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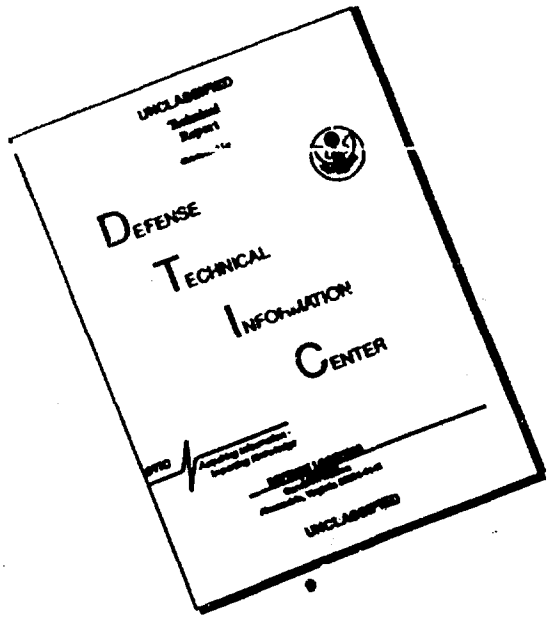

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DESCRIPTION OF SUSCEPTIBILITY OF WHEAT SPECIMENS FROM THE WORLD COLLECTION OF VIR [All-Union Institute of Plant Growing] TO BREEDS OF STEM AND BROWN MILDEW [rust] (Methodological Aids for Breeders)

Kharakteristika porazhayemosti rasami buroy i steblevoy rzhavchiny obraztsov pshenits iz mirovoy kollektsii VIR (Metodicheskoye posobiye selektsioneram) (English version above),
USSR Ministry of Agriculture, All-Union Scientific Research Institute of Plant Protection, All-Union Scientific Research Institute of Plant Growing
Leningrad, 1963, pages 1-83

Ye.G. Rassadina,
V.V. Shopina,
and
M.M. Yakubtsiner

Introduction

Wheat breeding for resistance to mildew breeds can be more effective if resistant varieties and forms are used as initial parent pairs for crosses.

Under the conditions prevailing at our breeding and experimental institutions the work on creation of resistant varieties with consideration of susceptibility of initial forms is not conducted by everyone and at all institutions by far.

At the present level, breeding for resistance to diseases is being conducted by many without due consideration of intraspecific variability of the parasite, without knowledge of the breed composition of the pathogen , its distribution in different zones. All this reduces to a significant extent the effectiveness of work on producing resistant varieties and hybrids.

At the Laboratory of Immunity of VIZR (All-Union Institute of Plant Protection) work has been in progress for a number of years for

identification of resistant original wheat specimens from the world collection of VIR with respect to brown and stem mildew. These studies are being pursued with due consideration of the distribution of different breeds in the country, their aggressiveness and spectra of action.

The work was done with specially selected specimens of spring and winter wheat (totalling 830 specimens) suitable for use in different zones of the country. These specimens were selected by the head of the VIR wheat section, M.M. Yakubtsiner, with due consideration of their geographic origin, diversity of botanical composition and ecological characteristics. They included wheat referable to the main species: Triticum aestivum and Tr. durum. In addition rare species were also included: Tr. turgidum; Tr. compactum, Tr. polonicum, Tr. carhlicum, Tr. turanicum, Tr. aethiopiaem, Tr. macha, Tr. spelta and others.

This collection includes many varieties of spring wheat released to different rayons in different zones and republics of the USSR, a number of domestic local and breeding varieties, and diverse foreign initial breeding material.

A study of the breed composition of brown and stem mildew of wheat in our country enabled us to discover breeds with a broad spectrum and breeds that may grow in the next few years in view of the addition of new varieties of wheat.

We found that the following breeds of brown mildew may be of importance on the territory of our country: 77, 113, 116, 80, 91, 82. The following breeds may be significant in the next few years: 65, 47, 115, 125. The following are widespread breeds of wheat stem mildew: 15, 40, 126; the breeds that may grow in the future are 21, 100. The above-mentioned breeds of brown mildew are distributed in the following zones:

77 -- everywhere;
82 -- in Kievskaya and Moskovskaya oblasts, Moldavian SSR, Lithuanian SSR and North Ossetian Autonomous SSR;
91 -- in almost all oblasts of Ukrainian SSR, Moldavian SSR, Tselinnyy Kray and Moskovskaya Oblast;
113 -- Moskovskaya, Novosibirskaya, Omskaya, Sverdlovskaya oblasts;
116 -- Krasnodarskiy Kray, Odesskaya, Poltavskaya, Stanislavskaya, Kievskaya, Voronezhskaya, Rostovskaya oblasts, Moldavian SSR, Dagestan Autonomous SSR;
65 -- Krasnodarskiy Kray, Odesskaya, Omskaya, Volgogradskaya oblasts, Kirgiz SSR, Moldavian SSR, Azerbaydzhan SSR, North Ossetian Autonomous SSR;
47 -- Sverdlovskaya and Krymskaya oblasts, Uzbek SSR, Armenian SSR, Kirgiz SSR;
115 -- Krasnodarskiy Kray, Krymskaya Oblast, Tselinnyy Kray, Lithuanian SSR;

125 -- Kievskaya, Saratovskaya and Volgogradskaya oblasts, Lithuanian SSR, Modavian SSR, Kirgiz SSR.

Wheat stem mildew breeds are distributed in the following zones:

15 -- Ukrainian SSR, Moldavian SSR, Dagestan Autonomous SSR; Krasnodarskiy Kray, Permskaya Oblast;
126 -- Krasnodarskiy Kray, North Ossetian Autonomous SSR, Orlovskaya and Kustanayskaya oblasts;
100 -- Moldavian SSR, Dal'nevostochnyy, Primorskiy, Altayskiy, Krasnodarskiy krays, Mogilevskaya and Vinnitskaya oblasts;
40 -- Khabarovskiy, Altayskiy and Krasnodarskiy krays, Dnepropetrovskaya and Tselinogradskaya oblasts;
21 -- Moldavian SSR, Azerbaydzhan SSR, Krasnodarskiy Kray, Novosibirskaya, Leningradskaya, Kustanayskaya and Krymskaya oblasts.

In view of the difference in nature of susceptibility of the same wheat sample to different breeds it is necessary to know exactly the degree of resistance of forms involved in crosses to each breed individually. On this basis, we determined the resistance of all selected specimens individually to all of the above-mentioned breeds of brown and stem mildew.

Determination of resistance was made using artificial infection at the following stages: shoots and lactic maturity. Resistance was determined according to the following immunity scales: Jackson and Mayns for brown mildew, and Steckman and Levin for stem mildew.

Following are the characteristics of these scales:

type (points) 4 -- very susceptible varieties [strains];
" " 3 -- moderately susceptible varieties;
" " 2 -- mildly susceptible varieties;
" " 1 -- resistant varieties;
" " 0 -- highly resistant (immune) varieties;
" " X -- heterogeneous type of susceptibility (unestablished resistance).

As a result of the work conducted it was possible to characterize the resistance of a large group of wheats (the list is attached).

The list indicates that most of the specimens (88.7%) are referable to the group of markedly and moderately susceptible to all of the tested breeds of both species of mildew. Only a few (12.3%) were mildly susceptible and even fewer (3%) were immune.

In addition to specimens manifesting resistance or susceptibility to the entire set of pathogen breeds we also found some that are susceptible

to some breeds and not to others. Such specimens are also of interest for breeding work. Knowing the distribution of pathogen breeds one can select specimens for crosses that are not susceptible to the breeds encountered in the zone of breeding the variety.

V.V. Whopina (VIZR) conducted the work on determination of breed composition of brown mildew and characteristics of wheat resistance to breeds of this pathogen, Ye.G. Rassadina (VIZR) conducted similar work with respect to stem mildew, under the supervision of the head of the VIZR laboratory of immunity, Professor T.I. Fedotova, Doctor of Agricultural Sciences. M.M. Yakubtsiner (VIR) classified the initial material according to ecological groups.

[Key to Table beginning on source pages 8-9]

Column 1 — VIR catalogue No
Column 2 -- variant
Column 3 -- variety [strain]
Column 4 -- origin
Columns 5 through 13 -- breeds of brown mildew
Columns 14 through 18 -- breeds of stem mildew

Column 3	Column 4
WHEAT VARIETIES RELEASED TO USSR RAYONS	
<u>Soft spring Wheat</u>	
Akmolinka I	Kazakh SSR, VNIIZKh [All-Union Scientific Research Institute of Grain Crops]
Apu	Finland
Albidum 43	Scientific Research Institute of Agriculture of the South-East
Local Babilo	Tadzhik SSR
Bashkurskaya 4	Bashkir Autonomous SSR
Vatan	Uzbek SSR
Galgaloc	Armenian SSR
Garnet	Canada
Grazhuchyay	Lithuanian Scientific Research Institute of Agriculture
Diamant	Sweden
Iroda 1006	Tadzhik Scientific Research Institute of Agriculture
Kazakhstanskaya 126	Kazakhstan Scientific Research Institute of Agriculture
Karagandinskaya	Karagandinskaya Oblast Agricultural Experimental Station
Leda	Krasnoyarsk Scientific Research Institute of Agriculture
Lutescens 62	Scientific Research Institute of Agriculture of the South-East

[source pages 8-9 continued]

column 3	column 4
Lutescens 801	Kinel'sk. Breeding Station
Lutescens 1729	Krasnoyarsk Scientific Research Institute of Agriculture

[source pages 10-11]

Milturum 321	SibNIISKhOZ [Siberian "Order of Red Banner of Labor" Scientific Research Institute of Agriculture]
Milturum 553	" " " " "
Moskovka	Scientific Research Institute of Agriculture of Central Nonchernozem Zone Rayons
Odesskaya 13	All-Union Breeding and Genetics Institute
Saratovskaya 36	Scientific Research Institute of Agriculture of the South-East
Sarrubra	" " " "
Smena	SibNIISKhOZ
Surkhak 5688	Tadzhik Scientific Research Institute of Agriculture
Sary-Biday	Kazakh SSR, Chimentskaya Oblast
Caesium 94	SibNIISKhOZ
Caesium III	"
Yakutanka 224	Yakutsk Scientific Research Institute of Agriculture

Hard Spring Wheat

Hordeiforme 10	SibNIISKhOZ
Kustanayskaya 14	Kustanay State Agricultural Experimental Station
Melanopus 69	Krasnokutsk Breeding Station
Charnokoloska	SibNIISKhOZ

[source pages 10-11, continued]

column 3	column 4
Soft Winter Wheat	
Alborubrum 22308	Krasnovodopadskaya State Breeding Station
Arazbugdasy	Azerbaydzhan Scientific Research Institute of Agriculture
Batkan krasnaya	Przheval' Experimental Field

[source pages 12-13]

Local Vysokolitovskaya	Belorussian SSR
Hostianum237	Scientific Research Institute of Agriculture of the South East
Graecum 433	Krasnovodopadsk State Breeding Station
Karmir Sifaat, local	Armenian SSR
Milturum pererod	Orlovskaya oblast
Odesskaya 3	All-Union Breeding and Genetics Institute
Rye-wheat hybrid 46/131	Scientific Research Institute of Agriculture of the South-East
Stepnaya 135	Scientific Research Institute of the Central Chernozem Zone
Turcicum, local	Nakhichevan Autonomous SSR
Turcicum 57	~~b. [expansion unknown]~~ former Turkmen Breeding Station
Ukrainka	Mironov Experimental Breeding Station
Ferrugineum 9704/2	Azerbaydzhan Scientific Research Institute of Agriculture
Hard Wheat, Fall Planting	
Arandany	Azerbaydzhan Scientific Research Institute of Agriculture
Sary-Bugda	Azerbaydzhan SSR

[source pages 12-13, continued]

column 3	column 4
DOMESTIC SPECIMENS	
ECOLOGICAL GROUPS OF SOFT SPRING WHEAT	
Volga Steppe	
Erythrospermum 341	Scientific Research Institute of Agriculture of the South-East
" 0./78	" " "
Turcicum 2447	" " "

[source pages 14-15]

Albidum 21	" " "
Lutescens 53/12	" " "
Lutescens 3221	" " "
Saratovskaya 33	" " "
" 35	" " "
Russkaya	Saratovskaya Oblast
"	" "
Poltavka	" "
Amerikanskaya	" "
Poltavka	" "
Chudo	" "
Rusak	Volgogradskaya Oblast
"	" "
	" "
Southern Steppe	
Girka	Rostovskaya Oblast
"	Stavropol'skiy Kray
Erythrospermum 2260	Stavropol' Experimental Breeding Station
Lutescens 1163	All-Union Breeding and Genetics Institute

[source pages 14 -15, continued]

column 3	column 4
Eastern Steppe	
Noe	Omskaya Oblast
Strain Mixture	Karagandinskaya Agricultural Experimental Station
A_2-47	" " "
B-022	" " "
	Aktyubinskaya Oblast
Gracum Chingirlausskiy	Ural'skaya Oblast
Girka	Alma-Atinskaya Oblast

[source pages 16-17]

Southern Forest-steppe	
Milturum 162	Ukrainian Scientific Research Institute of Plant Growing, Breeding, and Genetics
	Chernovitskaya Oblast
Ferrugineum 13	Krasnodar Scientific Research Institute of Agriculture
Pionerka	Stavropol' Experimental Breeding Station
Yarovaya Ukrainka	Alma-Ata Breeding Station
Volga Forest-steppe	
Lutescens 1487	Kuybyshevskaya Oblast State Experimental Agricultural Station
" 32	" " " "
" 35	" " " "
Gor'kovskaya 15	Gor'kiy Experimental Agricultural Station
Eastern Forest-steppe	
Golubka	Kustanay State Strain Testing Plot
	Severo-Kazakhstanskaya Oblast
	" " " "
	" " " "
	" " " "
	" " " "
	" " " "
	" " " "
	" " " "
	" " " "
	" " " "
	" " " "
	" " " "
	Vostochno-Kazakhstanskaya Oblast

[source pages 18-19]

column 3	column 4
Duvanskaya krasnokoloska	Bashkir Autonomous SSR
Milturum 13	Altay Scientific Research Institute of Agriculture
Shadrinka 38	Shadrin Experimental Station
Lutescens 956	SibNIISKhOZ
Milturum 2078	"
Lutescens 379	Novosibirskaya Oblast Experimental Agricultural Station
Sibirskaya	Tyumenskaya Oblast
East Siberian Forest-steppe	
Kamalinka	Krasnoyarsk Scientific Research Institute of Agriculture
Krasnoyarskaya 1103	" " "
Urozhaynaya 716	Yakutsk Scientific Research Institute of Agriculture
Ferrugineum 960	" " " "
Circumpolar	
Alen'kaya uluchshennaya	Altay Scientific Research Institute of Agriculture
Sibirka 1818	Tulun State Breeding Station
Sibirka Yartsevskaya	Yartsev Reference [opornyy] Center
B-633	" " "
B-624	" " "
Sibirka	Arkhangel'skaya Oblast

[source pages 20-21]

North Russian Forest	
Belorusskaya 525	Belorussian Scientific Research Institute of Agriculture
Velikovskaya	Kostromskaya Oblast
Sibirskaya	" "
	Kirovskaya Oblast
	" "
	Bryanskaya Oblast
	Latvian SSR
	Permskaya Oblast
Far Eastern Maritime	
	Primorskiy Kray
	" "
Amurskaya golokoloska	Amurskaya Oblast

[source pages 20-21, continued]

	column 3	column 4
		Sakhalin
	Kaba 135	Sakhalin Base of USSR Academy of Sciences
	Khon 244	" " " " "
	" 209	" " " " "
	Akatsuki	" " " " "
	Minaminasi	" " " " "
	Khoku 220	" " " " "
	Khon 240	" " " " "
	Karafuto 2	" " " " "
	" 3	" " " " "
	Khoku 130	" " " " "
	Kaba 105	" " " " "
	" 115	" " " " "
	Local 117	" " " " "

[source pages 22-23]

Column 2		
		Armenian-Nakhichevan (steppe) Caucasian Mountain Region
population		Armenian SSR
"		" "
		Central Asian Bogar [dry] Region
	Pseudoturcicum 2115	Krasnovodopad State Breeding Station
	Graecum 289	" " " "
	Erythrospermum 5437	Burnensk Experimental Field
	Terema	Kazakh SSR
		Yuzhno-Kazakhstanskaya Oblast
		Uzbek SSR
	Bokhary	" "
	Erythrospermum 5/55	Milyutin State Breeding Station
		Central Asian Lowlands (irrigated)
population		Turkmen SSR
	Kizyl-Bugday	Khorezmskaya Oblast
	Andizhanskaya	Uzbek SSR
	Sary-Biday	Chikmentskaya Oblast
	Erythrospermum 5437	Dzhambulskaya Oblast
		High Altitude Central Asian
		Tadzhik SSR
		" "
		" "
		" "
		" "
		" "
		" "

[source pages 24-25]

column 3	column 4
	Tadzhik SSR
	" "
	" "

Hybrid Siberian Group of Soft Wheats

178-F	Tulun State Breeding Station - VIR
GDS-6	" " " " "
GDS-II	" " " " "
Complex hybrid 9/3	" " " " "
Sibirskaya 1527	Tulun State Breeding Station
Udarnitsa	" " " "

ECOLOGICAL GROUPS OF HARD SPRING WHEAT

Volga Steppe

Astrakhanskaya	Kazakh SSR

Eastern Steppe

	Kirgiz SSR

Southern Steppe

Arnautka	Ukrainian SSR

Mediterranean Falcate

Ioanna	Belorussian SSR

[source pages 26-27]

ECOLOGICAL GROUPS OF SOFT WINTER WHEAT

Volga Steppe

Lutescens 329	Scientific Research Institute of Agriculture of the South-East

Southern Forest-steppe

Lesostepka 75	Belotserkov Experimental Breeding Station
Zernogradka	Zernograd Breeding Station
Banatka	Kalininskaya Oblast

[source pages 26-27, continued]

column 3	column 4
North Russian Forest	
Akuotuotey	Lithuanian Scientific Research Institute of Agriculture
Yaranka	Falen Breeding Station
Mos-4	Scientific Research Institute of Agriculture of the Central Rayons of the Nonchernozem zone
	Kaliningradskaya Oblast Experimental Agricultural Station
Strain mixture	Ivanovo Experimental Breeding Station
Forest-steppe of Mountainous Caucasus	
Dzali-Sura 35/3	Georgian Experimental Breeding Station
	Dagestan Autonomous SSR

[source pages 28-29]

Mountainous Caucasus Steppe	
	Armenian SSR
	Nakhichevan Autonomous SSR
Subtropical Mountainous Caucasus	
Rachula	Georgian Experimental Breeding Station
Tskhumari	Georgian SSR
Central Asian Lowlands (irrigated)	
Meridionale 77	Former Turkmen Breeding Station
Kirgizskaya 72	Kirgiz Scientific Research Institute of Agriculture
Kara-Kel'tek	Uzbek SSR
Dagestan-Azerbaydzhan	
	Nagorno-Karabakhskaya Autonomous Oblast

ECOLOGICAL GROUPS OF HARD WHEAT SOWN IN THE FALL

Dagestan-Azerbaydzhan	
Chay-bugday	Dagestan Autonomous SSR
Kanadka	Azerbaydzhan SSR
	Nakhichevan Autonomous SSR
Tselinnaya Kazakhstanskaya	Kazakh SSR
Chaza	Georgian SSR

[source pages 32-33, continued]

column 3	column 4
Chinese (in the broad sense)	
	China
Kuan-tung-Ta-hung-mai	"
Bima I	"
	"
	"
	"
	"
	"
	"
Mao ch'uang-t'o	"
	"
Chengun 939	"
	"
	"
	"
[source pages 34-35]	
	"
P-36-3	"
	"
	"
	"
	"
	"
	"
	"
	"
	"
	"
	"
	"
	"
	"
Tuglek	"
	"
	"
	"
	"
Mastlovasi	"
	"
	"
	"

[so rce pages 36-37]

column 2	column 3	column 4
	Central Asian (Kashgarian)	
population	Ak-Biday	
	Kul'zhinskaya	
	Ak-Mekke	
	Mongolian	
population		Mongolia
		"
		"
		"
	Far-Eastern (Manchurian)	
		China
		"
		"
		"
	Lyagonskaya	"
	Japanese	
		Japan
		" "
		"
		"
		"
[source pages 38-39]	**Central Asian**	
		Afghanistan
		"
		"
		"
		"
		"
		"
		"
		Iran
		"
	Shakhrud	"
	Zarand	"
	Gendum Abi	"
	Anatolian	
population		Turkey
		"
population		"
"		"
		"
		"

[source pages 38-39, continued]

column 2	column 3	column 4
		Near Eastern
		Iraq
population		Syria
		Israel
		"
		Saudi Arabia
	Damarskaya	Yemen
		"
[source pages 40-41]		
		United Arab Republic
		" " "
		" " "
		Mediterranean
		Morocco
		"
		Algeria
		"
		Eritrea
		"
		Sardinia
		Greece
		Pyrenees
		Spain
		"
		"
		Portugal
		Danube Region
		Austria
		"
		"
		Roumania
		Czechoslovakia
		"
[source pages 42-43]		
		Bulgaria
population		Yugoslavia
		Hungary
		"

[source pages 42-43, continued]

column 2	column 3	column 4
	North-European	
		Finland
		"
		"
		"
	Circumpolar	
		USA (Alaska)
		Switzerland
	Andes	
		Chile
		"
		"
		"
		"
		"
		"
		"
		"
		"
		"
		"
[source pages 44-45]		Peru
		"
		"
		Uruguay
		Brazil
		"
		"
		Mexico
		"
		"
		"
		"
	HYBRID GROUPS OF SOFT SPRING WHEAT	
	Kenyan	
		Kenya
		"
		"
		"
		"

[source pages 44-45, continued]

column 3	column 4
	Appenines
	San Marino
	"
	Italy
	"
	"
[source pages 46-47]	
	"
	"
	Polish
	Poland
	"
	"
	"
	Scandinavian
	Sweden
	"
	Finland
	"
	Denmark
	West European
	German Democratic Republic
	" " "
	" " "
	" " "
	France
	"
	"
	North American
	Canada
	"
	"
	"
	"
[source pages 48-49]	
	"
	"
	"
	"
	"
	"
	"
	"
	"
	"
	"
	"

[source pages 48-49, continued]

column 3	column 4
Kitayskaya [Chinese]	Canada
Kitayskaya x krasnaya yegipetskaya [Chinese X Red Egyptian]	"
"	"
"	"
Bezostaya [awnless] 609	"
Ostistaya [awned] 609	"
	"
	"
	"
	"
	USA
	"
	"
	"
D.S.	"
D.S. 1664	"
	"
	"
	"

[source pages 50-51]

	"
	"
	"
	"
Hybrid H44	"
D.S. II	"
	"
	"
	"
	"
	"
	"

Argentinian

	Argentina
	"
	"
Complex hybrid	"
	"
	"
	"
	"
	"
	"
	"
	"
	"
	"
	"
	"

[source pages 52-53]

column 2	column 3	column 4
		Argentina [repeated for 22 more lines]
		Australia
		" [repeated for 6 more lines]

[source pages 54-55]

		Australia
		" [for 9 lines]
		Republic of South Africa
		" " "
		" " "

ECOLOGICAL GROUPS OF HARD SPRING WHEAT

Near Eastern

		Jordan
population		"
"		Israel
		"
		"
		"
		Syria
population		"
		"
"		"
	Arabi	Iran
		Iraq
		"

[source pages 56-57]

		United Arab Republic
		Malta

Cypriite

population		Cyprus
"		"
"		"
		"
		"

Kilikiyskaya [?]

	Kara Kylchik	Turkey

[source pages 56-57, continued]

column 2	column 3	column 4
	Egyptian	
		United Arab Republic
		" " "
population		" " "
		" " "
	East Mediterranean	
		Algeria
		"
		"
		Tunisia
		"
population		"
		Morocco
		"
		Republic of South Africa
		" " "

[source pages 58-59]

	West Mediterranean	
population		Italy
		"
		"
		"
population		"
		"
		"
		"
		"
	Mediterranean (Falcate)	
		Portugal
		Morocco
		Syria
Pangelos		Crete
Goloshan'		China (Hsinchiang)
"		" "
	Balkans	
		Greece
		"
		Albania
		"
		"
		Turkey
		"
Yery buday		"
		Rhodes

[source pages 60-61]

column 2	column 3	column 4
		Pyrenees
		Portugal
		" [3 times]
		Spain
		Hindustanian
		India
		"
		Chinese
		China
		"
		Andean
		Uruguay
		Peru
		Chile
		"
		"
		HYBRID GROUPS OF HARD SPRING WHEAT
		North-African
		Tunisia
		North American
		USA
		" [3 times]
		Different Forms
population		USA
		"
[source pages 62-63]		
		Australia
		France
		Czechoslovakia
		Mongolia

[source pages 62-63, continued]

column 2	column 3	column 4
	ECOLOGICAL GROUP OF SOFT WINTER WHEAT	
	Central Asian (Kashgara)	
	Vali belaya	China
	Ak. chuschi	"
population	Kizma-Kyuzga	"
		"
		"
		"
population		"
		"
"	Kara-basman	"
		"
	Krasnaya [red]	"
	Touchan belaya [white]	"
	Yarkendskaya	"
		"
		"
		"
		"
population		"
"		"
		"
		"

[source pages 64-65]

	Kashmir	
		India
	Iranian	
	Kusse	Iran
population		"
"		"
	East Asian	
	Ten-yuk 15	Korean People's Democratic Republic
		Japan
		"
	Mediterranean (large grain)	
		Italy

[source pages 64-65, continued]

column 2	column 3	column 4
		Balkans
population		Bulgaria
"		"
"		"
"		"
"		"
		"
"		"
prevalence of lutescens population		"
"		"
"		"
"		"
"		"

[source pages 66-67]

population		"
"		"
prevalence of ferrugineum		"
"		"
population		"
prevalence of erythrospermum		"
		"
		"
		"
		"
		"
population		"
"		"
prevalence of erythrospermum		"
population		"
" [13 lines]		" [13 lines]

[source pages 68-69]

population		Bulgaria
" [6 lines]		" [6 lines]
prevalence of erythrospermum		"
population		"
prevalence of lutescens		"
	Yubileynaya [jubilee] II	"

[source pages 68-69, continued]

column 2	column 3	column 4
		Greece
		Yugoslavia
		"
	Bochka	"
		"
	Bela	"
	P-53	"
	Zhuzhitsa belaya	Albania
		Alps
		Switzerland
		"
		Danube Region (Forest-steppe)
		Hungary
	Teyskaya	"
	Tsioneshti	Rumania
		"
		Czechoslovakia
		Austria

[source pages 70-71]

HYBRID GROUPS OF SOFT WINTER WHEAT

	Appenines
	Italy
	" [4 lines]
	West-European
	German Democratic Republic
	" [5 lines]
	Belgium
	Holland
	" [3 lines]
	France
	" [3 lines]
	Scandinavian
	Norway
	Sweden

[source pages 72-73]

	South American
	Argentina
	Chile

[source pages 72-73 continued]

column 2	column 3	column 4
		Different Forms
		USA
		"
		Canada
		Tunisia
		Poland
		Spain
		"
		France
		"
		Hard Winter Wheats
		Roumania
		"
	Karabashak	Yugoslavia
population		"
"	Karabashak	"
		Bulgaria
		"
	Chirpak 13	"
prevalence of hordeiforme		"
prevalence of murciense		"
		"
		"

[source pages 74-75]

prevalence of hordeiforme		"
		"
"		"
		"
		"
		"
"		"
		"
prevalence of murciense		"
population		"
prevalence of hordeiforme		"
		"
"		"
		"
		Albania
		"
		"
	Barani 2	Iran

[source pages 74-75, continued]

column 2	column 3	column 4
		RARE HEXAPLOID SPECIES OF SPRING WHEAT
		Dwarf Wheat (Tr. compactum Host)
		Rostovskaya Oblast
		Turkey
		Israel
		China

[source pages 76-77]

	" [5 lines]
	German Federal Republic
	Tr. Spelta L.
	Switzerland
	"
	Spain
	"
	"
	German Democratic Republic
	L'vovskaya Oblast
	RARE TETRAPLOID SPECIES OF SPRING WHEAT
	Tr. turanicum Jakubz.
Migri bugda	Uzbek SSR
	Dagestan Autonomous SSR
	Kirgiz SSR
	Tadzhik SSR
	Turkey
	Iran
	Ethiopian Wheat (Tr. aethiopicum Jakubz.)
	Ethiopia
	" [4 lines]
	Yemen

[source pages 78-78]

	Persicum Wheat (Tr. carthlicum Nevski)
	Armenian SSR
	Dagestan Autonomous SSR
	Georgian SSR
	"
	North Ossetinian Autonomous SSR

[source pages 78-79, continued]

column 2	column 3	column 4
		Tr. Turgidum L.
	Ak biday	Kazakh SSR
	Kakhetinskaya vetvistaya	Georgian SSR
		Turkey
		Syria
		Crete
		Spain
		" [3 lines]
		Portugal
		"
		Italy
		Algeria
population		Chile
	Lao-Pai-p'i	China
		"
		Tr. polonicum L.
		Kazakh SSR
		Georgian SSR
		Adygeyskaya Autonomous Oblast

[source pages 80-81]

	Israel
	"
	"
	Turkey
	Cyprus
	Ethiopia
	German Democratic Republic
	Wild Spelt (dicoccoides schweinf.)
	Israel
	RARE HEXAPLOID SPECIES OF WINTER WHEAT
	Dwarf Wheat (Tr. compactum Host)
	Turkmenian
	China
	" [3 lines]
	Chile
	"
	German Federal Republic

[source pages 80-81, continued]

column 2	column 3	column 4
	Tr. macha Dek. et Men.	
		Georgian SSR
		" " [5 lines]

[source pages 82-83]

	Spelt (Tr. spelta L.)	
		Austria
		"
	RARE TETRAPLOID SPECIES OF WINTER WHEAT	
	Turgidum Wheat (Tr. turgidum L.)	
		Azerbaydzhan SSR
		" " [3 lines]
		Georgian SSR
	Milovskaya	L'vovskaya Oblast
		Turkey
		Greece
population		Yugoslavia
	Zafrani	Afghanistan
		China
		Switzerland
		German Democratic Republic
		Poland
		England
	Wild Spelt (Tr. dicoccoides schweinf.)	
population		Israel