

## Reversion of virus N-1 resistant mutant of blue-green alga *Nostoc muscorum*

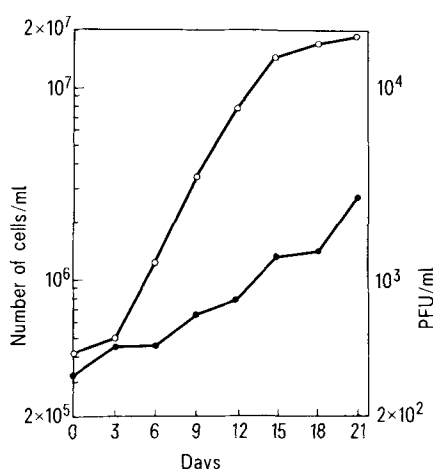
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**Summary.** The reversion of N-1 virus resistant strain of the alga *Nostoc muscorum* was studied by inoculating parent virus in the resistant culture at various incubations. A fraction of virus resistant cells reverted to wild sensitive type with the reversion rate of  $3.99 \times 10^{-6}$ /cell/generation.

The spontaneous and induced mutation in the blue-green algae *Plectonema boryanum* and *Nostoc muscorum* resistant to LPP-1 and N-1 respectively is established<sup>2-4</sup>. However, there is no previous report on the reversion of virus-resistance in blue-green algae. The present work deals with the reversion of N-1 virus-resistant cells of *N. muscorum*.

The nitrogen-fixing blue-green alga *Nostoc muscorum* and virus N-1 were used in the study. Aliquots of 0.5 ml of a clonal population of a virus resistant isolate was inoculated into a number of tubes containing 9.5 ml of growth medium. These were divided into 2 series. The 1st series was kept under light in a culture-room, for cell counting at



Growth of virus resistant isolate (○) and virus-titre (●) in resistant culture after virus addition.

intervals of 3 days after 1:10-fold dilution. To the 2nd series, aliquots of 0.1 ml of virus suspension ( $3.2 \times 10^5$  plaque forming units/ml) were added and these tubes were incubated under light along with the 1st series; the virus titre of this series was determined at intervals of 3 days after serial dilutions. The back-mutation rate ( $m_b$ ) of virus-resistance was calculated by the formula:  $m_b = \log_e \frac{2(M_2 - M_1)}{(N_2 - N_1)^5}$ , where  $M_1$  and  $M_2$  are numbers of virus sensitive cells (calculated from the increase in virus titres and the average burst-size) arising at times 1 and 2 and  $N_1$  and  $N_2$  are the corresponding total cell counts.

The cell number of virus-resistant strain and virus titre in the supernatant of the culture after addition of virus are illustrated in the figure, from which the back-mutation rate of virus-resistant cells to virus sensitivity was calculated. The increase in virus titres between 3rd and 15th day of incubation was  $7.5 \times 10^3$  PFU/ml. Since the average burst-size of this virus in parent<sup>6</sup> and revertant is 120 PFU/ml, the increase in virus titre ( $7.5 \times 10^3$  PFU/ml) was equivalent to 62.5 cells/ml, whereas the increase in total cell counts within this period was  $10.9 \times 10^6$  cells/ml. Thus, the mutation rate of virus-resistant population was calculated to be  $3.99 \times 10^{-6}$ /cell/generation.

- 1 We gratefully acknowledge Dr H.K. Pande and Dr S. Patnaik, Crops and Soils Division.
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## Environmental and racial influences on the masticatory apparatus of mediterranean and atlantic populations of *Ophryotrocha labronica* (Annelida, Polychaeta)

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**Summary.** Significant differences in the length of the definitive upper jaw have been ascertained in 3 populations of the comprehensive species *O. labronica*. The ratio of the variance (F) of the 3 populations has been employed in evaluating the taxonomic distance between the populations. The density of the water and the kind of food strongly influence the length of the definitive upper jaw.

La Greca and Bacci<sup>1</sup> described *Ophryotrocha labronica* on a proterandric hermaphrodite population from Livorno. Åkesson<sup>2</sup> later examined a number of *O. labronica* from different seas, and established that all of them were gonochoric with the exception of a population from Faro (Portugal) which was partly hermaphroditic. Åkesson also found that sex ratios differ in the different populations from 28% males in Malaga to nearly 50% in Famagusta (Cyprus) and Palma de Mallorca. Varying degrees of reproductive isolation were also ascertained between populations ranging from complete isolation to alteration in the sex ratios of hybrids.

The hard pieces of the complicated definitive masticatory apparatus<sup>3,4</sup> proved to be very useful in identifying the numerous species of *Ophryotrocha*. Measurements of such pieces are employed in the present research to check whether environmental factors have any influences on the size of the definitive upper jaw, and whether significant biometrical differences can be demonstrated between populations pertaining to the comprehensive species *O. labronica*.

The investigation was carried out on adult individuals measuring 13 chaetigerous segments, which came from strains originally collected in the lagoons of Venice (VE), in