RESEARCH NOTE

TWO TROX *KARYOTYPES DIFFERING RADICALLY IN THE LOCATION OF CENTROMERES*[1]

Trox is a scarabacoid genus. Its relation to the Scarabaeidae is not completely understood. It is the main genus, among a few others, forming

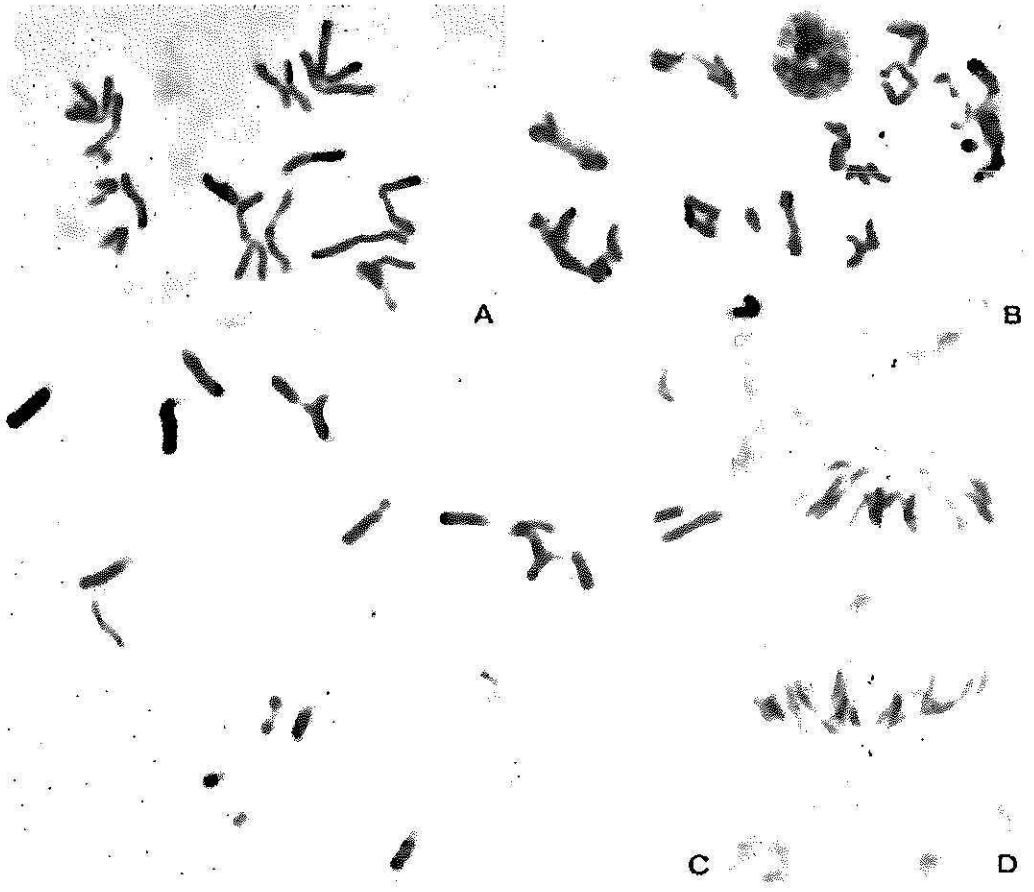

FIG. 1.—A and B, *Trox foveicollis*, metaphase and anaphase of a mitotic division, respectively; C and D, *Trox punctatus*, metaphase and anaphase of a mitotic division, respectively. Magnification H2133 ×.

the subfamily Troginae of Scarabaeidae, or the family Trogidae, as some taxonomists prefer to call it. The systematics of the American *Trox* species has been recently revised by Vaurie[2, 3]. The cytology of *Trox* is unknown.

[1] Contribution to the National Science Foundation Grant GB-3586.

[2] Vaurie, P., A revision of the genus *Trox* in America (Coleoptera, Scarabaeidae), *Bull. Amer. Mus. Natur. Hist. 106*(1): 1-89, 1955.

[3] Vaurie, P., A revision of the genus *Trox* in South America (Coleoptera, Scarabaeidae), *Bull. Amer. Mus. Natur. Hist. 124*(4): 107-67, 1962.

We received from Mr. Charles W. Baker[1] a small sample of *Trox foveicollis* Harold and *Trox punctatus* Germar for chromosome study. In the former species, meiotic divisions had not started at the beginning of the third week of adult life, the testis contents being formed by spermatogonia and spermatocytes up to diplotene. Only the mitotic chromosomes were encountered in this species. In *Trox punctatus*, the testis contained mainly gonia and meiotic prophase at the end of the fourth week of adult life.

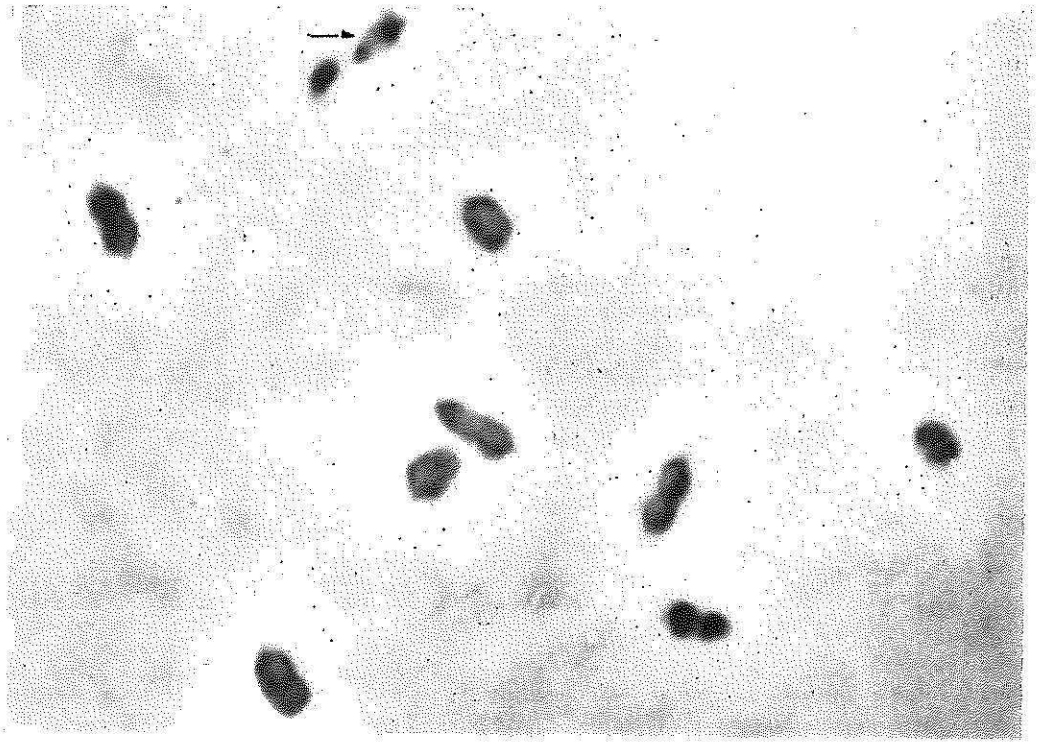

FIG. 2.—*Trox punctatus*, metaphase of the first meiotic division; arrow shows Xy_p. Magnification H2986 ×.

The meiosis was in full force in a specimen of 6 weeks, whereas a specimen 12 weeks old had no divisions, and its testis were collapsed. Thus *Trox* seems to have the type of spermatogenesis which starts late and proceeds in one big wave[2].

Trox foveicollis has 20 chromosomes, one of them small. This must be the y chromosome. All except perhaps the y chromosome, are metacentric, as shown by the unstained gap in their midpart, where they tend to bend (fig. 1,A). Metacentry of the chromosomes is confirmed by anaphase (fig. 1,B).

[1] Oregon State University, Agricultural Experiment Station, Department of Entomology, Corvallis, Ore.

[2] Virkki, N., Insect gametogenesis as a target, *Agr. Sci. Rev.* 3(3): 24–37. 1965.

Trox punctatus has the same chromosome number, but all of its autosomes, at least, are acrocentric (fig. 1,C). Acrocentry is confirmed by anaphases (fig. 1,D). The first meiotic metaphase of this species shows 9 + Xy (fig. 2).

It is surprising to find such a radical difference in chromosome structure within one and the same beetle genus. Centric fusions and fissions can create such relations between close species of beetles, as shown by Smith[6] in *Chilocorus*, but these rearrangements are accompanied by changes in chromosome number. In the present case of the two *Trox* species it seems most probable that pericentric inversions are responsible for the difference.

According to Vaurie,[3] *Trox foveicollis* is a more primitive species, belonging to the *terrestris* group and occurring in the Eastern and Central parts of the USA. *Trox punctatus*, belonging to the *suberosus* group, is more specialized, living in desert and mountainous regions of the West. It is said to have affinities with the little-known Australian species. This helps us to understand the difference between these karyotypes. *Trox foveicollis* has, without any doubt, the more primitive karyotype, resembling typical scarab karyotypes. Accumulation of pericentric inversions in *Trox punctatus* has apparently taken place during an evolutionary phase long separate from that of *Trox foveicollis*.

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[6] Smith, S. G., The cytogenetic basis of speciation in Coleoptera, *Proc. X Int. Congr. Genet. 1*: 441-50, 1959.