

Absence of 93 D-like Locus of *Drosophila melanogaster* in *Melanagromyza obtusa*

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Benzamide (BM) treatment selectively induces one of the major heat shock (HS) puffs (93 D locus) in *D. melanogaster*. Similar loci have been found conserved in several other species of *Drosophila*. In contrast, during present study it is reported that no such locus could be detected in *M. obtusa*. Since, *M. obtusa* belongs to a primitive dipteran family, Agromyzidae, it is suggested that 93 D like locus has been incorporated in later stage in the evolutionary history and conserved only in Drosophilid species.

The 93 D locus of *Drosophila melanogaster* is one of the heat shock (HS) loci, which is specifically induced by benzamide (BM) treatment¹. The function of this locus is not clearly known but its conservation in other Drosophilid species makes it more important and prompts further studies in the line of its evolution. During the present study, attempt has been made to know whether 93 D-like locus is a feature of Drosophilidae or it is found in other groups of Diptera also. In this context, experiments have been performed in *Melanagromyza obtusa*, a member of the family Agromyzidae and a suitable material for such studies².

In order to detect the 93 D-like locus in *M. obtusa*, the distal portions of salivary glands (SG) were excised and subjected to HS and BM treatments. For giving HS, sister glands were incubated separately at 39° and 24°C for 30 min in inorganic salt constituents of Poels' tissue culture medium³. The glands incubated at 24°C served as control. For BM treatment, SG was incubated in medium containing BM (1mg/ml) for 10 min at 24°C, the control being in BM free medium. After the treatments tissues were fixed in aceto-methanol (1:3) and stained in lacto-orcein for 5 min before squashing.

HS induced three major puffs in SG chromosomes of *M. obtusa*. The loci were identified as 2C on the X-chromosome and 31E and 37B on the D-chromosome (Fig. 1). On the other hand, BM treatment fails to induce any puff.

HS has long been known to induce a particular set of puffs in polytene chromosomes of *Drosophila*⁴⁻⁶ and other dipteran species⁷. When *D. melanogaster* larvae or their excised tissues are subjected to a brief HS treatment (30-40 min at

37°C, the normal rearing temperature being 24° ± 1°C), nine puffs are induced (33 B, 63 C, 64 F, 67 B, 70 A, 87 A, 87 C, 93 D and 95 D). Of these, the 93 D puff locus is distinct and can be specifically induced by BM treatment¹. Further, one of the major HS puffs can be induced by BM treatment also in other species of *Drosophila*⁶. Having similar response, these loci in dif-

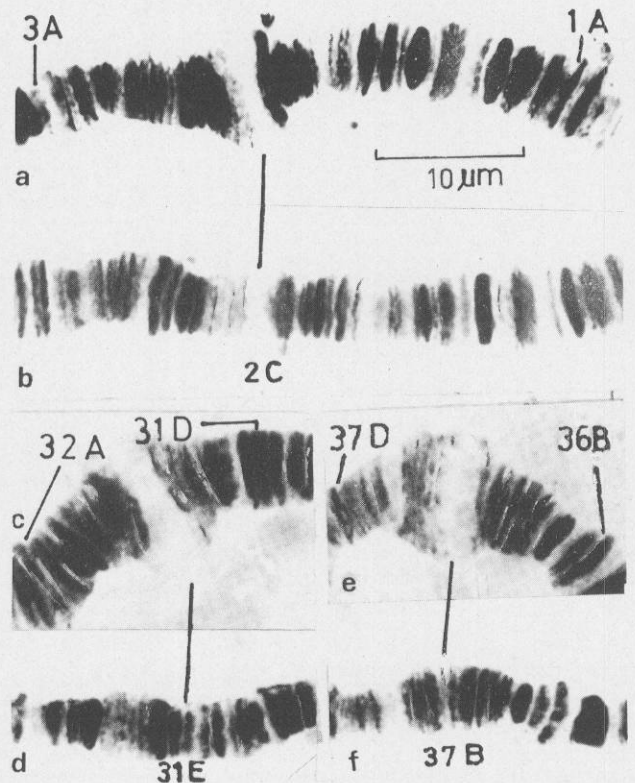


Fig. 1—Polytene chromosomes showing HS puffs: a, c, e HS treated; b, d, f control

ferent species are believed to be homologous to the 93D locus of *melanogaster* and that this locus is fairly conserved among the members of *Drosophila*. However, present study reveals that no such locus is detected in *M. obtusa*, which can be selectively induced by BM and considered homologous to that of the 93D locus of *melanogaster*. The family Agromyzidae, to which *M. obtusa* belongs, is considered to be a primitive dipteran family in evolutionary phylogeny⁸. It is therefore, suggested that the function of 93D-like locus has probably been introduced much later in the evolutionary history of diptera and found conserved only in Drosophilids.

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References

- 1 Lakhota S C & Mukherjee T, *Chromosoma*, **81** (1980) 125.
- 2 Singh O P, *Curr Sci*, **57** (1988) 48.
- 3 Poels C L M, *Cell Differ*, **1** (1972) 63.
- 4 Ritossa F, *Experientia*, **18** (1962) 571.
- 5 Ashburner M & Bonner J J, *Cell*, **17** (1979) 241.
- 6 Lakhota S C & Singh A K, *Chromosoma*, **86** (1982) 265.
- 7 Singh O P & Gupta J P, *Chromosoma*, **91** (1985) 359.
- 8 Spencer K A, *Agromyzidae (Diptera) of economic importance* (Dr W Junk B V Publisher, The Hague, Netherlands) 1973, 10.