A BRIEF NOTE ON THE CHROMOSOMES IN SOME *ACONITUM* SPECIES

BY

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(With one plate)

On the chromsomes in the genus *Aconitum*, several studies have been made since the end of the last century, although most of the materials adopted were those under cultivation. E. OVERTON in 1893 was the first to deal with this problem, and following him, OSTERWALDER (1898), LANGLET (1927), G. A. LEWITSKY (1931), C. D. DARLINGTON (1932), and A. AFIFY (1933) should be mentioned.

Reviewing their reports, there can be found a polyploidal phenomenon in the chromosome number. The following list includes the plants, of which the chromosome number has already been counted.

Diploid (n=8, 2n=16):

Aconitum Lycoctonum (LEWITSRY, AFIFY)
A. barbatum[1] (DARLINGTON)
A. vulparia[1] (DARLINGTON)
A. orientale (LEWITSKY, AFIFY)
A. luridum (AFIFY)

Triploid (2n=24):

A. Napellus (OVERTON, OSTERWALDER, LANGLET, and DARLINGTON)
A. Stoekrianum (AFIFY)

Tetraploid (n=16, 2n=32):

A. anglicum (DARLINGTON)
A. Anthora (LEWITSKY)
A. Napellus (LEWITSKY)

Octoploid (n=32, 2n=64):

A. Wilsonii (LANGLET)
A. volubile latisectum (DARLINGTON)

1) These species are synonyms of *A. Lycoctonum* according to BAILEY (1930).

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Some detailed morphological study of their chromosomes may be found, too.

Fortunately, the writer was able to gather a few wild species belonging to this genus from Hokkaido and Karafuto, and he wishes here to describe briefly the result of his observation on the number as well as on some morphological aspects of their chromosomes.

Here the writer ought to offer his heartful thanks to Mr. U. KIMOTO in Konuma, through whose kindness the two species from Karafuto have been handed to him.

Materials and Methods

Six wild species have been studied. Observations were made in the mitosis of the root-tip cells. After being fixed in NAWASCHIN's chromo-acetic-formalin, they were stained by RANDOLPH's iodine crystal-violet method. Thickness of the paraffin sections was 20–25 μ.

Results of Observation

The chromosome numbers counted in six species are as follows:

	Jap. Name	Obtained from	2n
Aconitum umbrosum KOM.	Ooreijinsō	Mt. Teine	16
A. yuparense TAKEDA	Yezo-hosoba-torikabuto	Mt. Daisetsu	16
A. Fischeri RCHB.	Oobushi	Konuma	32
A. sachalinense FR. SCHM.	Karafuto-bushi	Konuma	32
A. subcuneatum NAKAI	Oku-torikabuto	Zenibako	32
A. yezoense NAKAI	Yezo-torikabuto	Maruyama	32

The approximate lengths of each chromosome from one specimen measured with great care under the microscope is recorded in Table 1, and Fig. 7 is the chromosome-scheme founded on this table. These are made with the diploid species *A. umbrosum.*

TABLE 1. The approximate length of each chromosome of *A. umbrosum* in μ.

Chromosomes	IA	IB	IIA	IIB	IIIA	IIIB	IVA	IVB	VA	VB	VIA	VIB	VIIA	VIIB	VIIIA	VIIIB
Long arms	7.0	6.9	6.0	5.8	5.5	5.5	5.0	5.0	5.0	5.0	5.0	4.9	4.0	4.0	2.9	2.8
Short arms	6.5	6.5	3.0	3.0	1.1	1.1	1.5	1.5	1.0	1.0	1.0	1.0	2.0	2.0	1.2	1.2
Whole length	13.5	13.4	9.0	8.8	6.6	6.6	6.5	6.5	6.0	6.0	6.0	5.9	6.0	6.0	4.1	4.0

In the chromosome-scheme (Fig. 7), one can recognize eight classes from the largest I–chromosomes with approximately median constriction, to the smallest VIII-chromosomes with subterminal constriction. Among these eight types, I-chromosomes may be fairly recognized in all the species, and especially the VIII-chromosomes may be identified at a glance. The five species are compared in respect to these I- and VIII-chromosomes. Here the former is called the M, and the latter, the s chromosomes.

	M	s
Aconitum umbrosum	2	2
A. yuparense	2	2
A. sachalinense	(2)	$2s_1 + 2s_2$
A. subcuneatum	(2)	4
A. yezoense	(2)	4

A. Fischeri is excluded from this comparison on account of their badly fixed or stained figures.

In the above list, the number put in parentheses means that there have been found two M chromosomes at least, and consequently there might exist in reality just two or more of them. A more detailed measurement or an exact judgement with good figures is necessary in order to make this point absolutely clear.

Proportional to the chromosome number, the number of the s chromosomes is multiplied: in the diploids, we can find two of them, and in the tetraploids, four. The four s's in the latter two species are all alike in their size and form, except in the one species *A. sachalinense*, in which the 4 s's consist of 2 s_1's and 2 s_2's. Each length of the s_1 and s_2 chromosomes is as follows:

		Long arms		Short arms
s_1	=	ca. 1.5 μ	+	ca. 0.5 μ
s_2	=	ca. 2.0 μ	+	ca. 0 5 μ

The difference between the length of their long arms is ca. 0.5 μ.

Conculusion

The writer, working with six wild species from Hokkaido and Karafuto, found two diploids and four tetraploids.

According to the comparison of the s-chromosomes within these species, interspecific difference in the morphology of chromosomes should exist in some species.

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Fig. 1

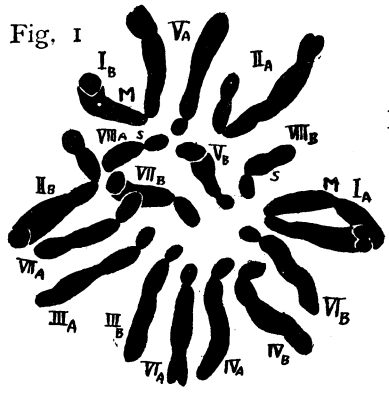


Fig. 2

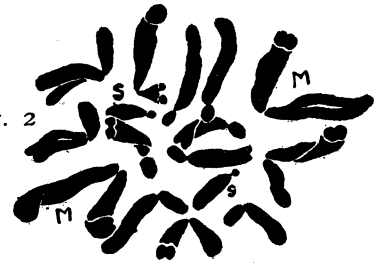


Fig. 3

Fig. 4

Fig. 5

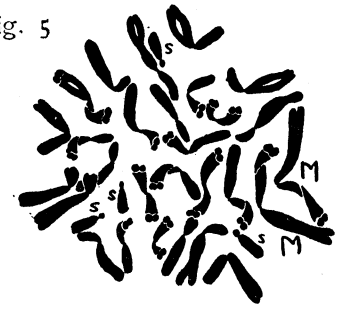


Fig. 6

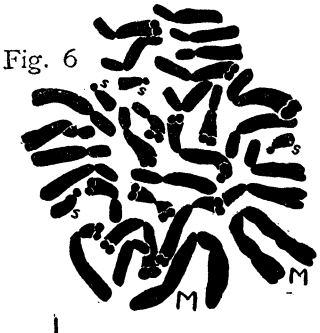
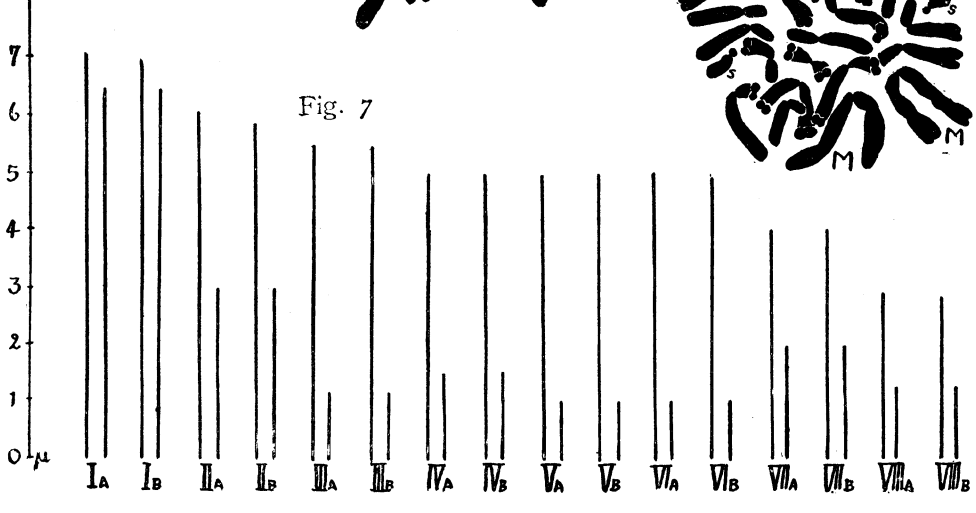


Fig. 7



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Explanation of Plate

Figs. 1–6. Chromosomes in root-tip cells, drawn with the aid of camera lucida under a magnification of × ca. 2300.

Fig. 1. *Aconitum umbrosum* Fig. 2. *A. yuparense*

Fig. 3. *A. Fischeri* Fig. 3. *A. sachalinense*

Fig. 5. *A. subcuneatum* Fig. 6. *A. yezoense*

Fig. 7. Scheme showing the approximate length of each chromosome in *A. umbrosum* made from Table 1.

摘　　要

トリカブト屬數種の染色体に就て

酒　井　寛　一

北海道及樺太に野生するトリカブト屬植物6種をとつてその染色体を觀察した所、2種のデイプロイドと 4種のテトラプロイドを發見した。トリカブト屬植物の染色体の基本數は 8 である。デイプロイド種なるオホレイジンサウ *Aconitum umbrosum* の各染色体の長さを測つた結果によれば（第一表及第七圖）、そこに 8 種の大さ及び形の異る染色体が見出される。その最小染色体なるVIII-染色体 即ち s-染色体に就て各種を比較するとこの s の數は全染色体數に比例してゐるが、4s をもつテトラプロイド種の中にはその 4個が全く相同な 4s より成る場合と、相同ならざる $2s_1+2s_2$ よりなる場合とが見出された。