

A NEW SERIES OF STUDIES ON THE FRESHWATER AND
LAND PLANARIANS FROM TAIWN
II. CHROMOSOMES OF *DUGESIA JAPONICA JAPONICA*
ICHIKAWA ET KAWAKATSU, 1964, FROM MT. ALISHAN
AND THE KENTING NATIONAL PARK^{1), 2)}

by

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INTRODUCTION

Chromosomes of *Dugesia japonica japonica* ICHIKAWA et KAWAKATSU, 1964, from 5 localities of the northern and western areas of Taiwan and Matsu-tao Island were reported in the previous paper (cf. KAWAKATSU, OKI, TAMURA, YAMAYOSHI, LUE & HAGIYA, 1979). All these localities are placed in the lowland areas. In the present paper, the karyology of *D. j. japonica* from the highland area (Mt. Alishan) and the lowland area in the southernmost part (Kentingpin-kuan Hotel) will be reported based upon the 1984 collection.

MATERIALS AND METHODS

Localities of the animals used are described in the first report of this series (cf. KAWAKATSU, LUE, TAKAI, HORI, MUTO & OSAWA, 1985, pp. 00-00, Station Nos. 54 and 58, p. 00, fig. 2, pp. 00-00, figs. 10 and 12; see also KAWAKATSU, TAKAI, HORI, MUTO, OSAWA & LUE, 1985, p. 6, fig. 4).

For the chromosomal analysis, regenerating somatic cells were observed by the use of the techniques described in the previous papers (cf. OKI, TAMURA & KAWAKATSU, 1976; OKI, TAMURA, YAMAYOSHI & KAWAKATSU, 1980, p. 4, fig. 4). Meiotic figures in spermatogenesis of the Mt. Alishan specimens were also observed.

OBSERVATIONS

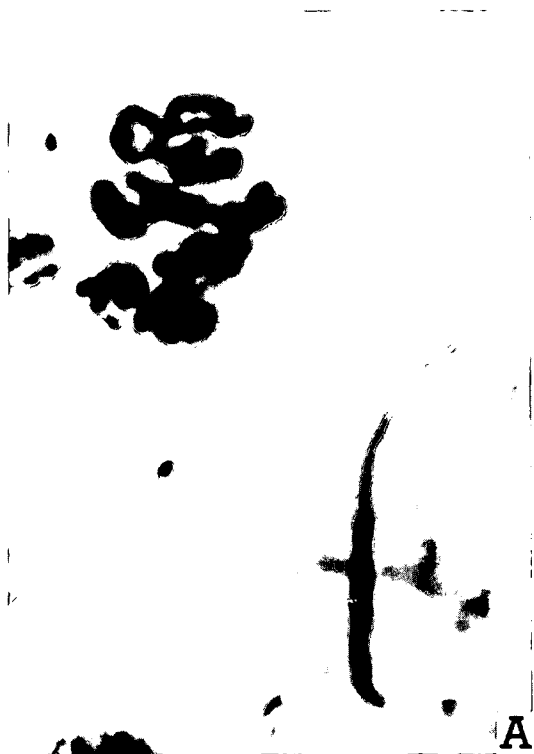
The result of the cytological study of animals from the Mt. Alishan and the Kentingpin-kuan Hotel localities is shown in Table 1; the idiograms are shown in Figure 1. Photomicrographs of the chromosomes are also shown in Figure 2 (A-D).

1) This study was supported in part by a Grant-in-Aid for Scientific Reserach from the Ministry of Education, Japan (No. 59041031).

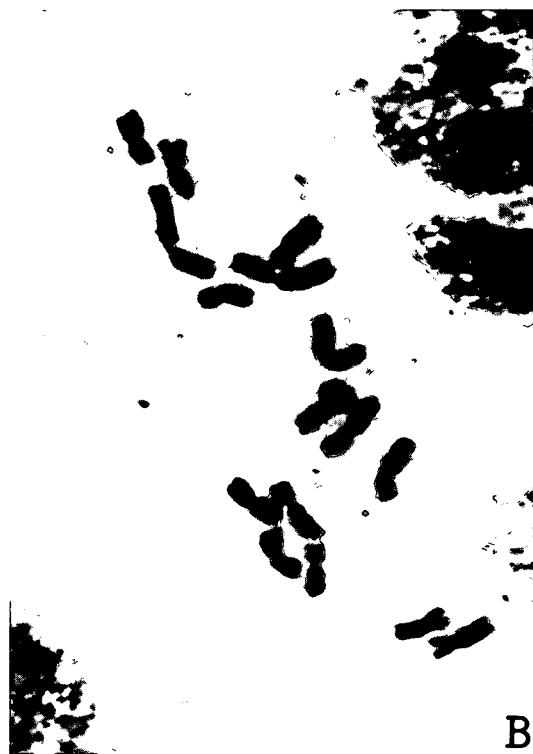
2) Preliminary report of some of the works in this series were presented at the 56th Annual Meeting of the Zoological Society of Japan, held in Tôkyô on October 10-12, 1985 (KAWAKATSU, OKI, TAMURA, LUE, TAKAI, HORI, MUTO & OSAWA, 1985).

| Localities | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | LB | SB |
|-----------------------|---|---|---|---|---|---|---|---|----|----|
| Mt. Alishan | | | | | | | | | | |
| Kentingpin-kuan Hotel | | | | | | | | | | |
| | | | | | | | | | | |
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Fig. 1. Idiograms of *Dugesia japonica japonica* ICHIKAWA et KAWAKATSU from 2 localities in Taiwan. Mt. Alishan : $n = 8$ and $2x = 16$. Kentingpin-kuan Hotel : $(3x - 1) + 1LB + 1 \sim 2SB = 24 + 1 \sim 2SB$. These 4 karyotypes were found in one body.



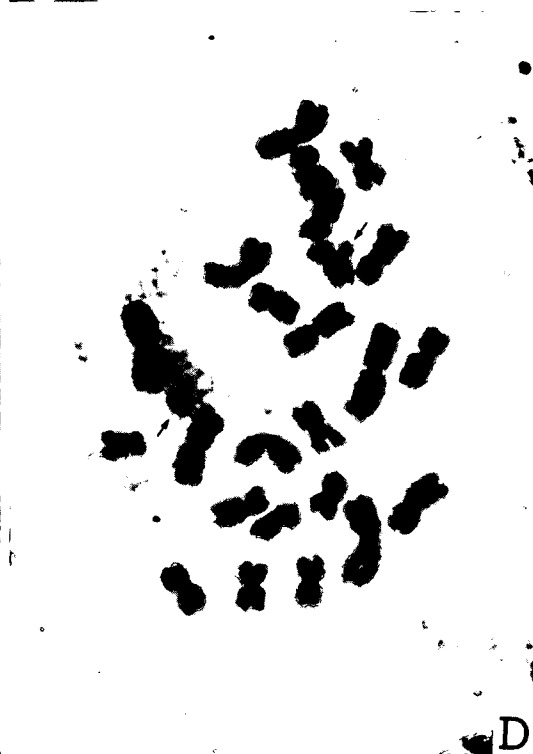
A



B



C



D

Table 1. Karyotypes of *Dugesia japonica japonica* from 2 localities of Taiwan.

| Localities | No. of specimens examined cytologically | | | Chromosome nos. & the no. of cells studied in parentheses | | Karyotypes |
|-----------------------|-----------------------------------------|--------|---------|-----------------------------------------------------------|--------------------|---------------------|
| | Total | Sexual | Asexual | Meiosis | Mitosis | |
| Mt. Alishan | 8 | 5 | 3 | 8 (18) | 16 (274) | 2x |
| Kentingpin-kuan Hotel | 5 | 0 | 5 | — | 24 + 1 ~ 2SB (201) | (3x - 1) + 1LB + SB |

Mt. Alishan :

Five sexual and 3 asexual specimens were examined. The chromosome number of the diploid cells is $2x=16$. During meiosis 8 bivalents are found (Figs. 1, 2 A and B). The diploid karyotype is typical of *Dugesia japonica japonica*, consisting of 8 pairs of meta- or submetacentric chromosomes in descending order of the size.

Kentingpin-kuan Hotel :

Five asexual specimens were examined. No diploid specimen was found in this population. Two hundred and one mitoses revealed a chromosome number of 24 [(3x - 1) + 1LB + 1 ~ 2SB = 24 + 1 ~ 2SB] (Figs. 1, 2 C and D). As will be found in the idiograms of Figure 1, this triploidic aneuploid karyotype of *D. j. japonica* may be explained by the elimination of one chromosome of the labelled 8 eutriploid set of chromosomes and the addition of one submeta- or subtelocentric chromosomes and one to 2 short B-chromosomes.

KARYOLOGICAL REMARKS

Up to the present, we have examined karyologically the animals from 8 populations of *Dugesia japonica japonica* from Taiwan. As was already reported in the previous paper (KAWAKATSU, OKI, TAMURA, YAMAYOSHI, LUE & HAGIYA, 1979) the animals of Taiwan are known to have cells with chromosomes of 4 different karyotypes: 1) $2x = 16$, 2) $(3x - 1) + 1LB = 24$, 3) $(3x - 1) + 2LB = 25$, and 4) $(3x - 1) + 1LB = 24$ & $(3x - 1) + 2LB = 25$.

In addition to these karyotypes of orthoploidic diploid, triploidic aneuploidy and mixoaneuploidic triploidy, a new variation of triploidic aneuploidy karyotype was found in the Kentingpin-kuan Hotel population: $(3x - 1) + 1LB + 1 \sim 2SB = 24 + 1 \sim 2SB$. The occurrence of one to 2 short B-chromosomes (SB) in the karyotype is the first record in Taiwan.

SUMMARY

Dugesia japonica japonica from 2 new localities of Taiwan was studied karyologically. The karyotype of the animals from the Mt. Alishan locality (alt. 2250m) was $2x = 16$ and $n = 8$; that of the animals from the Kentingpin-kuan Hotel locality was $(3x - 1) + 1LB + 1 \sim 2SB = 24 + 1 \sim 2SB$. Thus, a total of 5 karyotypes of *D. j. japonica* is now recorded in Taiwan.

Fig. 2. Photomicrographs of the chromosomes of *Dugesia japonica japonica* ICHIKAWA et KAWAKATSU from 2 localities in Taiwan. A and B: Mt. Alishan. A, meiosis, $n = 8$ and a sperm; B, $2x = 16$. C and D: Kentingpin-kuan Hotel. C, $(3x - 1) + 1LB + 1SB = 24 + 1SB$; D, $(3x - 1) + 1LB + 2SB = 24 + 2SB$. These 2 figures were found in one body. Arrow indicates small B-chromosome (SB).

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中文摘要

臺灣淡水棲和陸棲渦蟲之研究

II. 淡水產渦蟲染色體之研究：新增阿里山和墾丁賓館二個族群

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有關臺灣產淡水渦蟲 *Dugesia japonica* ICHIKAWA et KAWAKATSU, 1964, 之染色體研究, 在此以前經筆者等分析過的已有六個族群。此報告是新增加的二個族群; 阿里山和墾丁賓館族群。阿里山族群之染色體型為 $2x = 16, n = 8$ 。墾丁賓館族群為 $(3x - 1) + 1LB + 1 \sim 2SB = 24 + 1 \sim 2SB$; 此為三倍體。因此到目前為止, 已知臺灣產淡水渦蟲 *Dugesia japonica japonica* ICHIKAWA et KAWAKATSU, 1964, 之染色體型共可分為五型。

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