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### THE FIRST CYTOTAXONOMIC REPORT IN *CHARA BRAUNII* F. *NOVI-MEXICANA* (DIV. CHAROPHYTA)

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*CHARA BRAUNII* is characterized by ecortication of stem and branchlets. Wood and Imahori<sup>1</sup> located in the section *Charopsis* along with other ecorticated forms *C. corallina* and *C. socotrensia* and identified only seven forms of *Chara braunii*. Subsequently Wood and Mason<sup>2</sup> added one more form. Of the eight forms of *C. braunii* complex only seven forms viz. *C. braunii* f. *braunii*<sup>3-19</sup>, *C. braunii* f. *schweinitzii*<sup>15</sup>, *C. braunii* f. *coromandalina*<sup>15,20</sup>, *C. braunii* f. *kurzii*<sup>15,21</sup>, *C. braunii* f. *oahuensis*<sup>12,22</sup>, *C. braunii* f. *Perrottetii*<sup>23</sup> and *C. braunii* f. *novi-mexicana*<sup>18</sup> have so far been investigated for their cytological characters. Karyological investigations in *C. braunii* f. *novi-mexicana* have been undertaken for the first time while studying the charophytes of Rohilkhand division in Uttar Pradesh. The morpho-karyological studies are made by the present author on this taxon.

The plants *C. braunii* f. *novi-mexicana* were collected from a temporary pond on Sambhal road in the Moradabad District of Rohilkhand division during September-December, 1977 and 1980, and identified in accordance with the earlier provided description<sup>1</sup>.

Plants are monoecious, 8–20 cm high. Axes 560–870  $\mu\text{m}$  in diameter. Heavily incrustated. Internodes equal to branchlets. Haplostephanous. Branchlets 9–11 with coronary termination. Segments 3–4, gametangia conjoined sometimes in conjugate pairs. Oogonia 1–2, bracts 4, large, bracteoles 2, oogonia 560–833  $\mu\text{m}$  long, 334–588  $\mu\text{m}$  wide. Oospores black, 364–470  $\mu\text{m}$  long, 250–430  $\mu\text{m}$  wide. Convolutions 8–11. Antheridia 360–383  $\mu\text{m}$  in diameter.

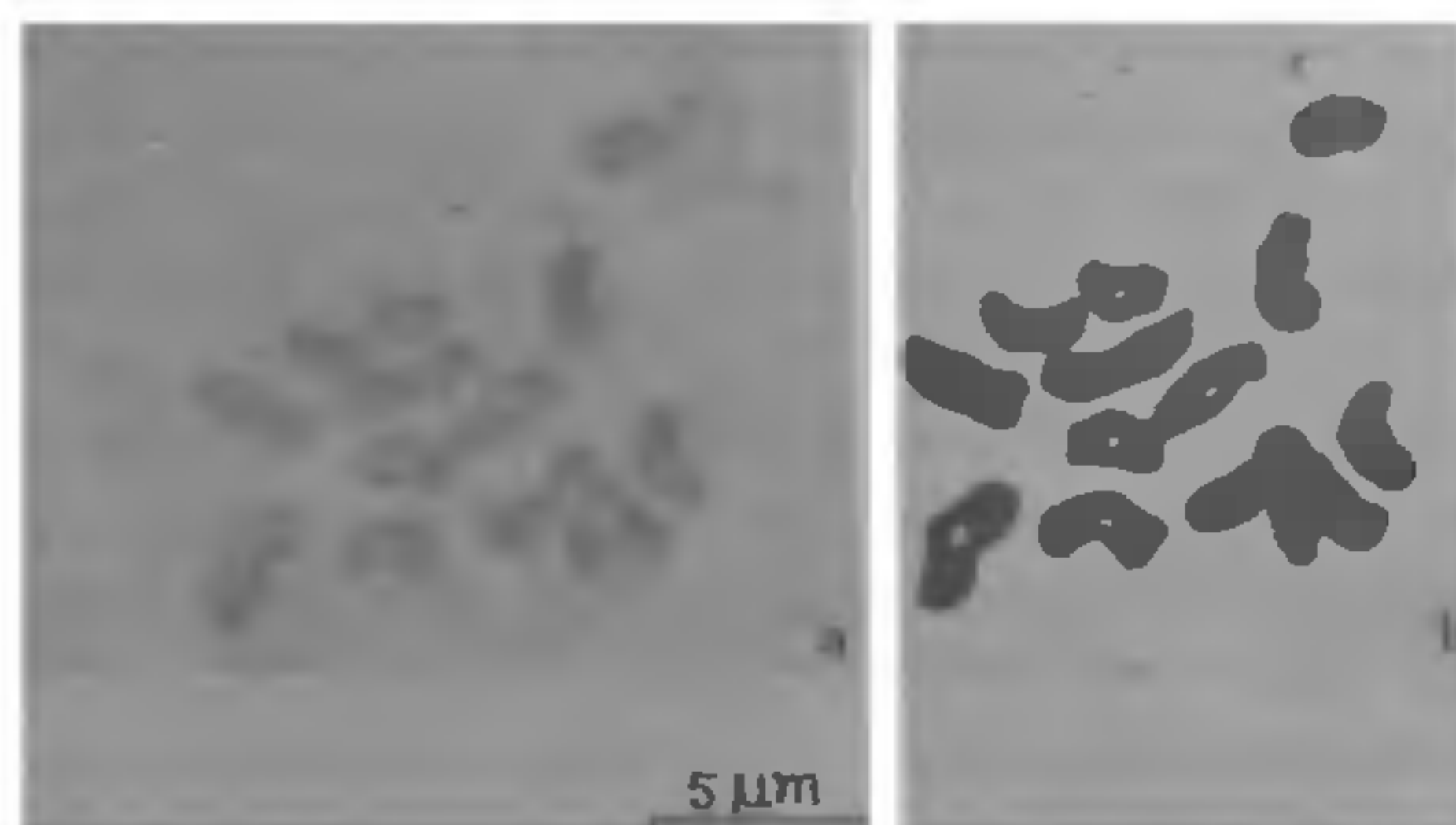


Figure 1a, b. a. Metaphase plate of *Chara braunii* f. *novi-mexicana* (A. Br.) R. D. W. showing 14 chromosomes; b. Drawing of the same.

Cytological studies revealed that the resting nucleus is spherical, 6.4–7.4  $\mu\text{m}$  in diameter, nucleoli 2, 1.6–2.3  $\mu\text{m}$  in diameter, chromocentres 1–2 (–3), chromosome number  $n = 14$  (figure 1A, B). Chromosomes small to medium, 1.5–3.6  $\mu\text{m}$  long, 0.8–1.2  $\mu\text{m}$  wide. Colchicine pretreated plants exhibit 3 metacentric and 11 submetacentric chromosomes (figure 2).

The earlier studies on *Chara braunii*<sup>3-24</sup> complex indicate the occurrence of 7, 12, 14, 28, 35 and 42 chromosomes but the majority of *C. braunii* forms possess 14 chromosomes. The occurrence of 14 chromosomes in *C. braunii* f. *novi-mexicana* is in conformity with the previous reports in *C. braunii* complex but for the 'forma', it is a new record.

Natural polyploidization in *C. braunii* complex has resulted in the formation of polyploid races within this complex ranging from  $n = 7$  to  $n = 42$ . Polyploidy is always associated with evolution. In the case of *C. braunii* complex, high ploidy level prevails which is an indication of advancement over other ecorticated forms of *Chara*. Wood and Imahori<sup>1</sup> have already assigned an advanced status to *C. braunii* on the basis of phenotypic difference and absence of dioecious taxa in this complex. Thus the phylogeny provided by Wood and Imahori<sup>1</sup> to *C. braunii* complex seems to be correct on cytological grounds.

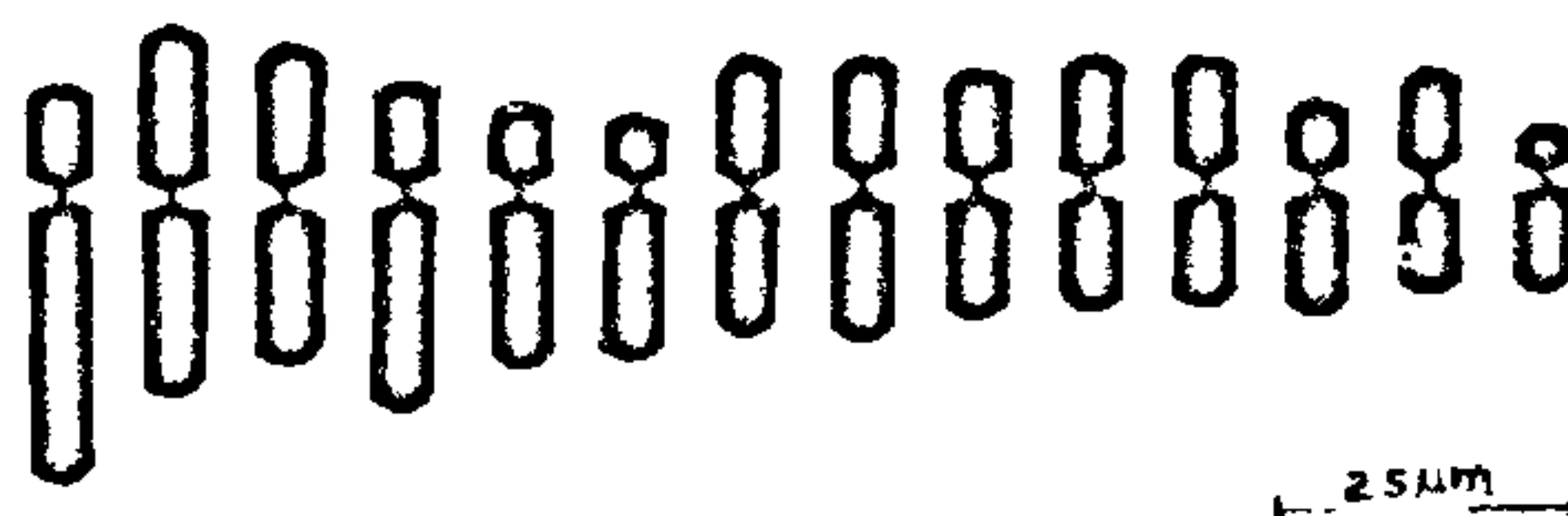


Figure 2. Karyotype analysis of *C. braunii* f. *novi-mexicana*.

The constancy of the chromosome number  $n = 14$  in most of the taxa of this complex is significant from an evolutionary point of view. *C. braunii* exhibits minor karyotypic variations which may be associated with phenotypic changes. All the forms of *C. braunii* complex show minor phenotypic differences between one another and it appears that in *C. braunii*, the structural alterations of chromosomes are associated with the evolution of phenotypic variations. Karyotypic asymmetry within the complex is natural but the majority of taxa in this complex has a dominance of metacentric and submetacentric chromosomes. It is evident from the present study that *C. braunii* f. *novi-mexicana* is a close representative of *C. braunii* complex due to the similarity in karyotypic organization and chromosome number.

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#### NULLISOMIC-TRISOMIC IN *COIX GIGANTEA* (POACEAE)

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WHILE aneuploids on the negative and positive sides of the disomic constitutions have been reported in many plants<sup>1</sup>, higher polysomics<sup>2,3</sup> occur with extreme rarity. Addition and/or subtraction of different chromosomes at a time, in a diploid constitution is still a rare phenomenon, tetratrismic<sup>4</sup> ( $2n + 2 + 1$ ) and monotrosomic<sup>5</sup> ( $2n - 1 + 1$ ) being the only two-in-one aneuploids reported so far. A new double-aneuploid constitution, nullisomic-trisomic ( $2n - 2 + 1$ ), in *Coix gigantea* is reported here.

*C. gigantea* Koen. ex. Roxb. ( $2n = 20$ ) belongs to the tribe Maydeae of family Poaceae<sup>6</sup>. Seeds of this species were collected from the Purandar Fort (Maharashtra) and a small plant population is maintained at the botanical garden of this University. Typical meiotic nondisjunction of a bivalent<sup>7</sup> and irregularities in the chromosomal segregation due to limited desynapsis<sup>8</sup> led to the formation of aneuploid gametes. The plants being of the open-pollinated type, it resulted in a range of aneuploid individuals, through spontaneous cross-fertilizations<sup>9</sup>. A telotrismic plant ( $2n = 20 + 1$ ) obtained from among the progeny was selfed by completely enclosing it in a muslin cloth bag with the onset of flowering. The selfed progeny consisting of about 60 plants was cytologically-screened by fixing immature male racemes of every individual plant