Chromosome study of *Cryptotaenia japonica* (Umbelliferae) in Japan

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Cryptotaenia japonica, a perennial plant distributed in Japan, Korea, the southern Kuril islands and Sakhalin in Russia, and the Northeast in China (Ohwi and Kitagawa 1983; Ohba 1999), is used as a traditional vegetable in Japan. This is because the plant has a good scent. Earlier cytological data so far known on C. japonica seems to indicate that the variation of chromosome numbers was accompanied by dysploid changes from x=9 to 11. We studied the chromosome number and karyotype of C. japonica in Japan, in order to ascertain this interesting fact.

Materials and methods
A total of 110 individuals of C. japonica Hassk., collected from 72 localities in Honshu and Kyushu of Japan, were used for the study. The collection localities and the numbers of individuals observed are presented in the appendix. To observe the chromosomes, actively growing roots were collected and pretreated in a 1 mM 8-hydroxyquinoline solution for an hour at 25°C and subsequently kept for 15 h at 6°C. The root tips were fixed in a mixture of glacial acetic acid and absolute ethyl alcohol (1:3) for 1 hr, and then soaked in 1 N HCl for a few hours. After being macerated in 1 N HCl at 60°C for 10 min, they were immersed in tap water. Their root tips of 1 mm long were stained and squashed in 1.5% lacto-propionic orcein. Karyotype was examined in a plant collected at Katagake, Hosoiri Village, Toyama Pref. The nomenclature of chromosome form follows Levan et al. (1964). Herbarium specimens made from the plants are cultivated now in the experimental garden of Toyama University will be deposited in the Toyama Science Museum (TOYA).

Results and discussion
All the 110 individuals studied had 2n=20 chromosomes (Fig. 1 A), which were consistent with the counts of Nakajima (1936), Gorzenkov and Gorovoy (1971) and Provatoba et al. (1989), and we found no plants with 2n=18 chromosomes reported by Mitsukuri and Kurahori (1959), and with 2n=22 chromosomes by Yamashita (1931, under the name of C. canadensis var. japonica), Pan et al. (1985, 1989) and Bell and Constance (1957, as n=11).

As shown in Fig. 1 B, the 20 chromosomes were consisted of eight large chromosomes (pairs 1 to 4) and 12 small chromosomes (pairs 5 to 10). At metaphase, the eight large chromosomes ranged from 1.9 μm to 2.3 μm in length and 2.1 to 8.5 in arm ratio, while the 12 small chromosomes ranged from 0.7 μm to 1.1 μm in length.
and 1.0 to 2.5 in arm ratio (Table 1). Thus the chromosome length of the somatic complement of C. japonica showed bimodal variation. In the complement the third longest chromosome pair had a satellite on the short arm. The length of the satellite was 0.4 μm, that was a half size of the shortest pair in the chromosome complement. The karyotype was formulated as 2n=20=2 M+2m+6 sm+2'sm+6 st+2 t.

The present result shows that 2n=20 C. japonica is prevalent in Japan and its karyotype is bimodal. The earlier literature counts in Japanese C. japonica of 2n=18 reported by Mitsukuri and Kurahori (1959), and of 2n=22 reported by Yamashita (1931) and Bell and Constance (1957, as n=11) seem to originate from heteroploid plants that occurred accidentally from 2n=20 plants, or they represent rare chromosome races of the species.

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References


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岩坪美兼・伊藤和幸*1，鴻橋直弘：日本産ミツバの染色体

ミツバの染色体数は，n=11，2n=18，20，22が報告されている。興味深い報告であることから，われわれのミツバを対象にして染色体の観察を行った。

材料には，宮城県，神奈川県，新潟県，富山県，石川県，福井県，岐阜県，静岡県，鹿児島県の72か所で採集した110個体を用いた。

観察の結果，110個体の染色体数は，すべて2n=20であり，過去に報告された2n=18，22の個体は見つからなかった。わが国のミツバは，通常，2n=20であることがわたった。ミツバの体細胞期の中の染色体組は1.9–2.3μmの長さの8本と，0.7–1.1μmの12本の，2群に分けられる染色体から構成されていた。

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Appendix

Collection localities and number of individuals examined (in parentheses) of Cryptotaenia japonica.

Miyagi Pref., Aoba-ku, Sendai City, (2); Taihaku-ku, Sendai City, (1); Shiroyoshi City, (3); Kanagawa Pref., Ougigadani, Kamakura City, (3); Naka-ku, Yokohama City, (1); Niigata Pref., Mizuho, Ittiigawa City, (1); Gochi, Joetsu City, (1); Toyama Pref., Nanbo, Asahi Town, (1); Sakai, Asahi Town, (2); Sasagawa, Asahi Town, (2); Miyagatani, Fuchu Town, (2); Shimoze, Fuchu Town, (1); Takaosuka, Fuchu Town, (2); Akage, Himi City, (1); Aoi, Himi City, (1); Busshoji, Himi City, (1); Hitohane, Himi City, (1); Isobe, Himi City, (1); Kuwano, Himi City, (1); Shichibuchi, Himi City, (1); Shiragawa, Himi City, (1); Yoshike, Himi City, (1); Katagake, Hosoiro Village, (1); Kakizawa, Kamiitchi Town, (2); Onagawa, Kamichi Town, (2); Sunabaysahibarakri, Kamiitchi Town, (1); Tajimano, Kamiitchi Town, (1); Kuridera, Kurobe City, (1); Motono, Kurobe City, (1); Komori, Namerikawa City, (2); Ooura, Namerikawa City, (1); Funato, Ohsawano Town, (1); Mangajin, Ohsawano Town, (1); Nankawara, Ohsawano Town, (1); Suguzaka, Ohsawano Town, (1); Awasuno, Ohyama Town, (1); Harara, Ohyama Town, (1); Higashikusawa, Ohyama Town, (1); Nakadaki, Ohyama Town, (1); Wada, Ohyama Town, (1); Miza, Taisha Village, (1); Sugio, Taisha Village, (1); Nanahimetaaira,
Tateyama Town, (1); Shibayama, Tateyama Town, (2); Anyobo, Toyama City, (2); Gofuku, Toyama City, (2); Kumano, Unazuki Town, (1); Ariyama, Uozu City, (1); Kakuma, Uozu City, (1); Kawamukai, Uozu City, (1); Hirabayashi, Yatsu Town, (1); Ieidani, Yatsu Town, (1); **Ishikawa Pref.,** Yakushima, Kanazawa City, (1); Futatsunashimachi, Komatsu City, (1); Korogimachi, Yamanaka Town, (1); **Fukui Pref.,** Iwagomoriyama, Tsuruga City, (1); **Gifu Pref.,** Kamiaso, Hichiso Town, (8); Nakagiri, Kanayama Town, (2); Hikumi, Kawabe Town, (1); Miwacho, Minokamo City, (5); Mizano, Mitake Town, (2); Todani, Miyagawa Village, (1); Tokicho, Mizunami City, (3); Akou, Shirakawa Village, (2); Kuta, Yaotsu Town, (6); Somasawa, Yaotsu Town, (1); **Shizuoka Pref.,** Sugio, Honkawane Town, (1); Miyajima, Okabe Town, (1); Kitanumagami, Shizuoka City, (1); **Kagoshima Pref.,** Shiroyama, Kagoshima City, (2); Uenodan, Kokubu City, (1); Nishinotahiro, Minamitane Town, (2).