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AN EXAMPLE OF CHROMOSOMAL POLYMORPHISM
IN THE PLANARIAN *DUGESIA BENAZZII*
(TRICLADIDA PALUDICOLA)

Abstract — In a population of *Dugesia benazzii* from Corsica a chromosome pair consists of two heteromorphous elements, one mediocentric corresponding to the common complement of the other populations and one submediocentric.

Riassunto — Un esempio di polimorfismo cromosomico nella planaria *Dugesia benazzii* (*Tricladida Paludicola*). In una popolazione di *Dugesia benazzii* della Corsica una copia cromosomica consiste di due elementi eteromorfi, uno mediocentrico corrispondente a quello del normale corredo delle altre popolazioni ed uno submediocentrico.

Key words — Chromosomal polymorphism / planarian / Corsica.

Dugesia benazzii, similarly to most of the other species belonging to the «*Dugesia gonocephala* group», presents a karyotype that is characterized by mediocentric chromosomes, according to the classification introduced by LEVAN *et al.* (1964). However, BENAZZI LENTATI *et al.* (1951) found that the tetraploid biotype from Sardinia possesses heterobrachial chromosomes. According to their length, these chromosomes can be attributed to the third group and with all probability originate from a pericentric inversion in homozygous condition. The mean of relative length of chromosomes in the third pair of the diploid biotype is 13.67 ± 0.75 and that of the tetraploid biotype is 13.36 ± 0.47 ; the centromere index is 45.98 ± 1.76 and 26.49 ± 2.76 , respectively.

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In an attempt to establish a possible relationship between fissioning and variations in the chromosome number in various populations from Corsica, BENAZZI LENTATI and DERI (1980) found a peculiar karyotype at Castello Pino, characterized by the presence of a polymorphic chromosome pair. In fact, one of the two elements is mediocentric (c.i. = 43.59 ± 2.37) while the other is similar to the heterobrachial chromosome of the tetraploid biotype (c.i. 26.87 ± 3.75). (Fig. 1). It is to be pointed out that the mean relative lengths of the second and the

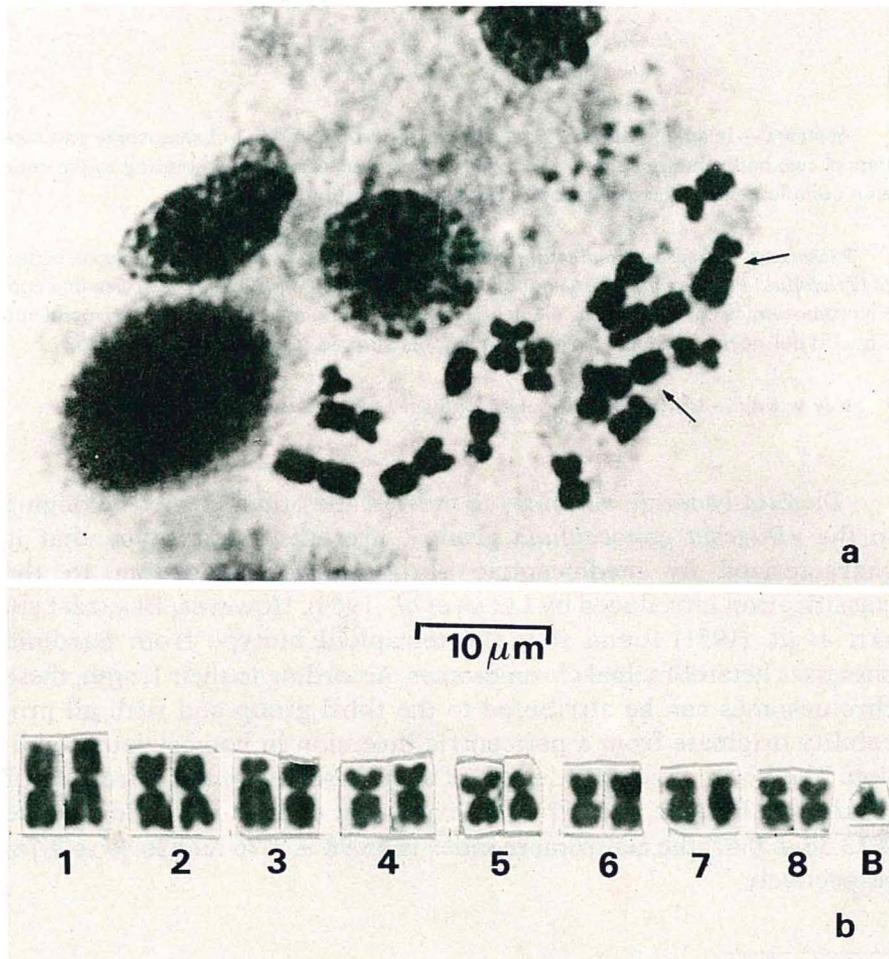


Fig. 1 - *Dugesia benazzii*: Castello Pino population. a) metaphase plate; b) karyogram.

third chromosome pairs resulted very close: 14.99 ± 1.09 and 14.45 ± 0.91 , respectively. Therefore, the attribution of the heteromorphic chromosome to the third pair is sometimes doubtful.

The Castello Pino population was largely studied by BENAZZI with particular regard to the genetic control of fissioning (BENAZZI, 1974). This planarian reproduces both sexually and by fission. Initially the specimens were diploid with 8 bivalents in the gonocytes. Later on, a gradual increase in the chromosome number of sexual and fissiparous specimens, including the appearance of B-chromosomes in some individuals, was observed (BENAZZI LENTATI and DERI, *l.c.*). The heterobranchial chromosome is present in both sexual and fissiparous specimens; since it appeared before the rise of the B-chromosomes, the two events are not casually related.

In this preliminary contribution, only diploid specimens were utilized, namely, 4 sexual individuals pertaining to the original stock and 6 of their offspring, 3 of which sexual and 3 fissiparous. Seventeen metaphase plates have been selected. Only one specimen without the polymorphous pair was found, being both chromosomes mediocentric.

Our findings rise some questions, first of all the origin of the chromosomal polymorphism. This may be supposed to be of hybrid origin, that is to be due to a cross between specimens with a normal karyotype and specimens similar to the tetraploid biotype of Sardinia. This hypothesis could be supported by the fact that polymorphism of the third pair has been obtained in crosses of this type made under laboratory condition (cf. BENAZZI LENTATI *et al.*, 1956) (¹). However, populations similar to the tetraploid biotype of Sardinia have not been found in Corsica.

New research on the population from Castello Pino and a more exhaustive karyometric analysis of various other populations are now in progress.

We should also recall an example of chromosomal polymorphism recently recorded by DE VRIES *et al.* (1984) in a planarian of the genus *Dugesia*, belonging to a different subgenus (*Schmidtea*), namely *Dugesia mediterranea* Benazzi *et al.* In two populations of this species, that are both fissiparous, occurring near Barcelona (Spain) and Mallorca, the third chromosome pair consists of two heteromorphic elements. A rela-

(¹) In this paper the third chromosome pair was erroneously attributed to the fourth one.

tionship of this case with the one found in *D. benazzii* is not advisable, by reason of the taxonomic and chromosomal differences in the two species. Moreover, also the type of polymorphism differs, because in *D. mediterranea* the members of the third chromosome pair are of different length, probably as a result of the duplication of a relatively large segment of one of the chromosome arms.

However, these findings appear noteworthy because, as pointed out by DE VRIES *et al.* (*l.c.*), chromosomal polymorphism, which is common in other animal groups, was hitherto unknown in planarians.

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