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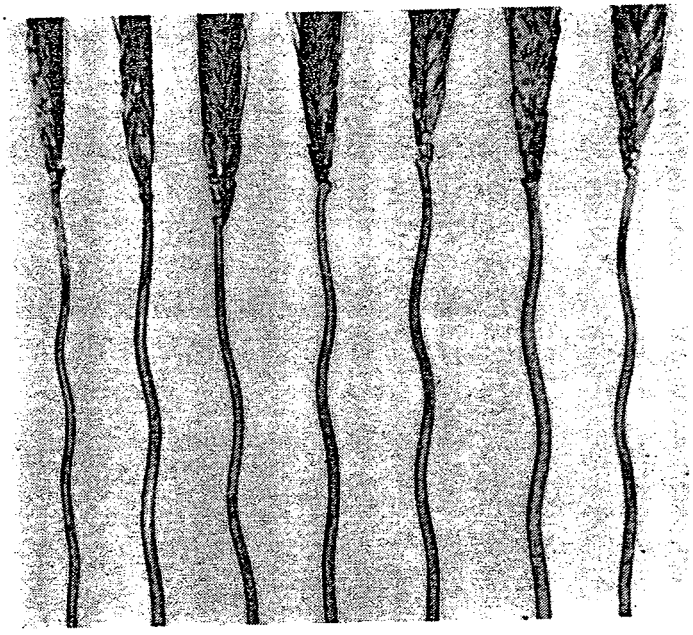

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March, 1959

Wheat Information Service
Biological Laboratory, Kyoto University
Kyoto, Japan

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I. Research Notes

Temperature effect on plastid pigment accumulation in mutants of Einkorn wheat

K. Yamashita and M. Sugino
Biological Laboratory, Kyoto University, Kyoto, Japan

Two types of chlorophyll mutants of *Triticum monococcum*, namely albino and carotina induced by the senior author by X-ray, have been used in the present investigation. Under normal conditions albino seedlings look red or white and carotina seedlings do orange with slightly green color. Both of those mutants are nonviable while their heterozygotes are viable and segregate green and albino or carotina in a ratio of 3 to 1.

1) Effect of temperature on the pigment accumulation in albino seedlings:

Albino seedlings grown at higher temperature (above 15°C) or under a short duration of low temperature lack chlorophylls (Table 1) and carotinoid pigments. Namely, the ether extract of the mutant leaves shows no absorption in the region of 340–700 μ of wave length. The red pigmentation in albino seedlings is anthocyanin, which is separated into washing water from etherial layer. The red pigmentation was observed more

Table 1. Comparison of chlorophyll content in the first leaves of albino and normal germinated at 10°C in various durations

(10 mg of fresh weight)

Duration		Protochloropophyll	Chlorophyll a	Chlorophyll b
46 days	albino	22.0	82.6	72.8
	normal	42.4	613.6	543.7
36 days	albino	12.7	27.7	21.0
	normal	44.1	524.0	455.2
26 days	albino	0	0	0
	normal	49.3	553.6	592.9
16 days	albino	0	0	0
	normal	50.5	637.3	625.0
0 days	albino	0	0	0
	normal	25.6	508.6	451.2

distinctly when the plant grew under a lower temperature or on the media with higher concentration of sucrose. When the seedlings germinated at 1°C in 36 days or more, chlorophyll gigment was accumulated in the basal portion of leaves.

The pigment accumulation was increased according to the duration in low temperature (Table 1) carotinoid pigment seemed also to be accumulated by low temperature treatment.

2) Effect of temperature on pigmentation in carotina seedling:

Carotina seedlings contain chlorophyll pigment except chlorophyll b in addition to carotinoid pigment when grown under the temperature at 10°C (Table 2). When, however, grown under the temperature higher than 20°C visible green pigment was accumulated and the entire leaves became yellow green in color (Table 1). This green pigmentation was localized in the lower portion of leaves. When the seedlings grew under low temperature and were transferred to the higher temperature, for example 25°C, the entire leaves became yellow green in a day.

In order to compare the carotinoid pigment in ether extracts of carotina and normal leaves, chlorophylls were removed off by washing the extract with water according to the Schertz's method. Absortion spectra of the extract showed that there is not big difference in carotinoid content between carotina and normal leaves.

Table 2. Pigment content in carotina and normal grown at 26°C and 10°C

Temperature		Protochlorophyll	Chlorophyll a	Chlorophyll b
26°C	carotina	17.7	118.1	89.6
	normal	39.6	555.1	508.1
10°C	carotina	12.3	13.7	0
	normal	202.8	439.7	427.6
10° and 26°C*	carotina	10.4	81.4	70.9
	normal	20.1	566.4	691.4

* The plants were kept at 10°C for 5 days and then at 26°C for 2 days.

3) Culture of the mutant plants:

Albino and carotina seedlings were cultured in a nutritional media containing 5 percent of sucrose aseptically in test tube. The mutant seedlings germinated at 1°C in 60 days in darkness were placed in light under the temperature of 25±2°C, and observation was made after about 96 days. In albino plants green pigment accumulation, which is localized on the basal portion of the leaves, occurs in the low temperature, but the plants can not sustain their growth. In carotina plants, the pigment accumulation occurs on the entire leaf in higher temperature condition so that they can sustain their growth longer than albino.

Genomes of 6x species of *Aegilops**

H. KIHARA, K. YAMASHITA and M. TANAKA
National Institute of Genetics, Misima and Kyoto University, Kyoto, Japan

Aegilops crassa

According to Eig (1929), the species *Ae. crassa* is known to be distributed through Palestine, Syria, Iraq, Iran, Afghanistan and Turkestan in U.S.S.R., but the respective geographical distributions of the 4*x* and 6*x* forms have not been established as yet. In our collection however, one strain from Iraq proved to be 4*x*, while one from Tashkent in Trukestan (U.S.S.R.) was 6*x*. In addition to these, it has also been found that among the materials collected by our expedition to the Karakoram and Hindukush in 1955, all the strains from Iran are 4*x* while in the northern stretch of the Hindukush Range in Afghanistan, namely in Pulikhumri and Maimana, 6*x* forms grow mixed together with the 4*x*. There were noticed significant ecological and morphological differences between Afghan and Iranian strains, namely the Iranian is recumbent and has narrow and dark green leaves, while the Afghan is erect and has broad and light green leaves. Near Kandahar, Afghanistan, a new awnless 4*x* form was collected.

Morphological analyses have been carried on for the comparison of the 4*x* and 6*x* forms. The characteristics represented by M genome are apparent in the 4*x* form and the characteristics by D genome are seen in the 6*x* form. From these facts, it can be said that the third genome involved in the 6*x* form is supposed to be D. We have further evidences, which will be discussed here.

An amphiploid was obtained by colchicine method from the cross between *Ae. crassa* 4*x* (DM^{cr}) and *Ae. squarrosa* (D). Accordingly its genome constitution is DDM^{cr}. The amphidiploid resembles the 6*x* species of *Ae.crassa* and the chromosome pairing of the plant is good (average number of bivalents per cell is 20.57), and its fertility is nearly normal. This plant was crossed to the 6*x* forms for the purpose of genome analysis. F_1 hybrids showed rather good chromosome pairing in average, namely, up to about 19 pairs, and the fertility was rather high, namely the pollen fertility was 68.8% and seed fertility was 90%. Based on these data it is clear that the parents in this cross have closely related genomes.

The 4*x* form of *Ae. crassa* would have been originated somewhere in and around Asia Minor. Where will be the home of the 6*x* form of *Ae. crassa*? From the fact that both 4*x* and 6*x* forms were found in a mixture in the northern stretch of the Hindukush Range in Afghanistan, it can be said that the 6*x* form was originated there

* This paper was read by K. Yamashita at the 10th International Genetics Congress in Montreal, 1958.

from the cross between the 4x form of *Ae. crassa* (DM^{cr}) and *Ae. squarrosa* (D) distributed there forming a wide simple population. According to the communication of Dr. Kuckuck his 6x material of *Ae. crassa* was found solely in Khorasan, the north-eastern part of Iran.

Aegilops juvenalis

On the basis of the morphological analysis, this species was classified in the section *Vertebrata*, which involves 2 tetraploid species, *Ae. crassa* and *ventricosa*, and a diploid species, *squarrosa*. The genome constitutions of these species are $M^{cr}D$, $M^{v}D$ and D, respectively. *Ae. juvenalis* has the basic characteristics morphologically represented by D and M genomes. By further investigations, however, it has become clear that the upper margin of the empty glumes of *Ae. crassa* and *ventricosa* is truncate-bidentate with a slight notch, while that of *Ae. juvenalis* is truncate-polydentate with slight notches. Which is the characteristics represented by the C^{u} genome of a diploid species *Ae. umbellulata*. This indicates that *Aegilops juvenalis* involves C^{u} in addition to D and M genomes.

Dr. McGinnis and Helnyk has proposed the genome constitution of this species for $C^{u}DS$, but we do think that the glume characteristics indicate the existence of M genome rather than S genome.

We have also the cytological evidences. The high frequencies of pairings have been observed in the respective hybrids of *Ae. juvenalis* with 4x and 6x *Ae. crassa*, and an amphiploid $C^{u}C^{u}DD$. From these data, both morphological and cytological, we have concluded that *Ae. juvenalis* has the genomes D M^{j}, which are closely related to DM^{cr} in *Ae. crassa*, and C^{u}.

If we may add a few words, the fact that *Ae. juvenalis* has been found only in the restricted regions in Turkestan in U.S.S.R. and Iraq would suggest that the area where the present species was originated, but speculatively.

Aegilops triaristata

According to Eig (1929) the species *Ae. triaristata* is widely distributed from Pyrenees through France, Italy, Greece, Crimea, Transcaucasia, Asia Minor, Tripoli, Cyrenaica, Tunis, Algeria to Morrocco.

The genome constitution of the 4x species of *Ae. triaristata* has already been established as $C^{u}C^{u}M^{t}M^{t}$ by the senior author in 1947.

Morphologically, 4x and 6x forms are very similar in general, but through the careful investigations a difference was found in the number of undeveloped sterile top spikelets between these two forms.

Namely, in 6x form the spikelets are fertile from the base to top of an ear, while in 4x form 1 or 2 top spikelets are not well developed and sterile. Similar relation is seen in the diploid analyzers. For instance, *Ae. comosa* or *Ae. uniaristata* has fertile

spikelets on the top of an ear, while *Ae. umbellulata* has a few sterile ones.

From these analytical data, it will be suggested that M genome should be involved in 6*x* form of *Ae. triaristata* in addition to C^uM^t genomes of the tetraploid form. For this consideration we have also the favorable genome analytical evidences. The cytological analyses have been carried out for the various hybrids of the 6*x* form of *Ae. triaristata*.

From the former and present data we can extract the following pairing relations between the genomes in M-group. This is based on the assumption that the chromosomes in C^u of *Ae. triaristata* pair completely with those of the other parents.

Based on these data, it will be concluded that the third genome of 6*x* triaristata will be the one in closer relation to M, especially M^u. Consequently the genome constitution of the 6*x* *triaristata* has been established for $C^uM^{t1}M^{t2}$.

The centre of the distribution of the tetraploid species, with the genome constitution C^uM is in Asia Minor. The place where 6*x* form was originated could be, though speculative, Balcan Peninsula, including Greece, where is the centre of the diploid analyzer *Ae. umbellulata*.

Morphology of *Aegilops* F_1 Hybrids with reference to genome differentiation*

K. Matsumoto
Biological Laboratory, Osaka University of Liberal Arts and Education
Osaka, Japan

If an allopolyploid plant, AABB, and one of its ancesters, AA, are known, the following formulae will be applied for estimating the number of awns of the other ancester, BB. The relation of dominancy in regard to the number of awns is:—awnless <single awned<many awned, as established by Kihara and Matsumoto (1939) and Kihara (1954).

When AA>AABB, then BB falls in between 0~(2AB–AA) .....(1)
When AA=AABB, then BB falls in between 0~AA .....(2)
When AA<AABB, then BB falls in between AB~(2AB–AA) .....(3)

The number of awns of empty glume of apical spiklet is 5 in *Ae. ovata* (C^uM^o) and is 3 in *umbellulata* (C^u). Applying these numerals to the formula (3), then M^o falls in between 5~7. This indicates that the M^oM^o plant, if exists, would possess 5~7 awns on each empty glume of apical spiklet.

Similarly the number of awns in hexaploid *triaristata* will be calculated, as follows: the number of awns of ($C^uM^tM^{t2}$) is 3 and that of tetraploid *triaristata* (C^uM^t) is also 3, therefore M^{t2} falls in between 0~3. This indicates that M^{t2} plant, if exists, would have

* A summary of the contribution paper which was read at the Xth International Congress of Genetics in Montreal, Canada, 1958.

0~3 awns. Thus calculated numbers of awns of empty glumes and outer glumes in apical spiklet are tabulated in the following table.

Calculated number of awns of empty glumes and outer glumes of apical spiklet

Genomes	Empty glumes	Outer glumes
M^o in *Ae. ovata*	5 ~ 7	3 ~ 4
M^t in *Ae. triaristata* (4*x*)	0 ~ 3	0
M^c in *Ae. columnaris*	0 ~ 3	0
M^b in *Ae. biuncialis*	0 ~ 3	3 ~ 4
M^v in *Ae. ventricosa*	1 ~ 2	0 ~ 1
M^{cr} in *Ae. crassa* (4*x*)	1 ~ 2	0 ~ 1
S^v in *Ae. variabilis*	0 ~ 3	0
S^v in *Ae. Kotschyi*	4 ~ 5	3 ~ 4
M^{t2} in *Ae. triaristata* (6*x*)	0 ~ 3	0
D^2 in *Ae. crassa* (6*x*)	0	0 ~ 1

According to the Eig's principle on evolution, the more awned is more differentiated. Hence, I should draw the following conclusions regarding the number of awns.

1. The modified genome M^o, involved in *Ae. ovata* and S^v in *Kotschyi*, is most differentiated.
2. The two genomes involved in the hexaploids, namely D^2 and M^{t2}, represent little or no differentiation.
3. The modified genomes in M group involved subordinately in tetraploid species are more differentiated than those in diploid species.

The results obtained from the investigations on the following characters of the ear also support the present conclusions:

1. Number of awns and teeth of empty glumes in apical spiklet.
2. Number of awns and teeth of empty glumes in lateral spiklet.
3. Number of awns of outer glumes in apical and lateral spiklets.
4. Color and hairs of glumes.
5. Keel of glumes.
6. Disarticulation of ear.

Growing habit of *Aegilops crassa* strains collected in Afghanistan and Iran

By M. Tanaka
Laboratory of Genetics, Kyoto University, Kyoto, Japan

It was reported in WIS No. 1 that the wild types of *Aegilops* and *Triticum* have a winter-growing habit which is considered to be the ancestral type. While, the 4*x*-strain

in Iraq had a spring type and the 6x-strains in Tashkent an intermediate type.

23 out of 58 strains of *Aegilops crassa* collected by Drs. Kihara and Yamashita, in Afghanistan and Iran in 1955, have been studied for growing habits in the experimental

Table 1. Results of sowing time experiments

Region	Habitat	Strain No.	Chromosome number (n)	Shooting habit[1]	
				March[2] 20	April[2] 20
Afghanistan: Kabul	Kandahar	2301	14	+	−
	Jaldak	2302	14	+	−
	〃	2306	14	+	−
	〃	2309	14	+	+
Pulikhumri	Pulikhumri-Haibak	2310	21	+	−
	〃	2311-5	14	+	+
	〃	2311-6	21	+	−
	〃	2312	21	+	−
	〃	2315	14	+	−
	〃	2317	21	+	+
	〃	2318	21	+	+
	〃	2320	21	+	+
Maimana	Maimana-Laman	2322	21	+	−
	〃	2325	21	+	+
	〃	2327	14	+	+
	〃	2328	21	+	+
	Laman	2330	21	+	+
	Laman-Herat	2332	21	+	+
Iran: Teheran	Ghazvin	2334	14	+	+
	〃	2337	14	+	+
	Tabriz-Mahabad	2338	14	+	−
	〃	2342	14	+	−
	Mahabad-Rezaiyeh	2345	14	+	−

1) +: shooted, −: not shooted
2) Dates of sowing time

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

Regions	Winter		Intermediate		Spring		Total
	6x	4x	4x	6x	4x	6x	
Kabul	0	0	3	0	1	0	4
Pulikhumri	0	0	1	3	1	3	8
Maimana	0	0	0	1	1	4	6
Teheran	0	0	0	0	2	0	2
Tabriz	0	0	3	0	0	0	3
Total	0	0	7	4	5	7	23

field in Kyoto (Table 1). As shown in the table, the strains of a winter type have not been found and the strains of spring or intermediate type have been found only in 3 regions in Afghanistan, in both $4x$ and $6x$ strains. Spring type was found in Teheran, and intermediate type in Tabriz of Iran.

Newly synthesized amphidiploids from the hybrids, Emmer wheats × *Aegilops squarrosa* varieties

M. TANAKA
Laboratory of Genetics, Kyoto University, Kyoto, Japan

Seed-fertility of F_1 hybrids ($3x$) between Emmer wheats and 3 varieties of *Ae. squarrosa* are shown in Table 1.

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

Cross-combinations			Pollen fertility	Seed fertility	
				Self	Free
T. durum	×	*Ae. squarrosa typica*	%	0.0%	0.0%
T. persicum stramineum	×	〃		15.0	47.1
T. dicoccoides spontaneo-nigrum	×	*Ae. squarrosa strangulata*	24.7	0.0	8.3
T. dicoccum (Vernal)	×	〃	48.1	2.4	8.3
T. durum Reichenbachii	×	〃	93.8	7.1	42.3
T. durum (Gulab)	×	〃		0.0	4.5
T. perisicum stramineum	×	〃	93.6	56.6	55.9
T. persicum fuliginosum	×	〃	96.8	73.3	70.0
T. orientale	×	〃		0.8	6.3
T. durum Reichenbachii	×	*Ae, squarrosa Meyeri*		3.2	61.5
T. persicum stramineum	×	〃		37.7	71.0

The seeds were produced by the union of unreduced gametes.

From these results, it became clear that in the following combinations, *T. persicum* × *Ae. squarrosa* var. *Meyeri* or *T. persicum* × *Ae. squarrosa* var. *strangulata*, abundant seed grains due to restitution are produced.

This fact may indicate that these combinations would have more posibilities than other combinations to be the origin of $6x$ wheats.

A new early ecotype of *Agropyron tsukushiense* var. *transiens* OHWI

S. SAKAMOTO
National Institute of Genetics, Misima, Japan

A. tsukushiense var. *transiens* ($2n=42$) is very common in Japan, growing in fields

and along road-sides. An early ecotype of this species which differs in several characteristics from the common type was found as a swarm in idle lying paddy fields in the hilly vicinity of Misima.

In comparison with the common type, plant height, first internode from the top, flag leaf and spike are shorter, the number of spikelets is much smaller but empty glume, lemma and palea are longer and all three are wider, the awn is shorter, the seed is longer and wider and much heavier; the flowering time is about 25 days earlier (Tab. 1).

Artificial hybrids between the early ecotype and the common type were easily obtained and the growth of the F_1 plants was very vigorous. Out of the observed characters of F_1, 74% were intermediate between the parents. At meiosis of F_1 hybrid,

Table 1. Comparison of several characters distinguishing the early ecotype from the common type and characters of F_1 plants (1958)

Characters \ Strains (Cult. No.)	Early ecotype (58107)	F_1 (5881)	Common type (58109)
Upper side of rosette leaf	pubescent	pubescent	non-pubescent
Plant height (cm)	67.22± 1.67	85.85± 3.41	97.80±3.55
First internode from top (cm)	27.85± 0.53	40.16± 1.83	39.70±1.23
Flag leaf (cm)	10.29± 0.41	11.75± 0.40	11.21±0.39
Spike (cm)	11.12± 0.03	14.96± 0.44	18.11±0.40
No. of spikelets	10.02± 0.07	14.29± 0.45	18.65±0.41
No. of florets per spikelet	10.54± 0.15	8.86± 0.16	6.68±0.21
Empty glume { length (cm)	0.93± 0.08	0.85± 0.10	0.80±0.14
Empty glume { width (cm)	0,22± 0.03	0.20± 0.01	0.16±0.01
Lemma with awn { length (cm)	3.41± 0.38	3.43± 0.27	3.61±0.27
Lemma with awn { width (cm)	0.21± 0.02	0.19± 0.02	0.17±0.06
Palea { length (cm)	1.28± 0.08	1.15± 0.07	1.03±0.14
Palea { width (cm)	0.15± 0.03	0.13± 0.02	0.12±0.02
Seed { length (cm)	0.72± 0.04	0.64± 0.04	0.53±0.02
Seed { width (cm)	0.20± 0.01	0.18± 0.02	0.16±0
Seed { weight (mg/100 grains)	890.40±31.68	647.20±31.60	443.60±5.04
Color of anther	red-brown	red-brown	yellow
Average date of first heading	April 26	May 7	May 22
Average date of first flowering	April 28	May 9	May 24
Chromosome number ($2n$)	42	42	42
Chromosome conjugation			
21_{II}	92	130	132
$1_{IV}+19_{II}$	2	23	0
$20_{II}+2_{I}$	1	9	3
$1_{III}+18_{II}+3_{I}$	0	1	0
(Total)	(95)	(163)	(135)
Pollen fertility (%)	85.86	76.99	96.68
Seed fertility (%)	76.21	62.16	76.92

tetravalent conjugation was observed in 14% of nuclear plates (163 plates observed). Pollen- and seed-fertility of F_1 were lower than in both parents, but F_1 was fairly fertile and the growth of F_2 seedlings was very good.

From the clear habitat segregation, the flowering time differentiation and the genetic relationship between the two types, ecotypic differentiation must be assumed. The early ecotype was often found together with *Astragas sinicus* LINN. (Chinese milk-vetch) in paddy fields. The distribution of the early ecotype seems to follow that of Chinese milk-vetch.

II. Genetic Stocks

List of the collected material of *Aegilops* in Pakistan, Afghanistan and Iran, by KUSE, 1955

H. KIHARA, K. YAMASHITA and M. TANAKA
National Inst. of Genetics, Mishima and Kyoto Univ., Kyoto, Japan

Aegilops strains were collected in Pakistan, Afghanistan and Iran during the Kyoto University Scientific Expedition to the Karakoram and Hindukush (KUSE) in 1955 by Kihara and Yamashita. Variety names have been determined by Tanaka according to Eig (1929). The strains which are being maintained at the Laboratory of Genetics, Faculty of Agriculture, Kyoto University, Kyoto, Japan, are as follows:

Aegilops squarrosa L. (n=7)

Stock No.	Variety	Locality	Growth habit[2]	Collector
2001–3	var. *typica*	Quetta, Pakistan	S	K.[3]
2001–6	〃	〃	〃	〃
2003–4	var. *anathera*	〃	〃	〃
2005–2	〃	〃		〃
2008–1	〃	〃	S	〃
2014–1	var. *typica*	〃	〃	〃
2015–1	var. *anathera*	Quetta–Chaman, Pakistan		K.Y.[4]
2016–1	intermediate type	Chaman, Pakistan		〃
2017–2	var. *anathera*	〃	S	〃
2024–7	intermediate type[1]	Kandahar–Jaldak, Afghanistan	S—W	〃
2026–2	var. *typica*	〃		〃
2032–1	intermediate type	Jaldak, Afghanistan		〃
2033–1	var. *typica*	〃		〃
2035–1	〃	〃		〃
2036–1	intermediate type	〃		〃
2037–1	var. *typica*	Jaldak–Ghazni, Afghanistan		〃
2038–1	〃	〃	W	〃
2040–2	〃	Ghazni, Afghanistan	W	〃
2042–2	〃	Kabul, Afghanistan		〃
2043–1	〃	〃		〃
2045–3	〃	〃	W	〃

1) intermediate type: intermediate between var. *typica* and var. *anathera*
2) S=spring, W=winter
3) K.: H. Kihara
4) Y.: K. Yamashita

2046–2	〃	〃		〃
2047–1	〃	〃		〃
2049–9	〃	unknown		Y.
2051–1	〃	Kabul–Pulikhumri, Afghanistan		〃
2053–2	〃	Pulikhumri–Haibak, Afghanistan		〃
2054–1	〃	Pulikhumri–Haibak, Afghanistan		〃
2055–3	var. *anathera*	〃		〃
2055–4	intermediate type	〃		〃
2057–1	var. *anathera*	〃		〃
2058–3	intermediate type	〃		〃
2059–2	var. *typica*	〃		〃
2060–3	intermediate type	〃		〃
2063–6	var. *typica*	〃		〃
2066–2	〃	〃		〃
2067–3	〃	〃		〃
2069–3	〃	〃	S	〃
2072–2	〃	〃		〃
2074–1	〃	〃		〃
2075–1	var. *anathera*	〃		〃
2076–3	intermediate type	〃	W	〃
2078–1	var. *typica*	Haibak, Afghanistan		〃
2082–3	〃	Andkhui–Maimana, Afghanistan		〃
2083–2	〃	〃	W—S	〃
2083–8	〃	〃		〃
2084–4	〃	〃		〃
2085–1	〃	〃		〃
2085–6	〃	〃		〃
2087–2	〃	Maimana, Afghanistan		〃
2087–6	〃	〃		〃
2088–2	intermediate type	Maimana–Laman, Afghanistan		〃
2089–1	var. *typica*	〃		〃
2089–6	〃	〃		〃
2090–2	〃	〃		〃
2091–1	〃	〃		〃
2092–2	〃	〃		〃
2093–4	intermediate type	〃		〃
2095–2	var. *anathera*	〃		〃
2095–9	intermediate type	〃		〃
2096–2	var. *typica*	〃		〃
2097–2	〃	〃		〃
2099–4	〃	〃	W—S	〃
2101–4	〃	〃		〃

2102–5	〃	〃		〃
2103–2	〃	〃		〃
2104–2	〃	〃	W— S	〃
2105–1	〃	Ghazvin, Iran		K.
2106–2	〃	Karaj (Suburbs of Teheran), Iran		〃
2107–1	〃	〃	W	〃
2108–4	〃	〃	W	〃
2109–4	〃	〃		〃
2111–7	var. *strangulata*	Sari–Behshahr, Iran		〃
2112–3	〃	〃		〃
2115–4	〃	Behshahr–Gorgan, Iran		〃
2118–1	〃	〃		〃
2119–1	〃	Gorgan–Khoshyailagh, Iran		〃
2120–1	〃	〃		〃
2122–3	〃	〃		〃
2123–4	〃	〃		〃
2126–2	var. *typica*	〃		〃
2128–4	〃	〃		〃
2129–1	〃	Khoshyailagh, Iran	W	〃
2130–3	intermediate type	〃	W	〃
2131–3	var. *typica*	Firuzkun, Iran		〃
2132–9	〃	〃		〃
2133–1	var. *strangulata*	Sari–Beshahr, Iran		〃
2134–1	〃	〃		〃
2135–3	〃	Beshahr, Iran	W	〃
2136–3	〃	〃		〃
2137–1	〃	Babul Sar–Sari, Iran		〃
2138–4	〃	〃		〃
2139–1	〃	Babul Sar–Chalus, Iran		〃
2139–6	〃	〃		〃
2139–10	〃	〃		〃
2140–2	〃	〃		〃
2141–2	var. *typica*	〃		〃
2142–7	〃	Ramsar, Iran		〃
2144–2	var. *Meyeri*	〃	W	〃
2145–2	〃	〃		〃
2146–2	var. *typica*	Ramsar–Rasht, Iran		〃
2147–1	〃	〃		〃
2148–1	〃	Rasht, Iran		〃
2150–1	〃	Pahlavi, Iran		〃
2152–1	〃	〃		〃
2153–3	〃	〃	W	〃

2154-4	〃	Pahlavi-Astara, Iran		〃
2155-5	var. *Meyeri*	〃		〃
2157-2	〃	Astara, Iran		〃
2159-2	var. *typica*	〃	W	〃
2162-6	intermediate type	Ardabil, Iran		〃
2163-5	〃	Ardabil-Surab, Iran		〃
2167-2	var. *typica*	Mahabad, Iran	W	〃
2168-1	〃	〃	W	〃
2169-1	〃	Mahabad-Rezaiye, Iran		〃
2170-1	〃	Rezaiye-Khoy, Iran		〃
2171-6	intermediate type	〃		〃
2172-3	〃	Khoy, Iran		〃
2173-1	〃	Khoy-Tabriz, Iran	W	〃
2174-1	var. *typica*	〃		〃
2179-2	〃	〃		〃
2175-2	〃	Mixed in chicken feed, in Tabriz, Iran		Y.
2176-8	〃	〃		〃
2180	intermediate type	Tchalousse (near of Chalus), Iran, given by the courtesy of Mr. H. Kakizaki		
2181	〃	〃		
2182	〃	〃		

Aegilops crassa Boiss. (n=14 or 21)

Stock No.	Polyploidy	Variety	Locality	Growth habit	Collector
2301-6	4x	new variety (awnless type)	Kandahar-Jaldak, Afghanistan	W—S	K.Y.
2302-6	〃		Jaldak, Afghanistan	〃	〃
2303-3	〃	new variety (awnless type)	〃		〃
2306-7	〃	〃	〃	W—S	〃
2307-8	〃	〃	〃		〃
2309-6	〃		〃	S	〃
2310-6	6x		Pulikhumri-Haibak, Afghanistan	W—S	Y.
2311-5	4x		〃	S	〃
2311-6	6x		〃	W—S	〃
2312-1	〃		〃	〃	〃
2315-5	4x		〃	〃	〃
2317-4	6x		〃	S	〃
2318-1	〃		〃	〃	〃
2320-1	〃		〃	〃	〃
2322-1	〃		Maimana-Laman, Afghanistan	W—S	〃

2322–4	4x	〃	〃	〃
2325–2	6x	〃	S	〃
2327–1	4x	〃	〃	〃
2328–1	6x	〃	〃	〃
2329–1	〃	Laman, Afghanistan		〃
2330–2	〃	Laman–Herat, Afghanistan	S	〃
2331–8	4x	〃		〃
2332–1	6x	〃	S	〃
2334–3	4x	Ghazvin, Iran	〃	K.
2336–3	〃	〃		〃
2337–2	〃	〃	S	〃
2338–5	〃	Tabriz–Mahabad, Iran	W—S	〃
2340–5	〃	Mahabad–Rezaiye, Iran		〃
2341–2	〃	〃		〃
2342–1	〃	〃	W—S	〃
2343–3	〃	〃		〃
2345–2	〃	〃	W—S	〃
2347–6	〃	Mixed in chicken feed in Tabriz, Iran		Y.
2347–4	〃	〃		〃
2349–1	〃	Collection of Agricultural Experiment Station, Teheran, Iran		
2352–7	〃	〃		
2353–1	〃	〃		
2354–1	〃	〃		
2355–2	〃	〃		
2356–1	〃	〃		
2357–6	〃	〃		
2358–2	6x	〃		

Aegilops juvenalis (Thell.) Eig (n=21)

2351–2		Collection of Agricultural Experiment Station, Teheran, Iran

Aegilops umbellulata Zhuk. (n=7)

2653	var. *typica*	Collection of Agricultural Experiment Station, Teheran, Iran

Aegilops cylindrica Host (n=14)

Stock No.	Variety	Locality	Collector
2401–1	var. *typica*	Ghazvin, Iran	K.
2405–4	〃	〃	〃
2406–4	〃	〃	〃
2409–2	〃	Teheran–Karaj, Iran	

2410-2	〃	〃	〃
1414-1	〃	〃	〃
2416-1	〃	Teheran, Iran	〃
2417-1,3	〃	Ardabil, Iran	〃
2418-1	〃	Ardabil-Sarab, Iran	〃
2420-2	〃	Tabriz, Iran	〃
2424-2	〃	〃	〃
2427-1	〃	〃	〃
2428-1	〃	Tabriz-Mahabad, Iran	〃
2429-1	〃	Mahabad, Iran	〃
2431-2	var. *panciaristata* Eig	Mahabad-Rezaiye, Iran	〃
2432-2	〃	〃	〃
2433-2	〃	〃	〃
2434-4	var. *typica*	〃	〃
2435-3	〃	Rezaiye, Iran	〃
2436-2	var. *panciaristata* Eig	Rezaiye-Khoy, Iran	〃
2438-1,3	var. *typica*	〃	〃
2440-1	〃	〃	〃
2441-8	〃	Khoy-Tabriz, Iran	〃
2442-2	〃	〃	〃
2443-2	〃	〃	〃
2444-2	〃	〃	〃
2446-2	〃	〃	〃
2447-1	〃	Rasht-Pahlavi, Iran	K.
2449-1	〃	〃	〃
2450-14	〃	Mixed in chicken feed, in Tabriz, Iran	Y.
2454-1	〃	Collection of Agricultural Experiment Station, Teheran, Iran	
2455-1	〃	〃	
2456-1	〃	〃	
2457-1	〃	〃	

Aegilops triuncialis L. (n=14)

Stock No.	Variety	Locality	Waxiness of ear	Collector
2502-2	var. *typica*	Pulikhumri-Haibak, Afghanistan	non waxy	Y.
2502-8	〃	〃	waxy	〃
2503-1	〃	〃	non w.	〃
2505-1	〃	〃	waxy	〃
2505-4	〃	〃	non w.	〃
2506-1	〃	〃	〃	〃
2507-1	〃	〃	waxy	〃

2508–5	〃	〃	non w.	〃
2509–8	〃	〃	waxy	〃
2509–5	〃	〃	non w.	〃
2510–5	〃	〃	〃	〃
2511–7	〃	〃	waxy	〃
2511–2	〃	〃	non w.	〃
2513–1	var. *assyriaca* Eig	Maimana–Laman, Afghanistan	waxy	〃
2517–1	〃	〃	non w.	〃
2519–3	var. *persica* (Boiss.) Eig	〃	waxy	〃
2522–3	var. *assyriaca* Eig	〃	non w.	〃
2522–10	〃	〃	waxy	〃
2523–6	var. *persica* (Boiss.) Eig	〃	〃	〃
2524–9	〃	〃	non w.	〃
2525–9	〃	〃	waxy	〃
2526–4	var. *assyriaca* Eig	〃	non w.	〃
2527–3	〃	〃	waxy	〃
2528–3	〃	〃	non w.	〃
2529–1	〃	〃	〃	〃
2530–1	〃	〃	〃	〃
2530–2	〃	〃	〃	〃
2530–5	〃	〃	waxy	〃
2531–1	var. *persica* (Boiss.) Eig	〃	non w.	〃
2532–5	var. *assyriaca* Eig	Laman, Afghanistan	〃	〃
2533–6	var. *persica* (Boiss.) Eig	〃	waxy	〃
2534–4	var. *assyriaca* Eig	Laman–Herat, Afghanistan	non w.	〃
2537–6	var. *typica*	Nishabur–Sabzawal, Iran	waxy	〃
2404–3	〃	Ghazvin, Iran	〃	K.
2541–5	〃	〃	non w.	〃
2549–1	〃	〃	〃	〃
2549–9	〃	〃	waxy	〃
2550–5	〃	〃	non w.	〃
2554–1	〃	〃	〃	〃
2556–3	〃	〃	〃	〃
2561–4	〃	〃	〃	〃
2407–1	〃	〃	waxy	〃
2408–1	〃	〃	〃	〃
2562–4	〃	〃	non w.	〃
2565–9	〃	〃	〃	〃
2569–9	〃	〃	〃	〃
2572–3	〃	Karaj, Iran	〃	〃
2572–6	〃	〃	waxy	〃
2575–6	〃	〃	〃	〃

2576–11	〃	〃	non w.	〃
2577–1	〃	Gorgan–Khoshyailagh, Iran	〃	〃
2578–10	〃	〃	〃	〃
2579–2	〃	Teheran, Iran	〃	〃
2580–2	〃	〃	〃	〃
2582–9	〃	〃	〃	〃
2583–7	〃	Teheran–Fruzkuh, Iran	〃	〃
2584–2	〃	〃	〃	〃
2586–9	〃	〃	〃	〃
2587–5	〃	Tabriz, Iran	〃	〃
2588–14	〃	〃	〃	〃
2590–1	〃	〃	〃	〃
2592–2	〃	〃	〃	〃
2593–5	〃	Tabriz–Mahabad, Iran	〃	〃
2595–10	〃	Mahabad, Iran	〃	〃
2596–1	〃	Mahabad–Rezaiye, Iran	〃	〃
2604–2	〃	〃	〃	〃
2604–10	〃	〃	waxy	〃
2605–1	〃	〃	non w.	K.
2607–1	〃	〃	〃	〃
2608–3	〃	Rezaiye–Khoy, Iran	〃	〃
2610–2	〃	〃	〃	〃
2613–5	〃	〃	〃	〃
2614–1	〃	Khoy, Iran	〃	〃
2615–1	〃	Khoy–Tabriz, Iran	〃	〃
2616–7	〃	〃	〃	〃
2617–1	〃	Mixed in chicken feed in Tabirz, Iran	〃	Y.
2618–2	〃	〃	〃	〃
2451–2	var. *assyriaca* Eig	〃	〃	〃
2621–7	var. *typica*	Collection of Agricultural Experiment Station, Teheran, Iran	〃	
2624–3	new variety ?	〃	〃	
2625–1	var. *typica*	〃	〃	
2627–4	〃	〃	〃	
2628–2	〃	〃	〃	
2629–3	〃	〃	〃	
2630–1	〃	〃	〃	
2631–1	〃	〃	〃	
2632–4	〃	〃	waxy	
2633–1	〃	〃	non w.	
2634–2	new variety ?	〃	〃	

2637-2	var. *typica*	〃	〃
2638-9	〃	〃	〃
2639-8	〃	〃	〃
2640-5	〃	〃	〃
2641-1	var. *assyriaca* Eig	〃	〃
2641-11	var. *persica* (Boiss.) Eig	〃	〃
2642-1	var. *typica*	〃	〃
2643-2	〃	〃	〃
2644-1	〃	〃	〃
2645-2	〃	〃	〃
2646-3	〃	〃	〃
2648-2	〃	〃	〃
2649-4	〃	〃	〃
2650-1	〃	〃	waxy
2652-4	var. *persica* (Boiss.) Eig	〃	non w.

Aegilops columnaris Zhuk. (n=14)

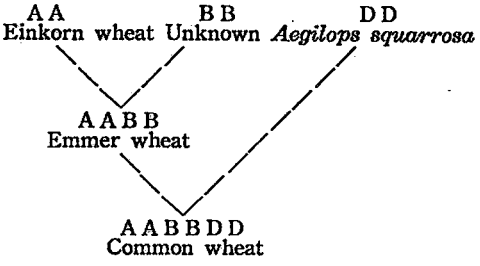
Stock No.	Variety	Locality	Collector
2538-8	var. *glabriuscula* Eig	Ghazvin, Iran	K.
2539-3	〃	〃	〃
2540-7	〃	〃	〃
2542-1	〃	〃	〃
2544-2	〃	〃	〃
2545-5	〃	〃	〃
2547-4	〃	〃	〃
2551-2	var. *typica*	〃	〃
2552-1	var. *glabriuscula* Eig	〃	〃
2555-1	〃	〃	〃
2558-1	〃	〃	〃
2559-2	〃	〃	〃
2560-4	〃	〃	〃
2563-8	〃	〃	〃
2564-2	〃	〃	〃
2566-1	〃	〃	〃
2570-10	var. *typica*	Karaj (Suburbs of Teheran), Iran	〃
2598-7	〃	Mahabad-Rezaiye, Iran	〃
2599-1	〃	〃	〃
2603-1	〃	〃	〃
2612-1	〃	Rezaiye-Khoy, Iran	〃

III. Specification of the Botanical Mission of the University of Kyoto to the Eastern Mediterranean Region

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

Proposed Project

According to the cytological and genetical and studies of Dr. H. Kihara, the former Professor of Genetice, University of Kyoto, Japan, it is known that the genealogical relationship of wheat and its relatives is as follows:



Annotation:
A, B or D represents the symbol of the genome which is the cytological and genetical unit of making up each species.

DD-species has already been found to be *Aegilops squarrosa*, a wild growing species from Pakistan to Iran through Afghanistan, and it is thought that our common wheat, AABBDD, occurred by the hybridization between Emmer wheat and *Aegilops squarrosa* in those regions.

Similarly, it is presumed that Emmer wheat was originated by the crossing between Einkorn wheat, an existing diploid wheat species, and a certain unknown species with BB constitution. By recent studies, however, we came to the conclusion that BB-species can be the species of the Section *Sitopsis* of the genus *Aegilops*. It is known that the species occurs in the region around the Eastern Mediterranean Sea. Besides, many other species of *Aegilops* are also distributed there.

In this connection, K. Yamashita, and his colleagues are especially interested in the botanical exploration in the Eastern Mediterranean Region. They are also interested in other wild growing plant species as well as cultivated plants.

With a Rockefeller research fund for this program, the Botanical Mission of the University of Kyoto, Kyoto, Japan, will be sent to the Eastern Mediterranean Region from the middle of April to the beginning of July, 1959.

Members

Dr. Kosuke Yamashita, Professor of Biology (Leader), Kyoto University
Mr. Masatake Tanaka, Assistant Professor of Genetics, Kyoto University
Mr. Osamu Suzuka, Lecturer of Cytogenetics, Kyoto University
Mr. Seiji Nakamura, A cameraman of the Nichiei Co. Ltd., Tokyo

A tentative itinerary

Y: K. Yamashita (Leader), *S*: O. Suzuka, *T*: M. Tanaka and *N*: S. Nakamura

Y. S. T. and N.

Apr. 13 (M) Lv. Tokyo (Japan) by air

15 (W) Ar. Cairo (UAR)

Y. T. and N.

17 (F) Lv. Cairo by air

Ar. Benghazi (Libya)

S.

18 (Sa) Lv. Cairo by air

Ar. Luxor

21 (Tu) Lv. Benghazi by air Lv. Luxor by air

Y. S. T. and N.

21 (Tu) Ar. Cairo (UAR)

24 (F) Lv. Cairo by ship

25 (Sa) Ar. Beirut (Lebanon)

29 (W) Lv. Beirut by car

30 (Th) Ar. Damascus by car

May 2 (Sa) Lv. Damascus by car

4 (M) Ar. Amman (Jordan)

8 (F) Lv. Amman by car

10 (Su) Ar. Damascus (UAR)

12 (Th) Ar. Alep

13 (W) Ar. Antakya (Turkey)

Y. T. and N.

15 (F) Lv. Antakya by car

17 (Su) Ar. Malatia

18 (M) Ar. Elazing

19 (Tu)

21 (Th) Ar. Agri

22 (F) Ar. Dogubayazit

23 (Sa)

: Mt. Ararat

26 (Tu)

27 (W) Lv. Dogubayazit

28 (Th) Ar. Kars

30 (Sa) Ar. Artvin

31 (Su) Ar. Rize

June 1 (M) Ar. Giresum

S.

Lv. Antakya by bus

Ar. Ankara

Lv. Ankara by bus

Lv. Konya

Ar. Afyon

Ar. Munisa

Ar. Izmir

Ar. Canakkale

	3 (W)	Ar. Sivas	Ar. Bursa
	4 (Th)	Ar. Yozgat ↘	↙
		Y. S. T. and N.	
	5 (F)	Ar. Ankara	
	8 (M)	Lv. Ankara by car	
	10 (W)	Ar. Istanbul ↘	
		↙	*S.*
	12 (F)		Lv. Istanbul by car
	14 (Su)		Ar. Thessaloniki (Greece)
		Y. T. and N.	↙
	16 (Tu)	Lv. Istanbul by air ↘	
		Y. S. T. and N.	
	16 (Tu)	Ar. Athens (Greece)	↘ *Y. S. and N.*
		T. ↙	
	19 (F)	L. Athens by car	Lv. Athens by air
		for Peloponnisos	Ar. Chania (Crete Isl.)
	21 (Su)	↘	↙ Lv. Chania
		Y. S. T. and N.	
	21 (Su)	Ar. Athens	
	23 (Tu)	Ar. Rome (Italy)	
	25 (Th)	Lv. Rome by air	
		Ar. Palermo (Sicily Isl.)	
	28 (Su)	Lv. Palermo by air	
		Ar. Rome ↘	
		↙	*S. and N.*
	29 (M)		Lv. Rome by air
			Ar. Athens
		Y. and T.	
July	1 (W)	Lv. Rome by air	
		Ar. Beirut (Lebanon)	
	2 (Th)	Lv. Beirut by air	Lv. Athens by air
		Ar. Kabul (Afghanistan)	Ar. Cairo (UAR)
	5 (Su)		Lv. Cairo by by air
			Ar. Karachi (Pakistan)
	6 (M)		Lv. Karachi by air
			Ar. New Delhi (India)
	7 (Tu)	Lv. Kabul by air	
		Ar. New Delhi (India)	

Y. S. T. and N.

9 (Th) Lv. New Delhi by air

10 (F) Ar. Tokyo (Japan)

Transportation

The Botanical Mission is equipped with a car of "Jeep" type delivery wagon made by the Mitsubishi Heavy Industries Co. Ltd. Reorganized, Japan.

IV. Report of the International Committee on Genetic Symbols and Nomenclature

Y. TANAKA
National Institute of Genetics, Misima, Japan

The Committee nominated in 1954 by the Permanent International Committee for Genetics Congresses met on August 20–23, 1957, in Zurich under the auspices of the International Union of Biological Sciences. Present: Y. Tanaka (chairman), Misima; B. Ephrussi, Paris; E. Hadorn, Zurich; A. Hagberg, Svalöf; T. Kemp, Copenhagen; A. Löve, Montreal; H. Nachtsheim, Berlin; G. Pontecorvo, Glasgow; M. M. Rhoades, Urbana.

In attempting to fulfill its task of drafting rules for genetic symbolization, the Committee took as a basis of its work the "Recommendations" prepared by a group of Japanese geneticists after consultation with some participants of the Genetics Symposia held in Tokyo in 1956. After careful consideration of these "Recommendations" and of the suggestions made by a number of geneticists, the present Committee agreed to submit to the Tenth International Congress a short list of recommended rules for symbolization preceded by the following remarks.

It is the opinion of the Committee that standardization of symbols and adoption of common rules, although they cannot and should not be made compulsory, are highly desirable whenever possible. Adherence to some standard system would lessen confusion and greatly facilitate communication between specialists in different areas of genetics. In general, the recommendations listed below are based on established practices and are broad enough to be used for diverse situations.

We have deliberately refrained from recommending any particular system of symbols for pseudoallelic series since at the present time such a proposal would inevitably reflect a preconceived interpretation of the structure of the genetic material.

We have also preferred to make no specific recommendations for the symbolization of the mode of origin (spontaneous or induced) of mutants or for the designations following exposure to various mutagenic agents.

It is clear that periodic revisions of nomenclatorial conventions will be called for by the progress of genetics. It is suggested, therefore, that this task be assigned by each Genetics Congress to a committee representing microbial, plant, animal and human genetics. This committee should also encourage the preparation of currently used symbols for genetically important forms by the investigators working with these organisms.

The commitee is of the opinion that well established names and symbols should not be changed unless new results make the old terms scientifically meaningless or misleading.

The following rules were adopted officially at the Tenth International Congress of Genetics on August 27, 1958, Montreal, and became effective after that time.

Recommended rules for symbolization

1. In naming hereditary factors, the use of languages of higher internationality should be given preference.

2. Symbols of hereditary factors, derived from their original names, should be written in Roman letters of distinctive type, preferably in italics, and be as short as possible.

Examples:

Drosophila:	*rudimentary r*
Mouse:	*kreisler kr*
Neurospora:	*p-aminobenzoicless pab*
Maize:	*virescent v*

3. Whenever unambiguous, the name and symbol of a dominant begin with a capital letter and those of a recessive with a small letter.

Examples:

Man and rabbit:	*Pelger Pg*
Silkworm:	*elongate e*
Wheat:	*Blue kernel Bk*
Drosophila:	*yellow y*

4. Literal or numeral superscripts are used to represent the different members of an allelic series.

Examples:

Drosophila: vg, vg^2, vg^{40b}, vg^a, vg^{mt}, etc. (vestigial series)
Man: I^0, I^{A1}, I^{A2}, I^B, etc. (Isoagglutinogens of the ABO blood group series)
Mouse: c^l, c^{ch}, c^e, c, etc. (colour or albino series)

5. Standard or wild type alleles are designated by gene symbols with + as a superscript or by + with the gene symbol as a superscript. In formulae the + alone may be used.

Examples:

Drososhila: vg^+, $+^{vg}$ or +

6. Two or more genes having phenotypically similar effects are designated by a common basic symbol. Non-allelic loci (mimics, polymeric genes, etc.) are distinguished

by an additional letter or Arabic numeral either on the same line after a hyphen or as a subscript. Alleles of independent mutational origin may be indicated by a superscript.

Examples:

Mouse: *hydrocephalus*, basic symbol *hy*

non-allelic { *hy*-1; *hy*-2; *hy*-3

Barley: *erectoides*, basic symbol *ert*

non-allelic { *ert-a*^{6}, *ert-a*^{11}, etc. (allelic); *ert-b*^{2}, *ert-b*^{4}, etc. (allelic); *ert-c*^{1}, *ert-c*^{89}, etc. (allelic)

Silkworm: *oily*, basic symbol *o*

non-allelic { o_s; o_a; o_a, $o_a{}^m$ (allelic); o_t

Aspergillus: *adenineless*, basic symbol *ad*

non-allelic { ad_1; ad_3; ad_8, $ad_8{}^{10}$, etc. (allelic); ad_9, $ad_9{}^{13}$, etc. (allelic)

7. Inhibitors, suppressors and enhancers are designated by the symbols *I*, *Su* and *En*, or by *i*, *su* and *en* if they are recessive, followed by a hyphen and the symbol of the allele affected.

Examples:

Fowl: *I-C*, inhibitor of colour
Galeopsis: *I-R*, inhibitor of colour
Pharbitis: *su-dy*, suppressor of dragonfly
Silkworm: *En-*$o_a{}^m$, enhancer of oily mottled

8. Whenever convenient, lethals should be designated by the letter *l* or *L*, and sterility and incompatability genes by *s* or *S*.

Examples:

Drosophila: *letal-translucida* *l-tr*
bobbed-lethal bb^{l}

9. Linkage groups and corresponding chromosomes are preferably designated by Arabic numerals.

10. The letters X and Y are recommended to designate the sex chromosomes.

11. Genic formulae are written as fractions with the maternal alleles given first or above. Each fraction corresponds to a single linkage group. Different linkage groups written in numerical sequence are separated by semicolons. Symbols of unlocated genes are placed within parentheses at the end of the formula. In euploids and aneuploids the gene symbols are repeated as many times as there are homologous loci.

Examples from *Drosophila melanogaster*

	Loci				
	chrom. 1 (X)	chrom. 2	chrom. 3	chrom. 4	unlocated
diploid ♀	*yvf*/*yvf* ;	*bvg*/++;	p^{p}+/+*e*;	*ey*/*ey*	(+/l^{27})
triploid ♀	*yvf*/*yvf*/*yvf*;	*bvg*/*bvg*/++;	p^{p}+p^{p}+/+*e*;	*ey*/*ey*/*ey*	(+/+l^{27})
trisomic (triplo-4) ♀	*yvf*/*yvf*;	*bvg*/++;	p^{p}+/+*e*;	*ey*/*ey*/*ey*	
monosomic (haplo-4) ♀	*yvf*/*yvf*;	*bvg*/++;	p^{p}+/+*e*;	*ey*	

12. Chromosomal aberrations should be indicated by the abbreviations: *Df* for deficiency, *Dp* for duplication, *In* for inversion, *T* translocation, *Tp* for transposition.

13. The zygotic number of chromosomes is indicated by 2n, the gametic number by n and the basic number by x.

14. Symbols of extra-chromosomal factors should be enclosed within brackets and precede the genic formulae.

V. Circulation List of WIS

(Addition, February 25, 1959)

ANDERSON, R. G.: Canada Dept. of Agr., Cereal Breeding Laboratory, Winnipeg 9, Man., Canada
ANDREWS, J. E.: Experimental Farm, Lethbridge, Alberta, Canada
BAIN, G. S.: Grain Research Laboratory, Winnipeg, Man., Canada
BEAUDRY, J. R.: Institut Botanique, rue Sherbrooke, Montreal 36, Canada
BORA, K. C.: Biology Division, Indian Cancer Research Centre, Parel, Bombay 12, India
BOWDEN, WRAY M.: Botany and Plant Pathology Laboratory, Dept. of Agriculture, Ottawa, Ont., Canada
BROLAUG, NORMAN E.: Rockefeller Foundation, Londres 40, Mexico D. F., Mexico
CALDWELL, RALPH M.: Life Science Bldg., Purdue University, Lafayette, Indiana, U.S.A.
CONNETTE, ANN: Acquisition Department, State College of Washington, Pullman, Wash., U.S.A.
D'AMATO, FRANCESCO: Istituto Botanico, Della Universita, Cagliri, Italia
DANTUMA, G.: Found. Agr. P 1. Breeding, Nude 66, Wageningen, Holland
D'CRUZ, R.: Botany Section, College of Agriculture, Poona 5, India
DIRKS, V. A.: S. D. State Exp. Station, College Station, Brookings, S.D., U.S.A.
DIXON, J. F.: Plant Breeding Station, Dept. of Agriculture, Njoro, Kenya, B. E. A.
EBELTOFT, DAVE: N. D. State College, Fargo, N. D., U.S.A.
FINKNER, VERNE C.: Univ. of Kentucky, Lexington, Kentucky, U.S.A.
FRAZIER, FLOYD W.: Dept. of Aronomy, Central Great Plains Field Station, Akron, Colorado, U.S.A.
FUAD, J. A.: Agronomy Dept., University Farm, St. Paul 8, Minn., U.S.A.
GIBLER, JOHN W.: Rockefeller Foundation, Apt. Aereo 58-13, Bogota, Colombia
GONI, MIGUEL ROGUE: Chacra Experimental, Barrow, FCR, Argentina
GONZALES BUENO, RODOLFO: Moneda 2479, Santiago, Chile
GOPAL-AYENGAR, A. R.: Biology Division, Indian Cancer Research Centre, Parel, Bombay 12, India
GOUGH, FRANCIS J.: N. D. State College Station, Fargo, N.D., U.S.A.
GRANT, M. N.: Cereal Breeding Section, Experimental Farm, Lethbridge, Alberta, Cadana
GREEN, G. J.: C. D. A. Research Laboratory, The University of Manitoba, Winnipeg, Canada
HALL, WILLIAM E.: Sherman Branch Expt. Station, Oregon State College, Moro, Oregon, U.S.A.
HAMILTON, D. G.: Experimental Farm Service, Ottawa, Canada
HAQ, M. SHAMSUL: East Pakistan Agr. Institute, Tejgaon, Dacca, East Pakistan
HECHT, ADOLPH: Botany Department, W.S.C. Pullman, Washington, U.S.A.
HEERMAN, R. M.: State Experiment Stations Division, U.S. D.A., Washington 25, D.C., U.S.A.
HOLLAND, R. F.: Research Department Dekalb Agricultural Association, Inc., Route 2, Lubbock, Texas, U.S.A.
IHONPER, H. B.: Plant Breeding Station, Njoro, Kenya, B.E.A.
JOHNSTON, DAVID R.: Dept. of Agronomy, Institute of Agric., St. Paul 1, Minn., U.S.A.
JONES, J. K.: Dept. of Agricultural Botany, The University, Reading Berks., England
KAMRA, OM P.: Dept. of Agronomy, W.S.C., Pullman, Wash., U.S.A.
KHAN, S. I.: Dept. of Agriculture, Botany and Plant Pathology Laboratory, Ottawa, Canada
KISS, ARPAD: Agricultural Experiment Institute of Duna-Tiszaköz, Kecskemet, P.O.B. 116, Hungary
KRUEGEN, MELANIE: Dept. of Plant Science, Univ. of Manitoba, Winnipeg, Man. Canada
KUSCH, A. G.: Experimental Farm, C.D.A., Scott., Sask., Canada
LAROSE, EM.: Station de Researches de l'Etat pour l'Amelioration des Plantes de Grande Culture, rue du Bordia A Gemboloux, Belgique
LOEGERING, W. O.: Plant Industry Station, Beltsville, Md., U.S.A.

MACLEAN, R. R.: 28 Tingalpa St., Imeynnum, Brisbane, Queensland Australia
MASSON, A. B.: 210 Great Western Bldg., 356 Main Street, Winnipeg 1, Manitoba, Canada
MASTENBROEK, C.: Veredelingsbedrejf Centreal Bureau, Hooferdorf, Holland
MCEWAN, J. W.: Crop Research Division, D.S. & I.R. Private Bag, Christchurch, New Zealand
MCKENZIE, R. I. H.: Experimental Farm, Indian Head, Sask., Canada
MCLENNAN, H. A.: Forage Crops Division, Ottawa, Canada
MCNEAL, F. H.: Agronomy Dept., Montana State College, Bozeman, Montana, U.S.A.
MEHRA, K. L.: Agronomy Department, Okla. State University, Stillwater, Oklahoma, U.S.A.
MEYER, HANS: Dept. of Plant Science, University of Manitoba, Winnipeg, Manitoba, Canada
MUNSHI, Z. A.: Agriculture College, Tandojam, West Pakistan
NARVAEZ, IGNACIO: The Rockefeller Foundation, Londres 40, Mexico, D. F., Mexico
NORONHA-WAGNER, M.: Estaçaõ Agronomica Nacional, Sacavem, Protugal
NUTZGER, R. J.: Oregon State College, Corvallis, Ore., U.S.A.
ORTEEA C. JACOBO: Londress 40, Mexico 6, D. F., Buenos Dias, Mexico
PINTHUS, MOSHE J.: Faculty of Agriculture, Hebrew University, Rehovot, Israel
PISSAREV, V. E.: Piatnitzkajastr. 76–6 Moscow, U.S.S.R.
POPE, WARREN K.: Dept. of Agronomy, University of Idaho, Moscow, Idaho, U.S.A.
PUTT, ERIC D.: Experimental Farm, Morden, Manitoba, Canada
QURESHI, S. A.: Agr. College, Lyallpur, W. Pakistan
RUNDFELDT, H.: Hannover-Herrenhaunsen, Deutschland
SCARASCIA, G. T.: Comitato Nazionale, Per le Ricerche Nucleari, Via Belisario 15, Roma, Italia
SCHALLER, C. W.: Agronomy Department, Univ. of California, Davis, Calif., U.S.A.
SEBESTA, E. E.: Agronomy Dept. Oklahoma State University, Stillwater, Okla., U.S.A.
SHALINSHA, MARIA: Institute of Cytology, Urakow University, Urakow, Poland
SILVA, ADY RAUL DA: Instituto Agronomico do Sul Pelotas—R.G. du Sul, Brazil
SINGH, M. P.: 2C/23, Rohtak Road, New Delhi 5, India
SISLER, W. W.: Malting Barley Improvement Assoc. Milwaukee, Wis., U.S.A.
SMITH, G. S.: N. D. State College, Fargo, North Dakota, U.S.A.
SOSA, OSCAR N.: Scida "La Aurora", Guatemala City, Guatemala, C.A., Mexico
SUNDERMAN, DONALD W.: Dept. of Agron., Inst. of Agriculture, St. Paul 1, Minnesota, U.S.A.
THORPE, H. C.: Plant Breeding Station, Dept. of Agriculture, Njoro, Kenya, B.E.A.
TITHERIDGE, E. V.: United Grain Growers, Winnipeg, Man., Canada
VILMORIN, ROGER DE: Services Scientifiques, Verrières-le-Buisson, Seine et Oise, France
VINCENT, A.: C.N.R.A. Versailles, S. et O., France
WANGENHEIM, K. H.: Max Planck-Institut f. Züchtungsforschung, Köln-Vogelsang, Deutschland
WHITESIDE, A. G. O.: Cereal Crops Division, Central Experimental Farm, Ottawa, Canada

(New Addresses, February 25, 1959)

FREIRE-MAIA, N.: Laboratorio de Genetica, Faculdade de Filosofia, Caixa Postal 1476, Curitiba, Brazil
GAUL, HORST: Max-Planck-Institut f. Züchtungsforschung, Köln-Vogelsang, Deutschland
GEORGE, DONALD W.: Box 378, Pendleton, Oregon, U.S.A.
HARRINGTON, J. B.: F.A.O., Rome, Italy
MELNYK, J. H.: Dept. of Plant Science, Univ. of Alberta, Edmonton, Alberta, Canada
NOTANI, N. K.: Biology Division, Atomic Energy Establishment, Indian Cancer Centre. Parel, Bombay 12, India
SARKER, PRIYABRATA: Dept. of Botany, Indian Agricultural Research Institute, New Delhi 12, India

VI. News

A motion carried at the I.W.G.S., 1959

It is a pleasure for me to transmit to you a motion carried unanimously by the participants of the First International Wheat Genetics Symposium held in Winnipeg, Manitoba, August 11 to 15, 1958. The motion reads as follows:

> "Moved by Dr. Konzak (U.S.A.) and seconded by Professor Shebeski (Canada) that the members of the First International Wheat Genetics Symposium express their appreciation and encouragement to the editors and supporters of Wheat Information Service for its help in accelerating knowledge concerned with the improvement of wheat. Carried Unanimously."

I trust that you will transmit this information to anyone concerned and accept my apologies for tardiness to send this motion to you. It has only been recently that I have had an opportunity to clear up some of the matters left after the Symposium.

B. Charles Jenkins

Committee of the Maintainance of the Genetic Stocks

After much delay, I have finally begun work on the the assignment given us at the First International Wheat Genetics Symposium.

In order to inform and enlist the cooperation of all wheat genetic research workers, some manner of contact should be made. To facilitate contact, I suggest that each one of us be responsible for certain areas as follows:

R. G. Anderson—Canada, Australia and New Zealand
R. Riley—British Isles, Europe and Africa
K. Yamashita—Japan and the countries of Asia
E. G. Heyne—United States, Mexico, Central America and South America

To make initial contact, for example, I would send a letter to wheat research workers in the U.S., Mexico and South and Central America similar to the following:

> "A committee was appointed at the meeting of the First Internation Wheat Genetics Symposium at Winnipeg in August, 1958 to organize and co-ordinate a system for maintaining wheat stocks of known genetic constitution and to arrange for the recording and dissemination of information related to this program.
>
> "The maintenance of genetic stocks is too large a program for one individual or station to undertake at the present time. In order to begin the maintenance program, we need individuals who will maintain some of these genetic stocks in viable condition so that other wheat research workers could obtain a few viable seeds on request.

Several individuals and organizations have already indicated their willingness to cooperate on this project. For example: the USDA in cooperation with Oregon State College (R. J. Metzger) would maintain known wheat genetic stocks for bunt (Tilletia sp) resistance; the University of Kyoto (K. Yamashita) would maintain stocks of *Aegilops* species; Kansas Agric. Expt. Sta. (E. G. Heyne), wheat strains resistant to leaf rust; Canada Dept. of Agric. Res. Lab., Winnipeg (R. G. Anderson), wheat strains resistant to stem rust; Cambridge University (R. Riley), awns in wheat; USDA in cooperation with the University of Missouri (E. R. Sears), Chinese aneuploids; and Nebraska Agric. Expt. Sta. (J. W. Schmidt), some of the genetic stocks not designated.

"At the present, only stocks of known genetic material on which published information is available will be maintained. This will result in a modest beginning as most of the stocks used in earlier studies probably are no longer available. We also are interested in maintaining viable stocks of wheat species and related genera. This is to be a maintenance program only and those requesting seed should expect to obtain no more than 10 to 15 viable seeds. We plan to list through FAO, the Wheat Information Service, and the Wheat Newsletter those individuals who will maintain wheat genetic stocks and the material they have available.

"If you are interested in this program of maintenance of wheat genetic stocks and related species, express your opinion and suggestions to me and also indicate if you would help in maintaining stock of any particular group of genetic characters in wheat or related species.

"Genetic studies involving disease reaction also are concerned with the preservation of the pathogenic organisms used in the studies. This phase of the problem needs further study.

"The problem of nomenclature and symbolization needs attention, but at the present, all of us should adhere to the general rules adopted at the Tenth International Genetics Congress. Perhaps later they may be clarified as to use in wheat.

"The international committee consists of R. G. Anderson, Canada; R. Riley, England; K. Yamashita, Japan; and E. G. Heyne, U.S.A.

Each of us could write such a letter to wheat genetic workers in our area and assemble the comments. If this suggestion does not seem feasible, I would appreciate your suggestions for a different or better approach to our assignment.

It appears that the National Seed Storage Laboratory at Fort Collins, Colorado will store a small sample of each stock. If they accept the seed, it becomes their property and will be handled under their rules and regulations. This may raise some objections from those outside the United States. However, I look at this storage only as a duplicate one on which only an occasional request will be made.

E. G. Heyne

VII. Announcement for the Next Issue, No. 9

WIS No. 9 will be ready for publication in August, 1959.

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 July 31, 1959**—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.*)

VIII. Acknowledgement

The cost of the present publication has beeen defrayed partly by the Grant in Aid for Publishing Research Results from the Ministry of Education, Government of Japan, and partly by contributions from the following Japanese organizations to which we wish to express our sincere thanks.

Flour Millers Association, Tokyo, Japan
Nisshin Flour Milling Co., Ltd., Tokyo, Japan
Nippon Flour Mills Co., Ltd., Tokyo, Japan
Showa Sangyo Co., Ltd., Tokyo, Japan
Nitto Flour Milling Co., Ltd., Tokyo, Japan

We should like to express our sincere gratitude for favorable comments regarding WIS Nos. 1~7 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

Spiral culms of X-ray induced mutation; *Sp*^{1}, in *Triticum monococum* (K. YAMASHITA)

PRINTED BY
INTERNATIONAL ACADEMIC PRINTING CO., LTD.
CHIYODA-KU, TOKYO