With compliments

WHEAT INFORMATION SERVICE

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I. Research Notes

Effect of chromosomes XII and XVI on the action of Neatby's virescent

E. R. Sears
U. S. Department of Agriculture, Columbia, Missouri, U. S. A.

Plants monosomic for chromosome XVI and heterozygous for Neatby's virescent *v*, a largely recessive gene located on chromosome III, bear 15~20% shriveled seeds, and all their virescent offspring are disomic. This indicates that the combination mono-XVI *vv* is a seed lethal. Mono-XII *Vv* also produces shriveled seeds, but in lower frequency; and about half the virescent offspring are monosomic. These monosomics are much smaller and less vigorous than their disomic sibs, showing that mono-XII *vv* results in poor viability when not lethal.

One virescent offspring of mono-XVI *Vv* had a small white sector. Instead of two normal XVI chromosomes, it carried one normal and one isochromosome. Since isochromosomes are sometimes lost somatically, it is reasonable to assume that the white sector was deficient for this chromosome and hence was mono-XVI *vv*. From seeds borne on the green portion of the plant, offspring were obtained which had the following doses of the arm of XVI involved in the isochromosome: two (two normal chromosomes), three (one normal and one iso), four (two isos), and five (one normal and two isos). Plants with two and three doses were virescent, with the latter being more vigorous. Individuals with four and five doses were non-virescent (*i. e.*, green).

It appears, then that chromosomes XII and XVI, which are homoeologous with III, carry genes which compete with *v*. This is in line with the suggestion previously made (Sears, WIS No. 3) that *V* is a member of a triplicate series concerned with chlorophyll development.

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Cytogenetics of solid stem in common wheat: Monosomic F_2 analysis of the variety S–615

R. I. LARSON
Science Service Laboratory, Department of Agriculture
Lethbridge, Alberta, Canada

Varieties of common wheat, *Triticum aestivum* L. *emend* Thell., with pithy culms are more resistant than those with hollow culms to the wheat stem sawfly, *Cephus cinctus* Nort. The two sawfly resistant varieties, Rescue and Chinook, licensed to be grown in Canada had as their resistant parent S–615, a Portuguese variety obtained by the Dominion Experimental Farm at Swift Current from Lincoln College, Christchurch, New Zealand. None of these so-called solid-stemmed varieties is immune to sawfly attack, and none has culms completely filled with pith. Although it has not been demonstrated that pith is the only factor that makes a wheat variety resistant to sawfly, those environmental field conditions that tend to make the culm hollow also tend to make the crop susceptible to the sawfly. Therefore an investigation of the genetics of solid stem in S–615 to identify the chromosomes bearing genes affecting pith production was initiated in the hope that this knowledge would improve opportunities of combining these genes with those from other sources.

Four monosomic F_2 lines, XIII, XIX, XX and XXI were more solid than the normal F_2 population of Chinese Spring × S–615 in every test in which an adequate sample was examined. This shows that these chromosomes, at least in Chinese Spring, carry genes for hollow stem. The change from a tetrahybrid to a trihybrid ratio in mono-XIII shows that Chinese Spring XIII has one gene for hollow stem and S–615 has not. As the loss of the other chromosomes did not change the apparent number of segregating genes it is probable that also they tend to make the culm hollow in S–615.

Monosomics I, VIII, IX, X and XI were less solid than the normal F_2 population in 1948 but not in 1949, when conditions were less faborable for pith development. Generally, this appeared to be due to a change in dominance relations of the genes. Monosomic VIII fit a trihybrid ratio best in 1949, suggesting that Chinese Spring chromosome VIII has a gene for solid stem not possessed by S–615. The linkage between solid stem and hooding supports this view. Mono–XII was less solid than normal in both 1948 and 1949.

There is some evidence that chromosomes affect pith distribution. Although the loss of the chromosomes of homoeologous group 2 was quantitatively different from chromosome to chromosome and from year to year, the pith pattern of the monosomics had similar relations to their normal checks. Monosomic XVIII, too, in hybrids with several varieties, showed a characteristic pith pattern, tending to be slightly more solid in the top internode and less solid in the lower internodes than the respective normal hybrid, The only associations of solid stem and morphological characters concerned the hooded awns of Chinese Spring, as mentioned above, and the lax spike of S–615. As spike density is a genetically complex character, it does not help locate genes for solid stem.

These results support many previous reports that the D genome tends to make the culm of wheat hollow in that loss of any of the 3 D-genome chromosomes, XIX, XX and XXI, has resulted in a more nearly solid culm. Chromosome XX carries the gene O_D as identified by Yamashita (1937, 1947) and Matsumura (1952, 1953). Of its homoelogues II and XIII, II probably carries the gene m_A in the A genome and XIII has the gene for the hollow stem at locus M_B in the B genome.

This F_2 monosomic analysis of a quantitative character has shown that it is far more effective in locating genes in the monosomic parent than those in the variety that is tested against it. No genes in S–615 for solid stem have been located, probably because they are recessive. The proportion of disomic plants in a monosomic population is approximately one-fourth, the same as the proportion of homozygous recessives in a normal F_2 population. Monosomic lines of S–615 should reveal chromosomes critical for genes promoting solid stem.

(*Excerpted from the author's draft by K. Y., Oct. 15, 1957*)

Further information on identification of the chromosomes in the A and B genomes

M. Okamoto
Curtis Hall, University of Missouri
Columbia, Missouri, U. S. A.

Subsequent to the previous report (Okamoto, WIS No. 5) on the identification of certain chromosomes of the A and B genomes, additional data have been obtained, and chromosomes III, X and XII added to the list.

In crosses of the amphidiploid *Triticum aegilopoides* × *Aegilops squarrosa* (AADD) with Chinese Spring wheat (AABBDD), in which the F_1's carried a telocentric for a particular A- or B-genome chromosome, heteromorphic bivalents were observed as given in the following table.

On the basis of the differences in the frequency of heteromorphic bivalents, chromosomes VI, IX, XI and XII are in the A genome and chromosomes I, III, V, VII, VIII and X are in the B genome. Since it may be assumed that homoeologous chromosomes are in different genomes, XIV and IV must be in genome A.

The above results agree with Larson's hypothesis as concerns chromosomes I and XIV, IV and VIII, and VI and X, but disagree for chromosomes III and XII, V and IX, and VII and XI.

The finding that IX is in the A genome conflicts with the long-standing assumption, for which Matsumura (1947, 1951) has presented corroborative data, that this chromosome is in the B genome. However, although the fact that telo-V forms a heteromorphic bivalent in low frequency is somewhat anomalous, the present results apparently leave no escape from the conclusion that IX is in the A genome. A possible explanation for Matsumura's results, which involved a comparison of AABBDD×AA deficient and non-deficient for chromosome IX, can be found in the reduced pairing caused by chromosome V in AABBDD×AADD (Okamoto, WIS No. 5). Chromosome IX may have had a similar effect in Matsumura's material.

Chromosome	Homoeologous group	Number of cells observed	Number of heteromorphic bivalents		
			Unequivocal	doubtful	Percentage of sure heteromorphic bivalents
I	1	283	0	1	0
XII	3	141	10	0	7 02
III	3	260	0	2	0
VIII	4	760	0	1	0
IX	5	1450	141	0	9.73
V	5	2185	38	1	1.73
VI	6	500	53	25	10.60
X	6	332	0	5	0
XI	7	265	8	2	3.61
VII	7	500	0	0	0

Because of the discovery of Sarkar and Stebbins that the B genome most probably came from *Ae. speltoides* or one of its close relatives, there is no longer any basis for the belief, expressed by McFadden and Sears (1946), that the free-threshing gene (Mac Key's *Q*) was obtained from the B-genome ancestor; for no such gene is known in the *Ae. speltoides* group. *Q* presumably arose as a mutation in either tetraploid or hexaploid wheat, and may just as well have arisen on a chromosome of either the A or B genomes.

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Further studies on the synthesis of a permanent RT-heterozygote in Einkorn wheat

K. Yamashita

Biological Laboratory, Kyoto University
Kyoto, Japan

In WIS No. 3, it was reported that an attempt to combine the lethal genes into a ring complex was in progress in Einkorn wheats, so that the plant maintains an RTheterozygosity as ⑥$= \frac{d\text{-}e\ f^{l}}{d^{l}e\text{-}f}$, where d–e and e–f are the translocation chromosomes, d^l involves lethal-1 and f^l lethal-2, respectively. The object has been attained partly as shown in the following table.

Segregation in the strains with (1) and without (2) lethal gene (lethal-2) on f-chromosome in the ⑥-complex

	Total	Lethal	Viable			
(1)	477	123	354			
			observed	⑥$+4_{II}$	7_{II}	others*
			196	131	62	3
(2)	151	—	151			
			observed	⑥$+4_{II}$	7_{II}	others*
			74	36	37	1

* Haploids.

In the former strains, in which f^l chromosome with lethal-2, namely, f^l, is not involved in the ring complex, ⑥$+4_{II}$ and 7_{II} segregated in a ratio of 1:1, while in the latter, in which f^l chromosome is involved in the ring complex, the segregation of ⑥$+4_{II}$ and 7_{II} was 2:1, indicating that half number of 7_{II}-segregants died off due to the balanced lethal mechanism. d^l chromosome was not combined successfully though attempted. Further studies are in progress.

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A preliminary experiment on carbon dioxide fixation of a mutant "orange" in Einkorn wheat

K. Yamashita, Z. Kasai and K. Asada

Biological Laboratory and Institute of Food Science
Kyoto Univ., Kyoto, Japan

An X-ray induced mutant "orange" in *T. monococcum vulgare* was used in the present studies. The mutant has carotinoid pigments but is deficient of chlorophylls, and dies at the seedling stage as do albinos. The mutant and normal plants were placed in a glass chamber containing carbon dioxide labelled with C^{14} for an hour ~~a certain number of days~~, and then the fixation of $C^{14}O_2$ was checked by cpm / 5 plants. The preliminary results are given as follows:

$C^{14}O_2$ Fixation in Einkorn wheat (cpm / 5 plants)

Days after planting	Normal			"orange"		
	alc. sol.	residual	total	alc. sol.	residual	total
2	106	24	130	41	0	41
4	1,653	470	2,123	0	86	86
6	5,053	826	5,879	329	170	499
8	7,070	1,343	8,413	1,018	260	1,278
10	9,395	900	10,295	1,289	596	1,885

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Genetic effects of ionizing radiation in Einkorn wheat

S. Matsumura and T. Fujii

National Institute of Genetics, Misima, Japan

Dormant seeds of *Triticum monococcum* var. *flavescens* were exposed to X-rays, γ-rays and fast neutrons.

X-rays of different wave lengths at the same dosage (10 *Kr*) and intensity (82 *r*/min)

Relation between wave length of X- or γ-rays and frequency of chromosome aberrations in *Triticum monococcum*.

Dosage (*Kr*)	Voltage (KVP)	Germination rate (%)	Length of seedlings* (cm)	Fertility of spike in X_1 (%)	Chromosome aberration in X_1 (%)	Chlorophyll mutation in X_2 (%)	Head progenies without germination (%)
Control	—	92.00	17.44 (14.54)	60.45	0.00	0.0	0.0
10 (82*r*/min)	20	82.00	15.85	44.20	12.50	6.3	3.0
〃 (82 〃)	50	88.00	14.23	40.73	4.88	6.8	4.8
〃 (81.4 〃)	100 (with filter 2 mm Al)	60.00	10.20	32.33	10.81	8.3	7.7
〃 (81.2 〃)	180 (with filter 0.8 mm Cu+1.5 mm Al)	90.00	11.11	36.50	21.82	10.3	8.1
5 (8.3 〃)	γ-ray	92.00	13.93	62.95	1.67	4.8	1.2
10 (16.6 〃)	〃	38.00	12.73	38.72	5.56	2.2	0.0
15 (25 〃)	〃	50.00	8.96	32.18	6.25	0.0	5.1
10 Ah	Neutron (4~7 MeV) (10^9 neutron/A. sec)	98.00	(14.25)	54.20	1.33	1.2	2.4
15 Ah	〃	88.00	(14.53)	37.01	4.17	3.7	1.2
20 Ah	〃	79.59	(13.84)	27.66	4.55	2.7	6.3

* X- and γ-irradiated seeds were sown November 9, 1956, and the seedlings were measured 26 days after sowing. ( ) Sown December 12, 1956, and measured 26 days after sowing.

were used with different filters; also the effect of γ-radiation by Co^{60} was examined for comparison. The thickness of the filter was adjusted in inverse proportion to the wave length; that is, at 100 KVP a filter of 2 mm Al, and at 180 KVP one of 0.8 mm Cu+1.5 mm Al was inserted into MATSUDA's Type KXC-17 apparatus. At 50 KVP and 20 KVP, irradiation was applied by two other types, Modified Type KR-75 and Type TX-20 (Grenz-rays) without filter, respectively. The data are shown in the foregoing table.

There was no striking difference between hard and soft X-radiation, in so far as the germination of seeds is concerned, but the growth of seedlings showed a slight delay with the decrease of wave length. The higher the dosage of γ-rays or neutrons, the lower was the germination rate of irradiated seeds, and the more delayed were the germination of seeds and growth of seedlings. It was shown, in terms of growth inhibition of the seedlings, that neutrons with a high specific ionization more uniformly affect the irradiated seeds than X- and γ-radiations with a low specific ionization.

The mean single-spike fertility of X-rayed plants generally decreased with the decrease of wave length. This relation is in good accord with that between the growth of seedlings and wave length. Also, the relation between the rate of induced sterility and wave length coincides roughly with the relation between the frequency of chromosome aberrations or chlorophyll mutations and wave length. But at 20 KVP the aberration frequency was unexpectedly high, while at 50 KVP it was too low.

It was also ascertained, as expected, that mean fertility decreased with decreasing germination rate accompanied by weaker growth of seedlings, and the chromosome aberrations increased in proportion to the dosage of γ-rays and neutrons. Concerning the frequency of gene mutations in X_2, the head progenies which did not germinate at all, must be added to the chlorophyll mutations.

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Effects of X- and γ-radiations upon wheat seedlings and their modification due to temperature or polyploidy

S. MATSUMURA, T. FUJII and S. KONDÔ
National Institute of Genetics, Misima, Japan

Dormant seeds of *Triticum monococcum* were subjected to X- and γ-ray treatments at dosages of 10 and 20 *Kr*. The germination rate of treated seeds and the growth of seedlings were compared for acute and chronic irradiation. In the former X- and γ-irradiation was applied either immediately before sowing or the irradiated seeds were kept for 30 days in storage and in the latter γ-irradiation lasted 54 days. In one experiment with acute irradiation one part of the treated seed were kept at room temperature (about 20°C) and the remainder at low temperature (5°C) for 30 days.

There was no marked difference in germination rate between untreated and treated seeds at 10 *Kr*, while the germination rate was reduced to 1/2 ~ 2/3 at 20 *Kr*. In the case of 30 day storage, γ-rays inhibited the growth of seedlings more than X-rays, while the irradiation applied just before sowing showed the reverse relation. It was found further especially with γ-rays that low temperature was more effective in inhibiting growth than room temperature. At 10 *Kr*, the acute γ-irradiation was more effective in this respect than the chronic one. On the other hand, the reverse relation between acute and chronic γ-irradiation was observed.

To examine the relation between the sensitivity to ionizing radiation and polyploidy, dormant seeds of *Triticum monoccocum* (2*x*), *T. durum* (4*x*) and *T. vulgare* (6*x*) were exposed to X- and γ-rays at the dosage 10~40 *Kr*. In general, γ-irradiation had a markedly stronger inhibiting effect upon seed germination and seedling growth than X-irradiation. 2*x* was most sensitive to X- and γ-rays and 6*x* was most resistant. There was unexpectedly no significant difference between 4*x* and 6*x*.

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Studies on chlorophyll mutants in diploid wheat induced by radiation

T. Fujii
National Institute of Genetics, Misima, Japan

Further studies on several mutant strains of *Triticum monococcum* var. *flavescens* induced by X-rays, were made.

The mutant strains "chlorina" (light green leaves) and "basi-viridis II" (base of leaves yellowish green) were crossed in 1955. All the F_1 plants from this cross were morphologically normal, and showed high germinating capacity and high seed fertility. In the F_2 generation, chlorina and basi-viridis II were found to be controlled independently by a recessive gene each, and a segregation according to the dihybrid ratio was observed. The chlorophyll content in both parents amounted to about 50% of that of the normal plants, but when basi-viridis II was illuminated by fluorescent lamps (about 4,000 luxes) in the dark phytotron (20°C), this mutant gradually recovered the green coloring and its chlorophyll content reached that of the normal plants, while in the chlorina mutant such a marked recovery of chlorophyll was not found. The chlorophyll content of the double-recessive plants grown in the field was about 20% of the normal and a high degree of mortality was observed. When these plants were grown in the phytotron, their leaves gradually became light green, and their chlorophyll content was restored to the chlorina level but further recovery did not occur. It is possible that the chlorina gene is epistatic over the basi-viridis II gene.

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Introduction of the leaf-rust resistance to wheat variety from *T. Timopheevi*

Y. WATANABE, K. MUKADE and M. YAMADA
Morioka Experimental Farm, Tohoku National Agricultural Experiment Station
Morioka, Japan

In 1953, 14 F_1 plants were raised from 93 seeds obtained by pollinating 340 florets of Fultz No. 1 (*T. vulgare*) with *T. Timopheevi*. F_1 plants were highly sterile, but 7 B_1F_1 seeds were obtained from the 352 florets of F_1's pollinated with the pollens of Fultz No. 1, and 6 of them germinated and reached maturity. It was found that 1 plant showed leaf-rust resistance both in the seedling stage and in field condition by an artificial inoculation with race group 21 of *Puccinia triticina*, which prevailed over Tohoku districts of Japan most virulently among several race groups. This plant was fertile, and gave the progeny with high leaf-rust resistance.

Of 149 B_1F_2 plants, 46 showed high resistance to the leaf-rust in both seedling and adult stages. The B_1F_1 population was again subjected to the artificial epidemics in a disease-garden. Consequently, 11 strains were selected which appeared to be homozygous for the resistance. The following table shows the somatic chromosome number and the main meiotic configurations at MI in PMC's of B_1F_2 and B_1F_3 plants.

Somatic chromosome number and main meiotic configurations of several B_1F_2 and B_1F_3 plants

(a) B_1F_2

2n	40	41	42	Others	Total
Configuration	20_{II}	$20_{II}+1_I$	21_{II}	$20_{II}+1f$	
Frequency	1	4	5	2	12

(b) B_1F_3

2n	40+1f	41	41+1f	42	Total
Configuration	$19_{II}+2_I+1f$	$20_{II}+1_I$	$20_{II}+1_I+1f$	21_{II}	
Frequency in FTF-21*	—	—	—	5	5
Frequency in FTF-33	1	9	5	—	15
Frequency in FTF-37	—	9	—	1	10

* FTF: Abbreviation of the strains of (Fultz × *T. Timopheevi*) × Fultz.

The cytogenetical study was carried out for 10 plants selected at random in B_1F_4 generation obtained from FTF-21 with 21_{II}. Acetocarmine smears of their root-tips showed 42 somatic chromosomes, and 21_{II} were observed at MI in PMC's, exclusively.

Although these plants in B_1F_4 generation showed a wide range in segregation for various morphological characters, no tendency of glume adherence which is typical of *T. Timopheevi* was found. Their seed fertility was considerably high. The time of maturity was a little later than the common winter wheat varieties, and, contrary to our expectations, they were attacked severely by the stem-rust epidemics in June, 1957, which had been very rare in the Tohoku districts.

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Chromosome pairing in the progenies of synthesized 6x-wheat, ABD No. 4

J. Tabushi

Laboratory of Genetics, Faculty of Agriculture
Kyoto University, Kyoto, Japan

Nine years have passed since Kihara and his collaborators (1948) synthesized 6x-wheat from the crosses Emmer wheat × *Aegilops squarrosa*. During these years, the present writer has selected the individuals of ABD No. 4 with $2n=42$, which showed varying configurations at MI as 21_{II}, $20_{II}+2_{I}$, $19_{II}+4_{I}$, and $18_{II}+6_{I}$. The univalents occurred with fairly high frequency. The results of cytological observations in 1956 and 1957 are shown in the following table. So far 70 ~ 80 percent of the offspring revealed $2n=42$, while about 20% revealed $2n=41$, and others revealed $2n=39$, 40, 43, or 44.

Configurations at MI in ABD No. 4

Year	Individual[1] No.	Chromosome pairing[2]				Total number of cells	Cells with univalents in %
		21_{II}	$20_{II}+2_{I}$	$19_{II}+4_{I}$	$18_{II}+6_{I}$		
1956	27- 1	28	18	4	—	50	44.0
1957	38- 4	22	14	1	3	40	45.0
	-13	15	12	2	1	30	50.0
	-19	28	18	4	—	50	44.0
	-20	26	19	4	1	50	48.0
	-22	28	17	4	1	50	44.0
	-24	10	6	5	4	25	60.0
	-25	23	19	6	2	50	54.0
	-28	20	15	5	—	40	50.0
Total		200	138	35	12	385	48.0

1) Individuals in 1957 are the offspring from 27-1 in 1956.
2) Observed in an anther in each individual.

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Completion of genome-analysis of three 6x species of *Aegilops*

H. KIHARA

National Institute of Genetics, Misima, Japan

A classification of the genus *Aegilops* by means of genome-analysis was published in 1954 (Cytologia 19). At that time the study of the 6*x* species, *Ae. triaristata*, *Ae. crassa* and *Ae. juvenalis* was still incomplete. Recently, with the assistance of my collaborators, I have obtained enough data on the basis of the morphological as well as genome-analytical analyses to draw the conclusion that the third genome of the hexaploid *Ae. triaristata* is a modified M and that of *Ae. crassa* is D. The genome-type of *Ae. juvenalis* was also ascertained.

A complete classification of the whole genus *Aegilops* is given in the following table.

A classification of the genus *Aegilops* by means of genome analysis

Section	Species	Genometype
Polyeides	*Ae. umbellulata* Zhuk.	C^u
	Ae. ovata L.	C^uM^o
	Ae. triaristata Willd. 4*x*	C^uM^t
	Ae. triaristata Willd. 6*x*	$C^uM^tM^{t2}$
	Ae. columnaris Zhuk.	C^uM^c
	Ae. biuncialis Vis.	C^uM^b
	Ae. variabilis Eig (incl. *Ae. Kotschyi* Boiss.)	C^uS^v
	Ae. triuncialis L.	C^uC
Cylindropyrum	*Ae. caudata* L.	C
	Ae. cylindrica Host	CD
Comopyrum	*Ae. comosa* Sibth. et Sm. (incl. *Ae. Heldreichii* Holzm.)	M
	Ae. uniaristata Vis.	M^u
Amblyopyrum	*Ae. mutica* Boiss.	Mt
Sitopsis	*Ae. speltoides* Tausch (incl. *Ae. Aucheri* Boiss.)	S
	Ae. longissima Schweinf. et Muschl. (incl. *Ae. sharonensis* Eig)	S^l
	Ae. bicornis (Forsk.) Jaub. et Sp.	S^b
Vertebrata	*Ae. squarrosa* L.	D
	Ae. crassa Boiss. 4*x*	DM^{cr}
	Ae. crassa Boiss. 6*x*	DD^2M^{cr}
	Ae. ventricosa Tausch	DM^v
	Ae. juvenalis (Thell.) Eig	DC^uM^j

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Variations of *Aegilops squarrosa* strains collected in Pakistan, Afghanistan and Iran

H. Kihara, K. Yamashita and M. Tanaka

National Institute of Genetics, Misima, and Kyoto University, Kyoto, Japan

Aegilops squarrosa strains collected in Pakistan, Afghanistan and Iran during the Kyoto University Scientific Expedition to the Karakoram and Hindukush in 1955 have been studied morphologically and physiologically in the experimental fields and laboratories of Kyoto and Misima in 1956 and 1957. Various variations in their characters have been found as listed in the following table.

Variations of *Aegilops squarrosa* strains collected in Pakistan, Afghanistan and Iran

Characters / Regions	Ear		Awn of lateral spikelet			Ear color		
	short	long	long	inter-mediate	awnless	black	purple	yellow
Afghanistan & Pakistan	+	−	+	+	+	+	+	+
Iran	+	+	+	+	+	+	+	+

(*Continued*)

Ear type		Grain size		Grain shape		Color of seedling		Height (cm)			
cylind-rical	zigzag	large	small	long	round	red	green	~50	50~65	65~80	80~
+	−	−	+	+	−	+	+	+	+	+	−
+	+	+	+	+	+	+	+	+	+	+	+

(*Continued*)

Procumbent/standing				Leaf		Shooting		
pro-cumbent	semipro-cumbent	semi-standing	stand-ing	non-waxy	waxy	early	inter-mediate	late
−	+	+	−	+	−	+	+	−
+	+	+	+	+	+	−	+	+

(*Continued*)

Growing habit			Reaction to rust				Total of +characters
			P. triticina		*P. graminis* f. sp. *tritici*		
winter	inter-mediate	spring	susc.	resist.	susc.	resist.	
+	+	+	+	−	+	−	25
+	−	−	+	+	+	+	32

F. N.: + or − indicates the existence or non-existence of corresponding characters.

From the data listed in the table, it is clear that the variations are accumulated in Iran, especially in the Elburz region. Hence Iran is considered to be the centre of diversity of *Aegilops squarrosa*.

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New geographical distribution of *Aegilops columnaris*

H. Kihara, K. Yamashita and M. Tanaka
National Institute of Genetics, Misima, and
Kyoto University, Kyoto, Japan

Among 120 *Aegilops triuncialis* strains collected from 48 habitats by the Kyoto University Scientific Expedition in 1955, 21 from 4 habitats in Iran as given in the following table, were identified as *Ae. columnaris* var. *typica* (5 strains) and var. *glabriuscula* (16 strains) on closer morphological studies.

Number of strains and habitats of *Aegilops columnaris* collected in Iran

Region	Number of strains[1)]		Habitats
	typica	*glabriuscula*	
Teheran	2	15	2
Tabriz	4	0	2
Total	6	15	4

1) All the strains were found mixed with *Ae. triuncialis*.

Those strains were crossed with *Ae. triuncialis* and *Ae. columnaris* of our old collection to verify the identification. In the hybrids with the former species $(6\sim9)_{II}+(16\sim10)_{I}$ were observed, while in the hybrids with the latter there were 14_{II} or $1_{IV}+12_{II}$. The former hybrids were sterile, while the latter were entirely fertile. These results indicate that those strains belong to *Ae. columnaris*.

According to Eig (1929), *Ae. columnaris* occupies a very limited area in Asia Minor. In the light of the present studies, however, the distribution area of this species extends as far as the western and central parts of Iran.

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Some aspects of the new amphidiploids synthesized from the hybrids, Emmer wheats ×*Aegilops squarrosa* var. *strangulata*

H. Kihara, K. Yamashita, M. Tanaka and J. Tabushi
National Institute of Genetics, Misima and Kyoto University, Kyoto, Japan

Aegilops squarrosa var. *strangulata* was collected in Iran by the senior author, the leader of the Kyoto University Scientific Expedition to the Karakoram and Hindukush in 1955. According to Hiratsuka's unpublished data, this variety is resistant to *Puccinia triticina*, while all the strains of *Ae. squarrosa* var. *typica* are susceptible. Consequently, we have synthesized new amphidiploids from the hybrids, Emmer wheats ×*Ae. squarrosa* var. *strangulata*, as listed below. They were produced by the union of unreduced gametes.

T. dicoccoides var. *spontaneo-nigrum*	×	*Ae. squarrosa* var. *strangulata*
T. persicum var. *stramineum*	×	〃
T. persicum var. *fuliginosum*	×	〃
T. durum var. *Reichenbachii*	×	〃

The percentage of normal pollen grains and seed-fertility of F_1 hybrids ($3x$) are shown in Table 1. 21 univalents were observed in most of the PMC's in $3x$ hybrids, except *T. dicoccoides* var. *spontaneo-nigrum*×*Ae. squarrosa* var. *strangulata* and abundant normal pollen grains (up to 93%) due to restitution were produced. Their seed-fertility was comparatively high (up to 47.9 %). The fertility was higher in the late head than in the early one (Table 2). For instance seed-fertility of one individual was 14.7 % in the early head and 47.7 % in the late one.

The hybrid vigor was expressed strongly in most of those $3x$ hybrid plants, while *T. durum*×*Ae. squarrosa* var. *strangulata* was semi-dwarf and weak. Investigations concerning the resistance of the synthesized amphidiploids to *P. triticina* are in progress.

Table 1. Pollen- and seed-fertility of $3x$ hybrids, Emmer species ×*Aegilops squarrosa* var. *strangulata*

Cross combinations			Pollen-fertility (%)	Seed-fertility (%)
T. dicoccoides var. *spontaneo-nigrum*	×	*Ae. squarrosa* var. *strangulata*	—	4.0 (2.2～ 7.1)
T. persicum var. *stramineum*	×	〃	72.0 (30.9～93.6)	27.6 (6.3～47.9)
T. persicum var. *fuliginosum*	×	〃	71.9 (35.0～96.8)	42.9 (32.0～47.7)
T. durum var. *Reichenbachii*	×	〃	93.8	42.3

Table 2. Pollen- and seed-fertility of early and late heads

Cross combinations			Plant Nos.	Early heads		Late heads	
				pollen	seed	pollen	seed
T. persicum var. *stramineum*	×	*Ae. squarrosa* var. *strangulata*	26-1	42.6 %	41.1 %	75.4 %	47.9 %
			-2	—	14.5	70.6	40.0
			-3	—	21.8	77.2	29.1
			-4	—	29.1	76.1	36.1
			-5	76.5	13.1	88.2	35.1
T. persicum var. *fuliginosum*	×	〃	27-1	55.8	17.6	80.5	45.8
			-2	—	20.0	63.8	45.4
			-3	—	14.7	35.0	47.7
			-4	—	10.6	81.2	42.0

(*Received Oct. 15, 1957*)

Errata

In a paper "Linkage analysis by RT-method (WIS No. 5, p. 3)" by K. Yamashita, an important typographical error was overlooked, which is corrected here as follows:

Mutants	Genetic relation to RT's a-b	b-c	e-f	c-d	a-c	e-g	Chromosomes located
Light green	—	—	—	—		+*	g

* Corrected from —. (*K. Y.*)

In a paper "B chromosome in *Aegilops mutica* Boiss." published in WIS No. 5 by A. Mochizuki, 0 configuration (line 6 from the bottom, page 10) should read 0-configuration, which is a frying pan form of a trivalent. (*A. M.*)

Aegilops species found in chicken feed in Tabriz

H. KIHARA and K. YAMASHITA
National Institute of Genetics, Misima and
Biol. Lab. Kyoto Univ., Kyoto, Japan

During the Kyoto University Scientific Expedition to the Karakoram and Hindukush in 1955, we found *Aegilops* spikelets mixed in chicken feed in a down town shop in Tabriz, Iran, which drew our special interest. We bought a sample of 350 grams which was classified on morphological investigations as follows:

Aegilops crassa	15	spikelets
〃 *squarrosa*	31	〃
〃 *triuncialis*	17	〃
〃 *cylindrica*	52	〃
Wheat	8,441	grains
Barley	1,231	〃
Weed seeds	over 85	species

It is noteworthy that the sample contained all the species of *Aegilops*, except *Ae. columnaris*, collected around Tabriz.

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Growing habit of *Aegilops squarrosa* strains collected in Pakistan, Afghanistan and Iran

M. TANAKA and K. YAMASHITA
Laboratory of Genetics and Biological Laboratory
Kyoto University, Kyoto, Japan

It was reported in WIS Nos. 1 and 3 that the wild types of *Aegilops* and *Triticum*, especially the diploid species, have a winter-growing habit which is considered to be the ancestral type. However, a strain found by Suzuka in Quetta, Pakistan, had a spring-growing habit.

31 out of 176 strains of *Aegilops squarrosa* collected by Kihara and Yamashita, in Pakistan, Afghanistan and Iran in 1955, have been studied for growing habits in the experimental field in Kyoto (Table 1).

Consequently, the strains showing spring- or intermediate-type have been found only in 4 regions in Afghanistan and Pakistan, and none in Iran (Table 2).

Table 1. Results of sowing time experiments

Regions	Habitats	Strain Nos.	Shooting habit[1] March 20[2]	April 20[2]
Pakistan:				
Quetta	Quetta	2001	+	+
		2002	+	−
		2003	+	+
		2008	+	+
		2014	+	+
Afghanistan:				
Kabul	Chaman[3]	2017	+	+
	Kandahar	2024	+	−
		2029	+	−
	Jaldak–Ghazni	2038	−	−
	Ghazni–Kabul	2040	−	−
	Kabul	2045	−	−
		2048	+	−
Pulikhumri	Haibak	2069	+	+
		2071	+	+
		2076	−	−
Maimana	Maimana	2083	+	−
	Murghab	2099	+	−
	Murghab-Laman	2104	+	−
Iran:				
Tehran	Tehran	2107	−	−
		2108	−	−
	Khoshyailagh	2129	−	−
		2130	−	−
Gorgan	Gorgan	2118	−	−
	Sari–Behshahr	2135	−	−
Pahlavi	Ramsar	2143	−	−
		2144	−	−
	Pahlavi	2153	−	−
	Astara	2159	−	−
Tabriz	Mahabad	2167	−	−
		2168	−	−
	Khoy–Tabriz	2173	−	−

1) +: shooted, −: not shooted.
2) Dates of sowing time.
3) The material collected in Chaman (Pakistan) was included in Kabul region for convenience.

Table 2. Distribution of winter-, intermediate- and spring-types

Region[1]	Winter	Intermediate	Spring	Total
Quetta	0	1	4	5
Kabul	3	3	1	7
Pulikhumri	1	0	2	3
Maimana	0	3	0	3
Tehran	4	0	0	4
Gorgan	2	0	0	2
Pahlavi	4	0	0	4
Tabriz	3	0	0	3
Total	17	7	7	31

1) Cf. Tab. 1.

(*Received Oct. 15, 1957*)

Genetical investigation on *Triticum vulgare* × *Secale cereale* hybrid

I. Study of some transgressive characters of the culm and ear in the F_4 generation

M. Kump
Department of Plant Breeding and Genetics
University of Zagreb, Yugoslavia

In 1951, *Triticum vulgare muticum* var. *milturum* "M 1830" was pollinated by mixture of pollen of *Secale cereale*. From these pollinations four kernels were obtained and only one of them germinated. From this seed the F_1-gen. plant *T. vulgare* × *Secale cereale* developed.

The wheat parent "M 1830" is a uniform, constant, true-breeding, midseason and winter hardy genotype with tall stem and glabrous peduncles. The glumes are glabrous and reddish, and the kernels are dark reddish and ovate with a high 1,000 kernel weight.

The rye strains used for pollination are uniform, constant, midseason and winter hardy varieties with tall stems, white glumes, greenish grey kernels. The peduncles below the head have a dense coat of hair, "hairy neck", for a distance of about 3 cm.

The plant of the F_1 generation was back-crossed with the wheat parent "M 1830". Seeds obtained by back-crossing germinated well and gave plants of the F_2 generation. F_2 gen. plants were selfed and from obtained seeds F_3 gen. progenies were cultivated in a completely isolated place. Seed from single F_3 gen. plant was sown in separate rows and spaced 10 cm apart in rows 20 cm apart. For control the wheat parent "M 1830" was grown in the same way. The F_4 gen. consisted of 1,538 plants. After maturity observations and measurements were made on each plant. For statistical analysis the plants were grouped in progenies to their origin from plants of F_3 resp. F_2 generation.

On the basis of segregation in the F_4 gen., and from the occurrence of transgression of some investigated characters in connection with the "hairy neck" and "smooth neck" character respectively, it may be pointed out as follows:

1) The presence of the I rye chromosome or part of it in the genome seems to have no influence on the degree of tillering because there are, in comparison with the wheat parent, some positive transgressive variants with a "smooth neck" as well as with a "hairy neck".

2) The culm of numerous plants of this F_4 gen. were shorter than those of wheat parent. In some progenies the tallest plant was not so tall as the shortest plant of the wheat parent, without regard to the pubescence. In some of these progenies with single short plants nearly all of them were very vigorous, with a firm culm, great tillering and a high degree of fertility. Although the culm length in the non-hairy necked plants was significantly greater than in the hairy-necked group, it may be concluded that the shortening of the culm was not merely connected with the presence of I rye chromosome or part of it, because there were some true-bred non-hairy necked progenies in which all plants were shorter than the shortest variant of the wheat parent.

3) Numerous plants of this F_4 gen. had a thicker culm than the mother parent without regard to the "hairy neck" or "smooth neck" character respectively.

4) There was significant correlation between the number of kernels per ear and the "smooth neck" character. It may be pointed out that an addition of a I rye chromosome to the wheat genome caused lower fertility of the plants with the pubescens pendicule. There were numerous positive transgressive variants in comparison with the wheat parent. This effect may be attributed to the expressiveness of the cumulative factors for yield of both parents.

5) There was a great correlation between the fertility per spikelet and "smooth neck" and for this character the same can be concluded as for the total number of kernels per ear.

6) Plants with a "smooth neck" had a higher "total weight of kernels per ear" than those with the hairy neck character. This difference is significant. A few plants (2.2%) were positive transgressive in comparison with the wheat parent.

7) The difference in the 1,000 kernel weight between plants with a "smooth neck" and those with a "hairy neck" is not significant. From these results it may be inferred that presence of the I rye chromosome in the genome does not cause depression in the development of the kernels. This effect may be attributed to the negative action of another rye chromosome or part of it in the genome or to the action of cytoplasmatical factors.

8) The difference in shape between kernels of plants with a "smooth neck" and kernels of plants with a "hairy neck" is significant, but it is not total because there are in both groups some plants with long kernels and others with more round kernels.

The cytological investigation of this hybrid will be published separately.

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A genetic analysis of rye populations from Iran

H. Kuckuck and A. R. Kranz
Institute of Plant-breeding, Hannover, Germany

The senior author, during his assignment as FAO-expert of cereal-breeding in Iran in 1952~1954 made cereal collections in order to preserve the germ plasm particularly that of wheat in living collections as basic material for his breeding program. Simultaneously he turned his attention to rye, which is commonly spread as weed in fields of cultivated wheat and of an overwhelming variability unknown in the cultivated rye varieties in Europe. These primitive rye types seemed to him of great interest and value from the evolutionary point of view as well as for breeding purposes.

Samples of 206 rye populations were picked out from wheat fields. The samples consisted of 4 to 68 ears; they were threshed and grown separately for an analysis of the populations carried out by the junior author in 1955 and 1956 in Hannover.

The main results of these studies which are to be published in detail in the "Zeitschrift für Pflanzenzüchtung" can be summarized as follows:

The following 11 characteristic features were studied with regard to their frequencies in the populations:

1. fragility of the rachis
2. colour of the glumes
3. number of the flowers in a spikelet (2 or 3)
4. colour of the auricula-junctura (red-bright green)
5. type of life: annual or perennial
6. winter- or summer-type
7. length of the stems
8. number of the stems
9. number of the spikelets
10. selffertility
11. lethality

The populations after having been combined in 11 "major" populations revealed significant differences in the above mentioned characteristics. The variation of these populations depends on their geographical origin and is due to the 3 evolutionary factors: selection, isolation and hybridization.

The effect of isolation is particularly impressing, when the combined differences (D^2-values) of the 3 quantitative characteristics (length and number of stems and number of the flowers) are taken into consideration. The D^2-values among the populations increase with their geographical distance.

There are also striking differences in the degree of selffertility among 16 "minor" populations. The selffertility varies from 1.51 to 56.4% that is very high when compared with the cultivated rye-variety "Petkuser" which amounted to 3.5% only. A distinct correlation was found between the degree of selffertility and the amount of segregating lethal or sub-lethal types in the following inbreeding generation: the higher the selffertility, the lower the lethality in the progenies.—Two collection samples of the species *Secale Vavilovii* with a fragile rachis proved to be completely selffertile: the seed setting showed approximately after selfing the same percentage as that in the open pollinated plants, i.e. 49.2% in 1955 and 45.4% in 1956 respectively. The progenies after selfing neither segregated into lethals and sublethals nor exhibited any depressions of inbreeding. The flowers are kleistogame and that is certainly the reason why hybridization does not occur with plants of other rye types in the immediate neighbourhood. Kleistogamy is to be considered as a species barrier preventing hybridization.

With regard to the evolutionary problem our studies on Iranian rye populations confirmed the hypothesis of a polyphyletic origin of the cultivated rye as inaugurated by Roshewitz.

The determination of 343 original ears by means of the key for classification of varieties as used by Vavilov and his scholars did not bring about any kind of results in the analysis of varieties. The varieties established by this method have no clearly defined areas of spreading but are mixed invariability and at random in the northern and western districts of Iran so that genetical relations among the population can not be detected in this manner.

The ideas of Stebbins, however, which consider the natural populations to be the genetically efficient entities in the process of evolution which inspired also the present investigation seemed us to be in many respects very fruitful for an analysis of an extensive collection.

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A new diploid form of *Haynaldia hordeacea* Hack.

P. SARKAR

Botanical Institute, University of Montreal, Montreal, Canada

The genus *Haynaldia* has been assumed by various workers to be closely related to the other genera of the Triticinae. However, the only species that has been extensively used in hybridization work, namely *H. villosa*, shows little chromosome homology with any species of the other genera. Besides *H. villosa* which is an annual and diploid with $2n=14$, one other species, *H. hordeacea*, is known in this genus which is perennial and tetraploid with $2n=28$. Morphologically the two species are quite close and both are self-sterile. Regarding natural habitat, both are known to grow in dry limy places. The area of distribution is more definitely known for *H. villosa* which is a native of the Mediterranean region and in its eastern limit goes as far as Caucasia and Asia-Minor. The extent of geographical range of *H. hordeacea*, on the other hand, is mostly unknown.

Recently, from a 1954 collection of *H. hordeacea* by G. L. Stebbins in Morocco, the present writer has isolated both a tetraploid and a diploid form. Both these forms are perennial, the diploid form being slower in growth than the tetraploid one and also with less coarse leaves. Meiosis has been studied in the tetraploid form and the data are given below.

Bivalents per cell		Quadrivalents per cell	
range	average	range	average
2∼14	11.7	0∼6	1.1

The occurrence of up to six quadrivalents in a cell may indicate an autoploid derivation of the tetraploid *H. hordeacea* and, in that case the newly isolated diploid form is the most likely ancestral type.

Further morphological and cytogenetical studies of these two forms and also of *H. villosa* are now under way.

(*Received Sept. 17, 1957*)

II. Genetic Stocks

Autoploids and amphiploids in *Triticinae* produced at the Agricultural Research Institute of the Hungarian Academy of Science, Martonvasar, Hungary

T. RAJHATHY[1] and A. KISS[2]

Name	2n	♀		♂		Growth habit
		Autoploids				
T. monococcum	28					S
T. polonicum	56					S
T. timopheevi	56					S
T. aestivum	84					W
Secale cereale (Kisvardai)	28					W
〃 〃 (Magyarovari)	28					W
		Amphiploids				
Triticum tidurum	56	*T. timopheevi*	×	*T. durum*		S
〃 *turgido-timopheevi*	56	*T. turgidum* v. *plinianum*	×	*T. timopheevi*		S
〃 *aestivo-timopheevi*	70	*T. aestivum* (F 481)	×	〃		W–S
Triticale turgido-cereale	42	*T. turgidum* v. *buccale*	×	*S. cereale*	(Magyarovari)	W–S
〃 *duro-cereale*	42	*T. durum*	×	〃	(Kisvardai)	?
〃 *carthlico-cereale*	42	*T. carthlicum* v. *fuliginosum*	×	〃	(〃)	?
〃 *timopheevi-cereale*	42	*T. timopheevi*	×	〃	(〃)	?
〃 *spelta-cereale*	56	*T. spelta*	×	〃	(〃)	W
〃 *aestivo-cereale*	56	*T. aestivum* (Bankuti 1201)	×	〃	(〃)	W
〃 〃	56	〃 〃	×	〃	(Magyarovari)	W
〃 〃	56	〃 〃	×	〃	(Lovaszpatonai)	W
〃 〃	56	〃 (F 481)	×	〃	(Kisvardai)	W
〃 〃	56	〃 〃	×	〃	(Magyarovari)	W
〃 〃	56	〃 〃	×	〃	(Lovaszpatonai)	W
〃 〃	56	〃 (Ardito)	×	〃	(Kisvardai)	?
〃 〃	56	〃 (Thatcher)	×	〃	(〃)	?
〃 〃	56	〃 (Newthatch)	×	〃	(〃)	?
〃 *aestivo-africanum*	56	〃 (Bankuti 1201)	×	*S. africanum*		?
Agrotriticale	112	*Triticale turgido-cereale*	×	*Agropyron elongatum*		Per.

1) Cereal Crops Division, Experimental Farms Service, Department of Agriculture, Ottawa, Ontario, Canada.

2) Agricultural Experimental Institute, Kecskemet, Hungary.

Wheats from Czechoslovakia

K. Yamashita
Biological Laboratory, Kyoto University, Kyoto, Japan

We have obtained the following wheat species and varieties from Czechoslovakia. We wish to express our gratitude to Dr. R. Hončariv for the kindness of sending those valuable materials with useful informations.

T. monococcum var. *Hornemanii*
T. durum var. *affine*
T. turgidum var. *Dreischianum*
〃 〃 *gentile*
T. dicoccum var. *bruneum*
〃 〃 *pycnurum*
T. polonicum var. *velutinum*
〃 〃 *album*
T. vulgare:
Ozimuná pšenica, Pyšelka M_2
Pšenica jarni (Ratbořská orig.) Semičice
Pšenica ozimná Dobrovická C Semičice
Ozimná pšenica "Košutská" I. Sládkovičovo

Winter varieties:

T. vulgare var. *lutescens*
Višnovská hustoklasá:
Half early, later one, period of vegetation 273 days. Available for especially advantageous places and for good soil with sufficient moisture. Requires early sowing.

T. vulgare var. *milturum*
Kaštická:
Half late, period of vegetation 289 days. Available for good soil in middle and lower places.

T. vulgare var. *milturum*
Židlochovická holice:
Early, period of vegetation 263 days. Available especialy for drier places for middle and worse soil.

T. vulgare var. *erythrospermum*
Slovenská B:
Early, period of vegetation 266 days. Available for advantageous places and for better soil.

T. vulgare var. *ferrugineum*

Židlochovická osinatka:

Early, period of vegetation 264 days. Available for all places, middle and lighter soil for drier places. Requires an early harvest.

Spring varieties:

T. vulgare var. *lutescens*

Vega:

A late one, period of vegetation 123 days. Available especially for good soils and places except dry ones.

T. vulgare var. *milturum*

Podboranka:

Half late, period of vegetation 121 day. Available especially for good soils in advantageous and dry places.

T. vulgare var. *erythrosperumum*

Niva:

Half early, period of vegetation 120 days. Available for all places with sufficient moisture.

T. vulgare var. *ferrugineum*

Stupnická vouska:

Half early, period of vegetation 120 days. Available for all places and all soils.

III. Informations Respecting the International Meetings

The First International Wheat Genetics Symposium to be held in Winnipeg, Manitoba, Canada, August 11~15, 1958

Historical Background

On the occasion of the Ninth International Congress of Genetics held at Bellagio, Italy, August 29, 1953, twenty-six geneticists representing nineteen different countries met to discuss important problems regarding wheat genetics. Dr. H. Kihara of Kyoto University, Kyoto, Japan acted as chairman. One important decision by this group was that an International Wheat Symposium should be held in 1956 in Japan if possible. Owing to the difficulty in financing, it was found impossible to organize this Symposium in 1956 when the International Genetic Symposia were held. However, a number of wheat workers attending the International Genetics Symposia met informally in Kyoto to discuss the possibility of holding the First International Wheat Genetics Symposium at the time of the Tenth International Congress of Genetics to be held in Montreal, Canada, August, 1958. The unanimous opinion was that it would be more desirable to hold such a symposium separately and apart from the International Congress of Genetics and it was proposed that it should be held in Winnipeg, Manitoba, Canada, the week prior to the congress. A committee with Dr. Kihara as Chairman and members including Dr. Pal of India, Dr. Müntzing of Sweden, Dr. Sears of United States, Dr. Yamashita of Japan, and Dr. Jenkins of Canada was asked to initiate preparations for this outstanding event.

Dr. Jenkins has assumed responsibility as the Secretary-Organizer for this Symposium and on behalf of the committee the following tentative plans have been made:

Location

The site of the Symposium is to be the Memorial Auditorium in the new Agricultural block at the University of Manitoba. Limited accommodation will be available in the Residence at the University but for the most part hotels and motels in Winnipeg will be utilized to house the people attending the Symposium.

Registration

A registration fee of $10.00 will be charged all those who participate in the meetings and entertainment. This fee will include one copy of the proceedings without extra charge.

Language

The language of the Symposium will be English and no arrangement is being made for interpretation.

Program

In preparing the program, world wide representation in the fields of wheat research was emphasized. Some 30 persons representing approximately 15 different countries are being invited to participate in the program. All persons who find it possible to attend the Symposium will be welcome to take part in discussions following the presentation of formal papers. Arrangements are being made to record all discussion so that the proceedings will be complete. A brief summary of the tentative program is outlined as follows:

Monday, August 11

All day	Conducted tour of agricultural areas near Winnipeg
Evening	Reception and barbecue

Tuesday, August 12

Morning	Opening ceremonies including addresses of welcome
	Session I—Genetics and Plant Breeding
Afternoon	Tour of laboratories and field plots
Evening	Reception and banquet

Wednesday, August 13

Morning	Session I continued—Genetics and Plant Breeding
Afternoon	Session II—Mutations

Thursday, August 14

Morning	Session III—Polyploidy and Aneuploidy
Afternoon	Tour of Grain Research Laboratory and Winnipeg Grain Exchange
Evening	Reception and banquet

Friday, August 15

Morning	Session III continued—Polyploidy and Aneuploidy
Afternoon	Session IV—Genetics Stocks

Financial Assistance

Local organizations are being canvassed for financial support to make the Symposium possible. It is expected that minimal financial assistance can be given to those invited participants who are unable to obtain funds from any other source.

General

When the program has been finalized it is our plan to send it to all wheat workers who's names we have on our mailing list. As the present time this list si made up of some 500 names. No doubt there will be omissions and changes that we are not aware of and for this reason we would solicit your co-operation in sending either lists from various countries or individual names so that we will be sure to get as wide a circulation as possible.

(B. C. Jenkins, Symposium Secretary-Organizer, November 12, 1957.)

The Xth International Congress of Genetics to be held in Montreal, Canada, August 20~27, 1958

Dr. J. W. Boyes, Chairman and General Secretary, Dr. E. W. Caspari, Dr. M. Demerec, Dr. P. C. Mangelsdorf, Dr. H. B. Newcombe, Exofficio, Dr. F. J. Ryan, Dr. S. G. Smith and Dr. N. F. Walker

Message to the Geneticists of the World

In this period of international tensions, the hope of the world rests in strengthening the bonds of understanding and sympathy among all peoples. The geneticists have an opportunity to contribute significantly to this process. We hope that the coming International Congress of Genetics will be attended by more representatives from all parts of the world than ever before and that it will be successful in strengthening our feeling of unity as well as in defining the current stage of development of our science.

Sewall Wright, President

Revised Program

As mentioned previously, the program has been revised somewhat to provide more time for the examination of exhibits. Present plans for the program are as follows:

August 19, Tuesday:

9.00 a.m.~Midnight	Registration
1.30 p.m.~3.30 p.m.	Nomenclature Meeting
4.00 p.m.~6.00 p.m.	McGill Reception. Tea with Band Concert
8.00 p.m.	Huskins Memorial Lecture

August 20, Wednesday:

8.00 a.m.~5.00 p.m.	Registration
9.00 a.m.~11.30 a.m.	Inaugural Ceremony and Presidental Address
1.30 p.m.~5.00 p.m.	Contributed Papers (parallel sessions)
6.00 p.m.~8.00 p.m.	Reception: City of Montreal (probably)

August 21, Thursday:

9.00 a.m.~11.30 a.m.	Two Invited Symposia (held concurrently)
	I. Structure of Genetic Material
	II. Advances in Human Genetics

1.30 p.m.～5.00 p.m.	Contributed Papers (parallel sessions)
8.00 p.m.	Public Lecture in French
August 22, Friday:	
9.00 a.m.～11.30 a.m.	Two invited Symposia (held concurrently)
	I. Cytogenetics and Plant Breeding
	II. Genetics in Animal Breeding
1.30 p.m.～10 p.m.	Exhibits open for examination
August 23, Saturday:	
9.00 a.m.～11.30 a.m.	Contributed Papers (parallel sessions)
1.30 p.m.～5.00 p.m.	Demonstration Papers
6.30 p.m.	Chicken Barbecue at Macdonald College
August 24, Sunday:	
10.00 a.m.～6 p.m.	Special Tours
	Exhibits open for examination
August 25, Monday:	
9.00 a.m.～11.30 a.m.	Invited Symposium—Mutation and Mutagenesis
1.30 p.m.～5.00 p.m.	Contributed Papers (parallel sessions)
8.00 p.m.	Public Lecture in English
August 26, Tuesday:	
9.00 a.m.～11.30 a.m.	Invited Symposium—Physiological Genetics
1.30 p.m.～3.00 p.m.	Contributed Papers (parallel sessions)
6.00 p.m.～8.00 p.m.	Reception: Province of Quebec (probably)
August 27, Wednesday:	
9.00 a.m.～11.30 a.m.	Invited Symposium—Genetics in Evolution
1.30 p.m.～5.00 p.m.	Business Meeting and Concluding Ceremony

"Publication Three, Special Information of X. I.G.C."

IV. Circulation List of WIS

(Addition, Dec. 31, 1957)

Bibliothek der Biologischen Bundesanstalt für Land- und Forstwirtschaft: Braunschweig, Messeweg, 11/12, Deutschland

BHARGAVA, P.D.: Rasta Thakur Achrol, Jaipur Rajasthan, India

BOROJEVIC, S.: Institute of Plant Breeding & Genetics, Faculty of Agriculture, University of Zagreb, Zagreb, Yugoslavia

HAUS, T. E.: Department of Agronomy, Colorado State University, Fort Collins, Colorado, U.S.A.

JENSEN, N. F.: Department of Plant Breeding, Cornell University, Ithaca, New York, U.S.A.

KASAI, Z.: Institute of Food Science, Kyoto University, Kyoto, Japan

KASHA, K. J.: Department of Plant Science, University of Alberta, Edmonton, Alberta, Canada

KUSPIRA, H.: Laboratory of Genetics & Plant Breeding, University of Alberta, Edmonton, Alberta, Canada

Library of the Citrus Experiment Station, University of California, Riverside, California, U.S.A.

Library of the Department of Plant Beeding, Cornell University, Ithaca, New York, U.S.A.

METZGER, R. J.: Farm Crops Department, Oregon State College, Corvallis, Oregon, U.S.A.

MORRIS, R.: College of Agriculture, University of Nebraska, Lincoln 1, Nebraska, U.S.A.

RAJHATHY, T.: Cereal Division, Central Experimental Farm, Ottawa, Ontario, Canada

SCHAEFFER, S. R.: Agronomy & Soils Department, Montana State College, Bozeman, Montana, U.S.A.

SCHEIBE, A.: Institut fuer Pflanzenbau und Pflanzenzuechtung, Nikolausberger Weg 9. Goettingen, Deutschland

SOLOMON, S.: Deputy Director of Agriculture, College of Agriculture, Poona 5, State of Bombay, India

THRELKELD, S.: Department of Plant Science, University of Alberta, Edmonton, Alberta, Canada

WAGENAAR, E. B.: Department of Plant Science, University of Alberta, Edmonton, Alberta, Canada

WARD, D. J.: Agricultural Research Division, U.S.D.A., Beltsville, Maryland, U.S.A.

WATANABE, Y.: Morioka Experimental Farm, Tohoku National Agricultural Experiment Station, Morioka, Japan

WATSON, I. A.: School of Agriculture, University of Sydney, Sydney, New South Wales, Australia

WEIJER, J.: Depertment of Plant Science, University of Alberta, Edmonton, Alberta, Canada

(New Addresses, Dec. 31, 1957)

ALLAN, R. E.: Crops Research Div., Washington State College, Pullman, Washington, U.S.A.

CAPINPIN, J. M.: College of Agriculture & Central Experiment Station, Los Banos, Laguna, Philippines

ELLIOTT, F. C.: Department of Farm Crops, Michigan State University, East Lansing, Michigan, U.S.A.

GARCIA, A.: Centro Inv. Agric. Del Noroeste. S.A.G. Sonora No. 64, SUR. Cd. Obregon, Sonora, Mexico

SARKAR, P.: Botanical Institute, University of Montreal, Montreal 36, Canada

TACKHOLM, V.: Cairo University, Giza, Egypt

V. News

Robigo No. 4

"Robigo No. 4, cereal rusts news from everybody to everybody" appeared in August, 1957 (pp. 23). All correspondence concerning this publication may be addressed to: Ing. Agr. José Vallega, Instituto de Fitotecnia, Castelar, Argentina (cf. information in WIS No. 4, p. 28).

I. W. G. S.

B. C. Jenkins, Symposium Secretary-Organizer: "we are certainly keeping busy with making arrangements for the symposium, but it is pleasing to know that almost all of the plans we have made so far are working out satisfactorily." Detailed information is given separately, p. 26∼28.

Loss by Fire

E. G. Heyne, Department of Agronomy, Kansas State College, Manhattan, Kansas, U.S.A.: "Last August, fire destroyed part of the building in which my office was located and all my records and library material were lost. I would appreciate receiving the back numbers of WIS. I would also like to receive any of your papers published in English". Even a single paper sent from anyone with sympathy would be appreciated by the victim.

Back Numbers of WIS

Back numbers of WIS, 1, 2, 3, 4, and 5 are available. They will be sent free on application.

Returned

Dr. A. Mochizuki, Hyôgo Agricultural College, Sasayama, Hyôgo, and Mr. M. Okamoto, Shiga Agricultural College, Kusatsu, have recently returned from U.S.A.

VI. Announcement for the Next Issue, No. 7

WIS No. 7 will be ready for publication in June, 1958, so that the number can be distributed before the Ist International Wheat Genetics Symposium in Winnipeg, Canada, August 11~15, 1958.

It is open to all contributions dealing with informations on methods, materials and stocks, ideas and research notes related to wheat genetics and cytology, including *Triticum*, *Aegilops*, *Agropyron*, *Secale* and *Haynaldia*.

Contributions should by typewritten in English. The authors are cordially requested to present —*not later than May 20, 1958*— their manuscripts which should not exceed two printed pages. Lists of stocks are not required to conform to this page limit. No illustrations can be accepted for publication.

Manuscripts and communications regarding editorial matters should be addressed to:

Dr. Kosuke Yamashita
Wheat Information Service
Biological Laboratory
Kyoto University, Kyoto, Japan (*K.Y.*)

VII. Acknowledgement

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Showa Sangyo Co., Ltd., Tokyo, Japan
Nitto Flour Milling Co., Ltd., Tokyo, Japan
Fuji Flour Milling Co., Ltd., Shimizu, Japan

We should like to express our sincere gratitude for favorable comments regarding WIS Nos. 1, 2, 3, 4 and 5 and the valuable contributions for the present number. Increased support for further issues would be appreciated.

The Managing Editor

Explanation of the Figure on the Cover

Radio-autograph of seedlings of *Triticum monococcum* showing the distribution of absorbed radioactive phosphorus P^{32}
(K. Yamashita)

WHEAT INFORMATION SERVICE
No. 6

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