	r•n0 ∏	۷L	u
	В	_ິS.ເ ∄	пО Я	+ R H	H + 1	ŤO Æ	S S	\$ 50	+ E	Ι _Σ	s.t	Ē. I	SI -	BR3-68
dno	Race Gr	Ricardo 11	Cebada capa Of	Peruvian 9	Batna 8	etstaA 7	9 † 1d <b>£</b> 3±	Gold Gold	- <sup>†</sup> 7 uepng	aniu9 E	Keka 1	Bolivia ,	•oN :	Culture
						aəij	eirsV Isitn	Differe						

### 5. Summary

The isolates separate into five major race groupings. There is a range of variability within the pathogen although resistance genes do not occur in arieties grown in Britain. There is also a relationship between numbers of isolates in a race group and breadth of virulence of those isolates - the more widely virulent the isolate the lower its frequency of detection. This is shown in Table 17.

Relationship between isolate frequency and virulence spectrum

 $\frac{1}{2} \left( \frac{1}{2} - \frac{1}{2} \right) = \frac{1}{2} \left( \frac{1}{2} - \frac{1}{2} \right)$ 

	Ħ	Ða	ВЪ	Race Groups
TOTAL	6	<b>t</b> t	MΝ	No. of susceptible differentials
20	N	N N ~	7 }	Frequency of isolates Number %
100	10	20	70	f isolates %

ĥ

Crown Rust oats. Welsh B. Cli Plant ifford. Breeding Station, Aberystwyth.

- total 1 of 4 samples was received following varieties. at the W.P.B. യ from
- 5 Varieties from which crown isolates were collected.

Table 18.

4	TOTAL
W	Breeding Material
	Pendrwm
No. of Isolates	Variety

Š Only the V Locations vone isolate W.P.B.S. from which was received from a location other than oat crown rust isolates were collected.

Table 19.

4	TOTAL	
W	Breeding material	W.P.B.S. (Aberystwyth)
	Pendrwm	Penally (Pembs)
No.of Isolates	Source Variety	Location

# 4. Race identification

All four samples were successfully cultured or disease free material and then inoculated on to differential varieties. In each case the race identified was race 229. This race is virulent the differentials Ukraine and Saja. Varieties the Victoria gene are resistant e.g. Manod. d d carrying 200 the

### Mildew wheat - Plant Breeding Institute. M.S. Wolfe Cambridge

- 1. A total of 253 isolates was received by the following varieties. P.B.I. from the
- 2. Varieties from which isolates were collected Winter wheat varieties are shown in Table 20, varieties are shown in Table 21. spring wheat

### Table 20

TOTAL	Margin Maris Totem	Petkus 71/64 Bouquet (FDA15)	On t	Zorba (Engelen 565)	Maris Widgeon	Maris Settler	Elite Lepeuple	Mildress	West Desprez	Maris Teal	Hybrid 46	<u> </u>	Cappelle Desprez	Сапа	Maris Ranger	Joss Cambier	Winter Wheat
167	WW	Μt	- <del>L</del> /	ກປາ	<b>ডা</b>	0	Φ	10	11	11	12	14	14	14	15	20	No. of Isolates

### Table 21

2 77	TW /5
11 10 7	Troll Maris Ensign Kolibri
16	Kloka Rothwell Sprite Janua
No. of Isolates	Spring Wheat

A further 9 isolates were received from other varieties.

Jocations from which wheat mildew isolates were collected. The isolates were collected from 43 locations in the British Isles. The location from which each isolate was collected and the variety from which it was collected is shown in Table 22.

4	Sprite, Janus	Culcheth (Lincs.)
<b>W</b> Р	M 10 C	$\sim$ $_{\odot}$
<b>1</b> 5	Mildress, Hybrid 46, Cama, West Desprez, Maris Ranger	ı
	Ensign, I Cappelle ein,Joss	
	Kloka, Troll, Rothwell Sprite, Janus, Kolibri	Dunmow (Essex)
<b>_</b>	bier, louquet (	
	West Desprez, Cappelle Desprez, Margin, Maris Widgeon, Belloy, Cama,	Dorchester (Dorset)
W	oka, Rothwell	Doncaster (Yorks.)
р,	Maris Ensign	Deeping St. James (Norfolk)
<u>.</u>	epeuple, Fange aris Range ress, Jose othwell Troka, Roth	
	appelle Desprez, hamplein, Elite	Croome Farm (Worcs.)
16	ka, Maris E is Settler a	Coningsby (Lines.)
	Cambier, ple, Cap pez, Cham 264, Roti	1
4	bier, Cama Troll, Cama, Janus, Hybrid 46, West Des- prez, Maris Ranger,	Cockle Park (Northumberland)
- f	is Widgeon, dress, Joss	Chester
_ <b>_</b>	eal, Margin, t6, Maris Cama, Maris Cappelle Wast Despre	
o.	, Mildra uet (FD/ oy, Jos	Bristol
	is Ranger Cama, is Teal, Bouquet A.15), Joss Cam-	Boston (Lincs.)
4	ຸດ	Beverley (E. Yorks)
Н.	ri Teal	())
- <b>р</b>	Kloka Janus, Kloka, Troll,	to V
No. of Isolates	Source Variety I	Location

	Zorba (Engelen 565)	Rothwell (Lines.)
	$\vdash$	Rothans ted (Harpenden, Herts.)
20	Teat, MGH0204, Petkus 71/64, Maris Beacon, Maris Settler	
ngan managara (A.) até atén	Troll, R prite, Ma	
	Ensign, Jambier,	
ining and an angelogical man	Elite Lepeuple, Zorba (Engelen 565),	
	Mildress, Maris Ranger West Desprez,	
	, Cappelle hamplein.	Rosemaund (Hereford)
7	Maris Ensi Clarion, C	
خے	Joss Cambier Kloka, Rothwell, Sprite	Moulton (Northants) Orlinbury (Northants)
-> V	Janus	Loughgall (Ireland)
)	Waris Ranger, Joss	Lincoln
ת	$^{\bowtie}$	
7	Desprez, Kolibri	Kirby (Lanes)
and production of the Paris		
	Ranger, Maris Ensign,	
	id h	
	Cama, Cappelle Desprez,	Kinver (Worcs.)
<u></u> -	Rothwell Sprite Cama	eld(Wes
	Kloka, Maris Ensign,	
	lein,	
٠.	Champlein Cappelle Desprez.	Inverness Kelvedon (Essex)
N	Elite Lepeuple, Champ- lein	Hockwold Fen (Essex)
<u>→</u> (	1000 1300 1301	
<u>,</u>	Maris Beacon, Maris	
	Joss Cambier, Champ- lein. Maris Totem,	
	19 IN75 (2	Headley Hall (Yorks.)
17	st Despr al	
	(2), Maris Envoy (105 55/253), Maris Ranger,	
	Settler, Maris Beacon	
	jo Jo	
	len 565), Maris	
	o, capped Cama, Ch Laress, E	Harper Adams (Newport, Salop)
		11
	Source Variety	Location

Location  Source Variety  Isole (Kent)  Cappelle Desprez, Maris Ranger, Joss Cambier, West Desprez, Maris Teal West Desprez, Maris Teal West Desprez, Kloka, Rothwell Sprite, Cappelle Desprez, Hybrid 46, Champlein Joss Cambier Hybrid 46, Champlein Cappelle Desprez, Maris Ranger Rest Desprez, Maris Totem, Maris Settler, Kloka, Maris Totem, Maris Settler, Kloka, Kolibri, Rothwell Sprite, Janus, Troll, Petkus 71/64, McH6264, Maris Desprez, Hybrid 46, Maris Ranger, Waris Ensign, Cappelle Desprez, Maris Teal, Cama, Hybrid 46, Maris Ranger, Maris Ensign, Cappelle Desprez, Joss Cambier, Mildress Ranger, Maris Ensign, Cappelle Desprez, Solibri, Fanger, Maris Ensign, Cappelle Desprez, Solibri, Fanger, Maris Teal, Maris Settler	253	TOTAL	
nt)  Source Variety  Int)  Rappelle Desprez, Cama, Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Micka, Rothwell Sprite, Cappelle Desprez, Rothwell Sprite, Cappelle Desprez, Into Sprite Ington Sprite Ingelen Ingel	19	s Settler	
nt)  Oappelle Desprez, Maris Ranger, Joss Cambier, Peal Desprez, Maris Ranger, Joss Cambier, Phybrid 46, Champlein Desprez, Moka, Hybrid 46, Champlein Desprez, Maris Rothwell Sprite, Cappelle Desprez, Maris Phybrid 46, Champlein Desprez, Maris Ranger Hybrid 46, Champlein Desprez, Maris Ranger, West Desprez, Mildress, Maris Ranger, West Desprez, Mildress, Maris Toten, Maris Toten, Maris Settler, Kloke, Kolibri, Rothwell Sprite, Janus, Troll, Patka 71/64, MgH6264, Maris Teal, Cama, Hybrid 46, Maris Ensign, Camplein, Cama, Hybrid 46, Maris Ensign, Joss Cambier, Maris Teal, Cama, Hybrid 46, Maris Ensign, Joss Cambier, Maris Feal, Cama, Hybrid 46, Maris Ensign, Joss Cambier, Maris Ensign, Cappelle Desprez, Maris Ranger, Maris Ensign, Cappelle Desprez, Kolibri, Kloke, Rothwell Sprite Teas, Elite Lepeuple, West Desprez, Kolibri, Kloke, Rothwell Sprite	gtich ad social co	us 71/94, MGH6	
Int)  Cappelle Desprez, Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Kloka, Rothwell Sprite, Cappelle Desprez, Hybrid 46, Champlein Joss Cambier Champlein, Rothwell Sprite Haris Ranger Hybrid 46, Champlein, Cappelle Desprez, Midress, Maris Ranger, West Desprez, Midress, Maris Ensign, Joss Cambier, Maris Totem, Maris Settler, Kloka, Kolibri, Rothwell Sprite, Janus, Troll, Petkus 71/64, MGH6264, Maris Teal, Cama, Maris Teal, Cama, Kolibri Kloka Kildress Ranger, Maris Ensign, Cappelle Desprez, Maris Teal, Cama, Joss Cambier, Maris Totem, Maris Settler, Kloka, Kolibri Kloka Kanger, Maris Ensign, Cappelle Lepeuple, West Desprez, Kolibri,	erathala y	Kloka, Rothwell Sprite	
nt)  Cappelle Desprez, Maris Widgeon (2), Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Kloka, Rothwell Sprite, Cappelle Desprez, Hybrid 46, Champlein Champlein, Rothwell Sprite Ington Sprite Ington Sprite Ington Champlein, Rothwell Sprite Sprite Ington Champlein, Rothwell Sprite Elite Ispeuple, Elite Ispeuple, Engelen 565, Maris Ensign, Joss Cambier, Maris Toten, Maris Settler, Kloka, Kolibri, Rothwell Sprite, Janus, Troll, Petkus 71/64, MGH6264, Maris Beacon Montgomery) Mildress Zorba (Engenlen 565), Champlein, Cama, Hybrid 46, Maris Ranger, Maris Ensign, Cappelle Desprez, Mildress Zorba (Engenlen 565), Champlein, Cama, Hybrid 46, Maris Ranger, Maris Ensign, Cappelle Desprez, Joss Cambier, Mil- dress, Elite Lepeuple,	******	West Desprez, Kolibri,	
ntion  Cappelle Desprez, Maris Widgeon (2), Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Kloka, Cappelle Desprez, Kloka, Rothwell Sprite, Cappelle Desprez, Hybrid 46, Champlein Sprite Ington Sprite Champlein, Rothwell Sprite Elite Desprez, Maris Ranger, West Desprez, Mildress, Maris Ranger, West Desprez, Elite Lepeuple, Engelen 565, Maris Settler, Kloka, Kolibri, Rothwell Sprite, Janus, Troll, Petkus 71/64, MGH6264, Maris Beacon Montgomery) Mildress Corba (Engenlen 565), Champlein, Cama, Hybrid 46, Maris Ranger, Maris Enssign, Cappelle Desprez, Mildress Ranger, Maris Enssign, Cappelle Desprez, Joss Cambier, Mildress Ranger, Maris Enssign, Cappelle Desprez, Joss Cambier, Mildress Ranger, Maris Enssign, Cappelle Desprez, Loss Cambier, Mildress Ranger, Maris Enssign, Cappelle Desprez, Loss Cambier, Mildress Ranger, Maris Enssign, Cappelle Desprez, Loss Cambier, Mildress	ne et e au	dress, Elite Lepeuple,	
ntion    Source Variety   No. of Isolate ont)   Cappelle Desprez,   Maris Widgeon (2),   Cama, Margin, Margin, Maris Ranger, Joss Cambier,   West Desprez, Maris Peal   Sprite,   Cappelle Desprez,   Maris Rothwell Sprite,   Cappelle Desprez,   Maris Pyrid 46, Champlein   1   1   1   1   1   1   1   1   1	organista	Joss Cambier, Mil-	
ntion  Source Variety  Int)  Cappelle Desprez,  Naris Widgeon (2),  Cama, Margin, Maris  Ranger, Joss Cambier,  West Desprez, Maris  Peal  Joss Cambier  Champlein, Rothwell  Sprite  Ints.)  (Norfolk)  Cappelle Desprez,  Hybrid 46, Champlein  Sprite  Sprite  Hybrid 46, Champlein,  Cappelle Desprez,  Mildress, Maris  Ensign, Joss Cambier,  Maris Teeuple,  Ensign, Joss Cambier,  Maris Toten, Maris  Settler, Kloka,  Kolibri, Rothwell  Sprite, Janus, Troll,  Petkus 71/64, MGH6264,  Maris Deacon  Maris Deacon  Kolibri  Maris Beacon  Kolibri  Kloka  Maris Deacon  Kolibri  Korba (Engenlen 565),  Champlein, Cama,  Hybrid 46,  Cama,  Settler, Kloka,  Kolibri, Rothwell  Sprite, Janus, Troll,  Petkus 71/64, MGH6264,  Maris Deacon  Lorba (Engenlen 565),  Champlein, Cama,  Hybrid 46,  Raris Freier  22  Korba (Engenlen 565),  Champlein, Cama,  Hybrid 46,  Raris Freier  Ranger  Ranger  Maris Freier  Ranger  Maris Freier  Ranger  Ranger  Maris Freier  Ranger  R	of garbac	e Desprez	
ntion  Cappelle Desprez, Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Maris Rathwell Sprite, Cappelle Desprez, Hybrid 46, Champlein Sprite Champlein, Rothwell Sprite Hybrid 46, Champlein, Cappelle Desprez, Maris Ranger Hybrid 46, Champlein, Cappelle Desprez, Maris Ranger Hybrid 46, Champlein, Cappelle Desprez, Mildress, Maris Ranger, West Desprez, Elite Lepeuple, Ensign, Joss Cambier, Maris Toten, Maris Settler, Kloka, Kolibri, Rothwell Sprite, Janus, Troll, Petkus 71/64, McH6264, Maris Teal, Cama, Maris Teal, Cama, Maris Teal, Cama, Champlein, Cama, Champlein, Cama, Champlein, Cama, Hebrid (Engenlen 565), Champlein, Cama, Champlein, Cama, Cama,	d the sec	TO, EXT. C.	
Ation  Source Variety  Int)  Cappelle Desprez,  Maris Widgeon (2),  Cama, Margin, Maris  Ranger, Joss Cambier,  West Desprez, Maris  Rothwell Sprite,  Cappelle Desprez,  Hybrid 46, Champlein  Joss Cambier  Champlein, Rothwell  Sprite  Hybrid 46, Champlein,  Cappelle Desprez,  Maris Ranger  Hybrid 46, Champlein,  Cappelle Desprez,  Mildress, Maris  Ranger, West Desprez,  Elite Lepeuple,  Ensign, Joss Cambier,  Maris Toten, Maris  Settler, Kloka,  Kolibri, Rothwell  Sprite, Janus, Troll,  Petkus 71/64, McH6264,  Maris Beacon  Montgomery)  Maris Beacon  Mildress  Maris Teal, Cama,  Mildress  Maris Teal, Cama,  Maris Beacon  Mildress  Mildress  Corba (Engenlen 565),  Lorba (Engenlen 565),	· - 16 · · · ·	ein,	
ntion  Cappelle Desprez, Mo. of Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Kloka, Rothwell Sprite, Cappelle Desprez, Kloka, Rothwell Sprite, Cappelle Desprez, Maris Pybrid 46, Champlein Sprite  Its.)  (Norfolk)  Hybrid 46, Champlein, Cappelle Desprez, Maris Ranger West Desprez, Maris Ranger Champlein, Cappelle Desprez, Maris Ranger, West Desprez, Mildress, Maris Settler, Kloka, Kolibri, Rothwell Sprite, Janus, Troll, Petkus 71/64, MGH6264, Maris Beacon  Montgomery)  Kolibri  Kloka  Mildress  Mildress  Maris Beacon  Montgomery)  Maris Beacon  Montgomery  Mildress	No service	(Engenlen 565)	Wye (Kent)
Ation  Source Variety  Incompelle Desprez, Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Maris Rothwell Sprite, Cappelle Desprez, Rothwell Sprite, Cappelle Desprez, Its.) Ington  Somerset)  Its.) Itaris Ranger (Norfolk) Cappelle Desprez, Mildress, Maris Ranger, West Desprez, Mildress, Maris Ensign, Joss Cambier, Maris Totem, Maris Settler, Kloka, Kolibri, Rothwell Sprite, Janus, Troll, Petkus 71/64, MGH6264, Maris Beacon  Montgomery)  Montgomery  Montgomery  Rolibri  Maris Beacon  1  No. of Incompez, Isolate Isolate Isolate Incomplein In	Н.	SS	lagb
Ation  Source Variety  Int)  Cappelle Desprez, Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Maris Teal  West Desprez, Kloka, Rothwell Sprite, Cappelle Desprez, Ington  Somerset)  Joss Cambier  Apprid 46, Champlein  Joss Cambier  Champlein, Rothwell Sprite Sprite Sprite Sprite Ensign, Joss Cambier, Maris Totem, Maris Settler, Kloka, Kolibri, Rothwell Sprite, Janus, Troll, Petkus 71/64, MGH6264, Maris Beacon  Montgomery)  Montgomery)  Montgomery)  Montgomery  Montgo	<b>  </b>	Kloka	H
Ation  Source Variety  Incolored Inc	<b> -</b> -	Kolibri	Welshpool (Montgomery)
ntion  Cappelle Desprez, Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Maris Teal West Desprez, Maris Rothwell Sprite, Cappelle Desprez, Cappelle Desprez, Its.) Ington Sprite Its.) Hybrid 46, Champlein Sprite Ranger, West Desprez, Mildress, Maris Ranger, West Desprez, Elite Lepeuple, Engelen 565, Maris Ensign, Joss Cambier, Maris Totem, Maris Settler, Kloka, Kolibri, Rothwell Sprite, Janus, Troll, Petkus 71/64, MGH6264, Maris Teal, Cama	22	Beacon	
ntion  Cappelle Desprez, Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Maris Peal West Desprez, Kloka, Rothwell Sprite, Cappelle Desprez, Hybrid 46, Champlein Sprite Hybrid 46, Champlein Sprite Hybrid 46, Champlein Cappelle Desprez, Mildress, Maris Ranger, West Desprez, Elite Lepeuple, Ensign, Joss Cambier, Maris Totem, Maris Settler, Kloka, Kolibri, Rothwell Sprite, Janus, Troll, Pathris 71/61, MCH6261,	To Tonk	l Cama.	
ntion  Cappelle Desprez, Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Maris Teal West Desprez, Kloka, Rothwell Sprite, Cappelle Desprez, Hybrid 46, Champlein Sprite Hybrid 46, Champlein Sprite Hybrid 46, Champlein, Champlein, Rothwell Sprite Hybrid 46, Champlein, Ciappelle Desprez, Maris Ranger, West Desprez, Elite Lepeuple, Ensign, Joss Cambier, Maris Totem, Maris Settler, Kloka, Kolibri, Rothwell	2011	CHOM LANGE	
ntion  Source Variety  Int)  Cappelle Desprez,  Maris Widgeon (2),  Cama, Margin, Maris  Ranger, Joss Cambier,  West Desprez, Maris  Teal  West Desprez, Kloka,  Rothwell Sprite,  Cappelle Desprez,  Hybrid 46, Champlein  Sprite  Hybrid 46, Champlein,  Mildress, Maris  Ranger, West Desprez,  Mildress, Maris  Engelen 565, Maris  Ensign, Joss Cambier,  Maris Totem, Maris  Settler, Kloka,		KOTHWELL	
ation  Source Variety  Int)  Cappelle Desprez, Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Maris Teal West Desprez, Kloka, Rothwell Sprite, Cappelle Desprez, Hybrid 46, Champlein Sprite Its.)  Haris Ranger Mildress, Maris Ranger, West Desprez, Mildress, Maris Engelen 565, Maris Ensign, Joss Cambier, Maris Totem, Maris			
Ation  Source Variety  Int)  Cappelle Desprez,  Maris Widgeon (2),  Cama, Margin, Maris  Ranger, Joss Cambier,  West Desprez, Maris  Teal  West Desprez, Kloka,  Rothwell Sprite,  Cappelle Desprez,  Hybrid 46, Champlein  Sprite  Cappelle Desprez,  Hybrid 46, Champlein  Sprite  Its.)  Maris Ranger  Maris Ranger  Maris Ranger, West Desprez,  Ranger, West Desprez,  Elite Lepeuple,  Enselen 565, Maris  Ensign, Joss Cambier,		otem, Maris	
ntion  Cappelle Desprez, Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Maris Teal West Desprez, Maris Teal Cappelle Desprez, Maris Rothwell Sprite, Cappelle Desprez, Its.) Ington Somerset) Champlein, Rothwell Sprite Its.) (Norfolk) Cappelle Desprez, Mildress, Maris Ranger, West Desprez, Elite Lepeuple, Engelen 565, Maris		Joss Cambie	
ntion  Cappelle Desprez, Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Maris Teal West Desprez, Maris Cappelle Desprez, Rothwell Sprite, Cappelle Desprez, Hybrid 46, Champlein Sprite Its.) Hybrid 46, Champlein, Cappelle Desprez, Mildress, Maris Ranger, West Desprez, Elite Lepeuple,  No. of No. of No. of Isolate Sprize Panser, Joss Cambier 1 1 2 1 2 1 2 2 2 3 3 4 4 5 6 6 6 7 6 7 7 8 7 8 8 8 8 8 8 8 8 8 8 8	····	565,	
ntion  Cappelle Desprez, Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Maris Teal West Desprez, Maris Cappelle Desprez, Rothwell Sprite, Cappelle Desprez, Hybrid 46, Champlein Sprite Champlein, Rothwell Sprite Hybrid 46, Champlein, Cappelle Desprez, Mildress, Maris Ranger, West Desprez,			
ntion  Cappelle Desprez, Meris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Maris Teal West Desprez, Kloka, Rothwell Sprite, Cappelle Desprez, Hybrid 46, Champlein Sprite Othemplein, Rothwell Sprite Its.) Hybrid 46, Champlein, Cappelle Desprez, Maris Ranger Hybrid 46, Champlein, Cappelle Desprez, Mildress, Maris		sprez	and and a
ntion  Source Variety  Int)  Cappelle Desprez,  Maris Widgeon (2),  Cama, Margin, Maris  Ranger, Joss Cambier,  West Desprez, Maris  Teal  West Desprez, Kloka,  Rothwell Sprite,  Cappelle Desprez,  Hybrid 46, Champlein  Sprite  Othamplein, Rothwell  Sprite  Sprite  Hybrid 46, Champlein,  Cappelle Desprez,  Its.)  Hybrid 46, Champlein,  Cappelle Desprez,  Cappelle Desprez,  Cappelle Desprez,  Cappelle Desprez,	and the same	Maris	
ntion  Cappelle Desprez, Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Maris Teal West Desprez, Kloka, Rothwell Sprite, Cappelle Desprez, Rothwell Sprite, Cappelle Desprez, Hybrid 46, Champlein Sprite Its.)  Norfolk)  No of		le Desprez,	
Ation  Source Variety  Int)  Cappelle Desprez, Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Maris Teal West Desprez, Kloka, Rothwell Sprite, Cappelle Desprez, Cappelle Desprez, Hybrid 46, Champlein Somerset) Joss Cambier Champlein, Rothwell Sprite Its.)  Source Variety Isolate	1	d 46. Champlei	Terrington (Norfolk)
Cation  Cappelle Desprez, Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Maris Teal Teal Nothwell Sprite, Cappelle Desprez, Rothwell Sprite, Cappelle Desprez, Hybrid 46, Champlein Champlein, Rothwell Cappelle Rothwell	<b>⊢</b> ∧	(	Swindon (Wilts.)
Cation  Source Variety  No. of Cappelle Desprez, Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Maris Teal West Desprez, Kloka, Rothwell Sprite, Cappelle Desprez, Hybrid 46, Champlein Joss Cambier 1	)	lein, Kothwei	Sufton Bonington
Cation  Source Variety  No. of Cappelle Desprez, Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Maris Teal West Desprez, Kloka, Rothwell Sprite, Cappelle Desprez, Cappelle Desprez, Hybrid 46, Champlein 6	<b> -</b> -	Cambi	
(Kent)  Cappelle Desprez, Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Maris Teal West Desprez, Kloka, Rothwell Sprite, Cappelle Desprez,	0	1d 46,	
(Kent) Cappelle Desprez, Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Maris Teal West Desprez, Kloka, Rothwell Sprite,	١	, (a	
ocation  Source Variety  [No. of Cappelle Desprez, Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Maris Teal  [Lincs.]  West Desprez, Kloka, 9		Sprite,	and the second
Location  Source Variety  [No. of Cappelle Desprez, Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, West Desprez, Maris 9	,	Desprez, Kloka	Spalding (Lincs.)
Location  Source Variety  [No. of Cappelle Desprez, Maris Widgeon (2), Cama, Margin, Maris Ranger, Joss Cambier, Maris Rest Desprez Maris	9	7.007+018 mat +	199
Location Source Variety No. of  (Kent) Cappelle Desprez,  Maris Widgeon (2),  Cama, Margin, Maris		Deannez Baoo	100 100
Location Source Variety No. of (Kent) Cappelle Desprez, Maris Widgeon (2),		, Margin,	and the
Location Source Variety No. of Isolate		s Widgeon	, ()
Source Variety No. of Isolate		elle Desprez	- 1
	No. of Isolates	Variety	Location

# 4. Race Identification

Identification of the physiologic race has been completed on 152 isolates; and the results obtained are given in Table 23.

### Table 23

Race	No. of Isolates	Variety and Place
0	7	Hybrid 46 (Headley Hall, Terrington), Mildress (Dunmow), Elite Leuple (Hockwold Fen, Wye), Joss Cambier (Morpeth), Maris Ranger (Spaxton)
N	W	Margin (S.Kyme), West Desprez (Terrington), Janus (Baverley)
W	29	Wildress (Croome Farm), Mari
		Ranger (S.Kyme, Cockle Perk, Croome Farm), Kloka (Croome
		Farm, Rosemaund), Maris Ensign (Rosemaund), Hybrid 46 (Wye),

23

00 HH	<b>L</b> 60	ת	74	+	Race No.
ЮH		on	6	÷ ;	of Isolates
y Hall, Ter Desprez (Har aund), Petku naund), Cama s.Kyme), Mar er Adams, Te ell Sprite ( (Halsall), le Park, Spa et (FDA15) ( (Dunmow), T (Spaxton), le, MGH6264 ess (Terring Maris Ensi en, Maris Te ent (Croome F er (Wye) le Desprez le Desprez	(Chester), Hybrid 46, 54 (Rosemaund), Joss er (Rosemaund, Harper)	ambier (Terrington) 45 (Dorchester), C 3utton Bonington), i (Backweston), Eli le (Harper Adams) scorez (Dorchester)	Ensign (Harper A Park, Terringto ein (Rosemaund, (Aberystwyth) Te Farm, Kirby), J eston, Cockle Pa und), Mildress ( ye, Dunmow), Tro eth, Beverley), z (Spalding, Har 11 Sprite (Terri 11 Sprite (Terri 11 Sprite (Terri 11 Sprite (Terri 12 (Headley Hall (Headley Hall (Headley Hall (Headley Hall (Tose Cambier Adams), Ca Nolibri (Dunmo ), Joss Cambier t (F.D.A.15) (Sp 14 (Cockle Park), Rosemaund) Maris r Adams) Canpelen 565) (W	(Wye, Duckle Parkone Farm), Cappe Dunnow, (Terrin Park), Y Hall), Cama (Tund)	Variety and Place

TOTAL	152	13
Harm), Cappelle Desprez, Elite Lepeuple, Zorba (Engelen 565), Maris Ranger (Rosemaund), Hybrid 46, Janus (Croome Farm), Belloy (Dorchester), Joss Cambier (Headley Hall, Chester), Sirius (Kirby)	A calculation of the second of	, a mand it is a site of the captured unions additional to solve un
rell Sprite (Halsall,	12	35
CO.	N	27
ple (Kinver, Croom (Halsall), Mildre ell), Kloka (Kelve Settler (Wye, Har), Maris Teal (Har	The control of the co	hir khanshiyalar (s.) - Si ma'' va abon 1927-gambal
Maris Widgeon, Cappelle Desprez,	12	26
s! Variety and Place	No. of Isolates	Race

) i = 1

### Summary

13 Physiologic races were identified, and of these races 3 (29 isolates), 13 (39), 16 (29), 26 (12) and 35 (12) were most frequently identified. The number of races identified from each variety is indicated in Table 24.

### Table 24

(FDA15)	4 700 2004	Kolibri Maris Widgeon	is TB29	11 ba(E	is	7 F.	West De	ro	Mil Rot	لسا	Cam Eli	Ja	Ηy	지 .	Ca	С Д .	Jo Ma_	V.
			a1 1/5)	nge-	tler	-1. 1973	zeroz	prite	50	Lepeuple	ama Lite		lybrid 46	Desprez	ppelle	. Kanger Champlein	oss Cambier ris	Variety
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1	111	. I	Η .	H	N I		1	ı	N	N	i	1	I  -	لـا د		l	ı	26
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N	NWV	ı W.	t t	. w.	ם ת	`	7 .	7	7	7	7	Φ(	œς	0 0	ŀ	11	13	To: Isolates
N	NWW	1 N-	F W	UI (	ы С	1	n (	N	জ	л	UTV	J1 (	טת	١٥	4	- o	7	tal Races

25

TOTAL	Maris Totem Petkus 71/64 TW 75 Margin Sirius TJB 32 Trident	Variety
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7	1 1 1 1 1 1	2
7 3 29 4 39	111117 7	3
4		<del>†</del> .
39	1111101 -	13
6		14
9		Rac 15
29	11111-	16
		18
N	11111	Race 0 2 3 4 13 14 15 16 18 19 26 27 35
7	111111	26
10	11111	27
7	11-111	35
6 29 1 2 12 2 12 152	ママママン ひ	Total Isolates
73		1 s Races

### Mildress

Eleven isolates were resistant variety. received from Mildress,  $^{c}$ milder

Seven of these were analysed (see al isolate (ref. W8/254), a race 26 isolate virulent on seedlings of Mildress. above) te from but only Rothwell one was

### Kolibri

Eight isolates were received from this mildew resistan variety, of which only three could be race tested, Tests on Kolibriitself are still in progress; there appears to be a variable response from the variety to different isolates, but isolate W8/250 from Backweston, Eire, (identified as race 14) produces a heavier attack than the other isolates. resistant 9

병

# Mildew - barley. Plant Breeding Institute, Cambridge. W.S. Wolfe.

- 283 isolates of barley mildew were received by from the following varieties. the P.B.I.
- N Varieties from which isolates were collected. Winter barley varieties are shown in Table 25, barley varieties in Table 26. spring

### Table 25

60 5 6 6 7	Pella Pioneer Senta Leon TOTAL
12 9 8	Maris Otter Dea Malta Dura
No. of Isolates	Winter barley

TOTAL	Tellus	Crusader (MGH.59175)	Gerkra	Emir	Maris Druid	Zephyr	Tern	Maris Canon (HB. 380/22)	Vada ,	Impala	Deba Abed	Proctor	Julia	Sultan	Inis	Spring Barley
204	W	W	W	W	+	Vī	V1	O	N	20	20	24	22	34	32	No. of Isolates

A further 19 isolates Were received from other varieties.

ŝ The isolates were collected from 67 locations in the British Isles. The location from which each isolate was collected and the variety from which it was collected is shown in Table 27 Locations from which barley mildew isolates were collected.

Ŋ	Akka, Trias, Vada, Pioneer, Proctor, Dea, Maris Druid, Impala, Malta, Maris Otter, Inis, Pella, Leon.	Edinburgh
W	Dura, Sultan, Inis	Durweston (Dorset)
10	Deba Abed, Proctor, Vada, Impala, Inis, Julia, Malta, Pella, Dura, Maris Otter	Dunmow (Essex)
\( \sqrt{1} \)	Sultan, Tern, Julia, Proctor, Maris Canon (HB 380/22)	Dunbar (E.Lothian)
7	HA	Doncaster (Yorks.)
N	Julia, Inis	Docking (Norfolk)
_\	Sultan	Diss (Norfolk)
0,	Impala, Sultan, Proctor, Deba Abed, Julia, Vada	Culcheth (Lancs.)
Vī	Prætor, Julia, Impala, Deba Abed, Inis	Croome Farm(Worcs.)
	Inis	Coningsby (Lincs.)
0	Impala, Proctor, Inis, Pioneer, Dura, Maris Otter, Dea, Julia, Deba Abed	Cockle Park (Northumberland)
W	Tellus, Julia, Crusader (MGH 59175)	Cirencester (Glos.)
+	Sultan, Inis, Maris Druid, Tern	Chester
Ţ	Impala, Inis, Deba Abed, Proctor	Cardigan
14	Maris Canon(HB580/22) (3), Sultan (3), Emir(3), Vada(2) Gopal (2), Inis	Cambridge
	Julia	Brough (Westmorland)
	Sultan	Bradwell (Essex)
<u></u>	Unknown	Boxworth (Cambs.)
ڻا 	Inis (2), Julia, Proctor (2)	Bonvilston (Glam.)
	Inis	Blandford (Dorset)
0	Julia, Vada, Impala, Sultan, Proctor, Deba Abed	Bishops Burton(Yorks)
	Sultan	Banbury (Oxford)
<u>ن</u>	Impala, Sultan, Inis, Tern, Deba Abed	Backweston (Ireland)
6	Sultan, Akka, Lofa Abed (Abed 0317), Julia, Inis, Maris Canon (HB380/22)	Auchincruive
, W	Proctor, Impala, Inis	Aberystwyth (Cards)
f Isolates	Source Variety No. of	Location

Exeter (Devon)	~ 1
	Julia, Inis
Fakenham (Norfolk)	
Halsall (Lancs)	Gerkra, Deba Abed, Impala,
Headley Hall (Yorks.)	"Maris Deba
Inverurie (Aberdeen)	Julia
(Essex)	Maris Otter (2)
King's Lynn (Norfolk)	
Kinver (Worcs.)	(i)
٠	er, Dúra, Deba Abe a, Inis, Julia
Kirby (Lancs.)	Proctor, Vada, Julia, Gerkra, Deba Abed, Impala, Zephyr, Mosane, Miln's Golden Promise
Leamington Hastings (Warks.)	Impala, Sultan, Proctor, Inis, Zephyr, Mosane, Deba Abed
Lincoln	Julia
Lleyn (Caerns.)	Deba Abed, Impala, Proctor
Loughgall (Ireland)	Procto
Loughey (Ireland)	$\vdash$
Lytton Cheyney (Dorset)	
Market Weighton (Yorks.)	Vada
Montgomery	Impala
Morley (Norfolk)	Maris Otter, Dea, Dura, Malta, Pella,Leon,Pioneer, Algerian
Newquay (Cornwall)	Sultan
Northallerton (Yorks)	Zephyr
Oxenwood (Wilts.)	Dea
Reading (Berks.)	Sultan
Renfrew	
Rosemaund (Hereford)	Pioneer, Dea, Maris Otter, Dura, Malta, Leon, Pella, Proctor, Impala, Deba Abed, Inis, Julia,
Sewstern (Leics.)	Sultan, Julia
Shelbourne(Wilts)	
Spalding (Lincs.)	Malta, Maris Otter, Julia, Sultan, Impala, Proctor,
Sparton (Glos.)	(1) to
Stevenage (Herts.)	
Sutton Bonington (Notts.)	Dea, Dura, Proctor, Inis, Julia
M. Con Samuel & Sons	1291

283	TOTAL	
W W	Julia, Impala, Inis, Deba Abed, Proctor & 3 others Other varieties	Wye (Kent)
	Julia	West Suffolk
	Sultan	Woodbridge (Suffolk)
	Inis	Wolverhampton(Staffs)
Vī	Maris Druid, Senta (3), Dea	Wimborne (Dorset)
	Sultan	White Leckington (Somerset)
. 22	Sultan, Felda(Schweiger 755/631)	
erenga va	Zephyr, Lofa Abed (Abed 0317)	
Pyrophic results of the Spi	Imber $(G.136/22)$ , Julia, $Graphia$	
artiatives a almost a	Crusader(MGH 59175), Maris Canon (HB 380/22), Proctor,	Welton (Cumberland)
N	Inis, Sultan	Wellingborough (Northants.)
0	Maita, Fella, Dea, Leon, Dura, Senta	Warminster (Wilts)
<sub>.</sub> Vī	Julia	
***************************************	Proctor, Inis (2), Deba Abed,	Tulloch (Spey)
	Sultan	Tidenham (Glos)
00	Maris Canon(HB380/22)	
e guantine e e e e e e e e e e e e e e e e e e	Proctor, Impala, Deba Abed,	Terrington(Norfolk)
No. of Isolates	Source Variety	Location

The races have been identified following tests on the basic differentials, Proctor, Europa, Maris Concord and Impala.

136 isolates have been identified and the results are shown in Table 28.

	Impala Mla 6 + Mlg	Maris Concord Mla6	Proctor Europa Mlg	Race Group
Proctor: Proctor(11), Malta(6), Maris Otter(4), Dea(3), Dura(3), Leon (3), Pioneer (3), Gerkra (2), Miln's Golden Promise, Trias Europa: Deba Abed (12), Julia (12), Mosane (2), Zephyr (2), Maris Concord: Maris Druid(3)  Impala: Inis(16), Impala (15) Maris Canon (HB380/22) (5) Others Sultan (11), Vada (4), Emir (2), Tern (1)  TOTAL  -30-	Source variety group	Maris Otter, Pella	Sultan (2), Vada(2), Inis Sultan (2), Vada(2), Akka, Dea, Dura, Julia, Maris Otter, Pella	Source Variety
37 28 36 18		N	0 M	No. of Isolates

The proportion of Impala virulent isolates appears to be higher than in 1967, being 88% of the total analysed (77% in 1967). Of the Impala virulent races, 35% were obtained from Impala Group varieties (Impala, Inis, Maris Canon (HB380/22) compared with 29% in 1967. This occurred in spite of a reduction in the Impala acreage and may therefore be a reflection of the increase in the Inis acreage. **/**22))

and number the results of race identifications are shown resistant below. varieties

Table

Variety			Ħ	Race				-	TOT/L
C	A1	<u>1</u> 77		CH	c5	<u>c6</u>	c7	c7 : c10	
Inis	1?	1	1	W	<u> </u>	1	1	1	15
Vada*	_		٠.,		N	i	1		7
Emir	ı	1	· · · · · ·	1		1	i	1	
Maris Canon (HB380/22)	1	1	1			1	1	I	N
Akka.		1	1					1	

None of the Vada isolates were fully virulent on Vada

Similarly, two . and one Impala ( isolates from Rothwell Tern, one Proc Group, did not attack Tern seedlings. Proctor Group

Sultan Seven isolates completed results were of virulent in t differential tests tests 200 are Sultan shown seedlings a wn in Table and 30. the

Table

t		THE COMPANY OF THE PERSON NAMED IN COLUMN	AND THE PERSON NAMED IN COLUMN TWO		}		ב
ブT	С5	7.7	DI	B15	A3	B17	Race
ന്മ	ಬ	ß	യ	S	ಬ	ß	tor
No test	Н	H	Н	Н	H	H	Arabische
മ	ထ	യ	മ	מ	ಬ	യ	Sultan
Н	Н	Н	H	Ħ	Н	Ħ	HOR 1402
Ħ	Ħ	Ħ	Ħ	Ħ	Ħ	Ħ	HOR 1104
Ħ	Ħ	Ħ	Ħ	Ħ	R	Ħ	Algerian
Ħ	Ħ	Ħ	Ħ	Ħ	Ħ	Ħ	HOR 1036
ന	හ	മ	മ	ထ	ത	മ	HOR 1657
Ħ	Ħ	Ħ	Ħ	Ħ	Ħ	Ħ	HOR 1063
Ħ	ഗ	לל	Ħ	Ħ	Ħ	മ	GM 501
Ħ	ഗ	Ħ	Ħ	മ	മ	മ	GM 511
Ħ	മ	Ħ	R	Ħ	Ħ	ഗ്ര	M.Concord
ω	က	ಭ	ಙ	Н	യ	മ	W41/145
യ	യ	Ħ	മ	മ	Ħ	Ħ	W37/136
ĸ	Ω	Ħ	Ħ	ന	Ħ	ന	WEP127422
B8/283 Twyfords	B8/282-	B8/260 Renfrew	late #8/233y Hall	Isol B8/232 E. Yorks	*B8/96	B8/52 NIAB	Differential Variety

S = Susceptible R = Resistant I = Intermediate
Two isolates\* were also virulent on Impala and these isolat
obtained from widely separated locations. These isolates v
divided into the basic race groups using a standard series
differential varieties, but each isolate was capable of att
Sultan seedlings. Therefore these races could be called e.g. C5 Sultan, B15 Sultan, etc. Impala and these isolates were ions. These isolates were of attacking

<sup>...</sup> The Akka isolates did not re-infect Akka

Q.

# Mildew - oats. Welsh Plant Breeding Station Aberystwyth.

### I.T. Jones

- <u>-</u>--A total of 31 isolates of out mildew was received by the W.P.B.S. from the following varieties.
- 2. Varieties from which isolates were collected.

These are shown in Table 31.

Table 31

 $\frac{1}{4} \frac{1}{2} \frac{1}$ 

TOTAL	Picton 1 each Unknown Varieties	Pendrwn Mostyn Maris Osprey(AB158/7),	Condor Manod Padarn	Variety
23	N VI	<b>→</b> 10	25 4 25 5	No. of Isolates

ŷ Locations from which oat mildew isolates were collected.

Isolates were collected from 14 locations in the British Isles. The location, and the variety from which each isolate was collected is shown in Table 32.

Table 32

												<del></del>
	Trawscoed (Aberystwyth Cards.) W.P.B.S. (Aberystwyth, Cards.)	mosemanna (nererora)	Renfrewshire	Reading (Reals)	Loughgall (N. Ireland)	Lleyn (Caerns.)	Leeds	Kinver(Worcs)	Cockle Park (Northumberland)	Blaenpennal (Cards)	Backweston (Ireland)	Location
TOTAL	Condor Sun II	Padarn, Pendrum, Maris Osprey (AB158/7), Condor, Manod	Aristata, Aurea, Picton, Condor Condor	Manod, Condor (2)	Condor, Manod	Condor	Condor	Padam Condon Warieties	Hanod, Condor	Condor	Mostyn, Condor	Source Variety
31	<u></u> (	JI	<b>-</b> 4	Si	ν -	- ·	<b>,</b> +	· W	N·	ا	2	No. of Isolates

### 4. Race identification

25 isolates were successfully identified and the results are indicated in table 33.

31 30/7	30 30/7			-		25 26/7	24 23/7	23 23/7	22 23/7	21 23/7	20 22/	19 22/	18 22/7	17 22/	16 22/	15 15/7	14 9/7	13 9/7	12 9/7	11 5/1	10 10/6	9 10/6	8 25/6	7 10/6	6 28/5	5 28/5	4 27/5	3 25/5	2 21/5		No.
7				7	, 7		7	7	7	7	7	7	7	7	7	77	7	7	7	7	/6	/6	/6	/6	/5	/5	/5	5	/5	21/5/68	7000
	Loughgall (N. Ireland)	Cardiganshire	Renfrewshire	=	salfe	Montgomery-	=	3	=	Reading	Trawscoed	3	Cockle Park	3	Backweston	Lleyn (Caerns)	=	2	Guernsey	Doncaster	2	<b>a</b>	Kinver	W.P.B.S.	3	Rosenaund	Kinver	=		Rosenaund	TO TO TO SERVICE STATE OF THE SERVICE STATE STAT
Manod	Condor	Condor	Condor	Condor	Condor	Manod	Condor	Picton	Aurea	Aristata	Condor	Condor	Manod	Condor	Mostyn	Condor	Not Known	Condor	Not Known	Condor	Hanod	Pendrwn	Condor	SunII	Manod	Condor	Padarn	Maris Osprey (AB 158/7)	Pend <b>r</b> wn	Padarn	
N	22	Ν	N	Failed	Failed	Ν	Pailed	Failed	N	ß	2+1?	N	22	2	N	N	N	N	Failed	Ν	2+3?	No	N	N	Ν	N	2	N	N	N	

### Summary

The results of the 1968 survey are summarised in Table 34.

### Table 34

	2+1? mixed Condor	2+3? mixed Manod	3	N	Race
TOTAL	Condor	Manod	Aristata	Padarn (2), Pendrwm, Maris Osprey (AB158/7), Condor(10) Manod (4), Sun II, Mostyn, Aurea + 1 other	Variety
25	_			22	No. of Isolates
					ates

Race 2 was found to be the prevalent oat mildew race in Britain during 1968. It was recovered in samples from England, Scotland, N. Ireland and Wales. There was no major change in the race spectrum when compared with that for previous years.

Only one sample of mildew was received from the resistant variety, Mostyn. Severity of attack was light and identification of the race revealed that it was race 2, which failed to re-infect Mostyn seedlings.

# Rhynchosporium - barley. The University of Reading.

### H. Owen.

- <u>۔</u> ه A total of 137 samples of Rhynchosporium was sent University of Reading. to the
- N Varieties from which samples were received. Winter barley varieties are shown in Table 35, spring barley varieties in Table 36.

### Table 35

TOTAL	Maris Otter  Malta Senta Senta Dura Dea La Mesita Pella: Pioneer Atlas Atlas Atlas Atlas Atlas Objer Hudson Leon Modoc Topper Turk Wisconsin Winter x Glabron Wong Osiris Trebi	Winter barley
		No. of samples

TOTAL	Sultan Deba Abed Tern Inis Julia Proctor Impala Akka Vada Unknown	Spring barley
L 71	7 7 7 7 7 7 7 7 7 7 7 7 7	No. of samples

# 3. Locations from which samples were received

The samples were received from 33 locations in the British Isles, and the source of each sample is shown in Table 37.

Table 37

۰ .	Atlas, Atlas 46, Brier, Hudson, La Mesita, Modoc Turk, Wisconsin Winter x Glabron, Wong.	Seale Hayne (Devon)
t -	Wong Dura, Malta, Maris Otter, Sultan	${ t Rosemaund (Herefs)}$
:	Atlas, Atlas 46, Brier, Hudson, La Mesita, Modoc, Osiris, Trebi, Turk, Wisconsin Winter x Glabron,	Padstow(Comnwall)
747	Abed Otter, unkno	Montgomery Norfolk Oxfordshire
<u>→</u> 05	Otter	Leominster
	a, Inis, Julia, sita, Malta, Ma , Pella, Pionae or, Sultan, Ter	
NO	Maris Otter Dea, Deba Abed, Dura,	Kelvedon(Essex) Kinver(Worcs)
) <del> </del> +	n, Tern Abed, Inis,	Inverness
<u>.</u>	Sultan(2), unknown(2) Dea, Deba Abed, Dura, Impala, Inis, Julia, Leon, Malta, Maris Otter Pella, Pioneer, Proctor,	Harper Adams (Salop)
いっつ	Tern, Vada. Abed Abed, Sultan Abed, Inis(2 Abed, Senta,	Flintshire Garstang(Lancs) Glamorgan
+	Sultan Akka, Deba Abed, Impala, Inis, Malta, Maris Otter	Edinburgh
- N -	3	Devon Dorset Dunmow (Essex)
7	đđ O	Park thumb)
ΝĘΝ	Dea, Senta Tern, unknown(3) Proctor, Sultan, Tern	Eristol Cambridge Carmarthenshire
N	Unk	Bishop's Castle (Salop)
W -> ->	Sultan Proctor or Sultan Deba Abed, Julia, Sultan	
<b>→</b> W	Inis, Julia, Tern Impala	Aberdeen Aberystwyth
No. of Samples	Source variety	Location

137	TOTAL	
0	Dura, Leon, Malta, Maris Otter, Pella, Senta.	Zeals (Wilts)
- N(	Senta Unknown	Wiltshire Wye(Kent)
ν	Malta Akka Sultan Topper	Theale(Berks)
No. of samples	Source variety	Location

## 4. Race Identification

50 isolations of the fungus were obtained from the 1968 samples of Rhynchosporium. Very few of these were frequencies with the RH4 gene for resistance. These isolates were identified as race B, and it was possible that there we a mix-up over labelling, or that the diseased plants were rogues. The remaining isolates have not yet been tested partly because of staff difficulties and partly because it was expected that they would belong to races A & B. It has been decided that races A & B should be re-named from was

i.e. Race A = U.K.1 Race B = U.K.2

### Summary

Races of samples, i.ē. Britain. Few the RH4 gene. Rhynchosporium identified from the 1968 U.K.1 & U.K.2 were distributed throughout isolates were obtained from varieties with

### Final Summery

- numbered 50. in 1967. 932 samples of disease were collected in 1968 compared with 1034 967. The proportion of yellow rust and <u>Phynchosporium</u> samples ess, whereas mildew samples had increased. Brown rust samples
- $\mathring{\wp}$ previously only identified in the glasshouse. a new physiclogic race. Seedling tests indi are susceptible The majority of wheat yellow rust samples were identified as belonging to the race 3/55 group (58% of 40% in 1967). Race 60 identified relatively few times mainly from susceptible disease nursery varieties rather than commercial varieties (2% of 40% in Several 40 isolates were identified as being similar to race 58, this race. Seedling tests indicate that many varieties These isolates may be Was
- 3 Many barley yellow rust isolates were unsuccessfully inoculated anto susceptible varieties. Spore multiplication of the remaining isola frequent been slow and few isolates race from samples successfully identified. Spore multiplication of the have been tested. Race 24 was the most remaining isolates has
- 5 no major gene res field resistance. najor gene resistance to these races although some varieties exhibit В, С, D& Е. Barley brown rust could be divided into five virulence groups, & E. Commercial barley varieties grown in Britain exhibit
- 9 does ton four cat crown rust samples were identifattack the Victoria gene for resistance. samples were identified as race 229, which
- 7. 26 was found to be virulent on seedlings of the variety Mildress. identified. Thirteen races of wheat mildew were Of these, races 3, 13, 16 and 26 were most frequently
  No new races were identified although an isolate of race
  and to be wirelent on seedlings of the . mildew resistant identified from the 1968
- Ω resistant variety Sultan. Two of these isolates were also capable of attacking the Impala resistance Mla6 and Mlg). The majority of barley mildew isolates (88% of 77% 1967) were identified as belonging to the Impala race group capable of attacking the Mla6 +1 Mlg genes for resistance and thus the majority of barley varieties grown commercially in Britain, isolates of barley mildew were virulent on the proviously
- 9 groups. Knynchosporium be distributed evenly Race A, \_\_races were identified and placed into two renamed UK7, and race B, renamed UK2. These buted evenly throughout Britain. These races race
- 0. The survey of nercury tolerant strains of Pyrenophora avenae was discontinued during 1968. during 1968.
- <u>-</u> and queries. More detailed information concerning the results of particular isolates, or the general work and results of the physiologic race surveys may be obtained from the Secretary who would welcone comments
- 12 I would like to thank Dr. M.S. Wolfe, Dr. H.Owen, Dr. B. Clifford Mr. I.T. Jones who carried out the identifications and contributed information contained in this report.
- 3 Those of us concerned with the identification of races and the preparation of this report would like to thank all participants who have contributed to this survey by sending in samples. Their cooperation has greatly assisted in carrying out the aims of this survey, i.e. the early identification of new physiologic races of cereal pathogens.

