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DUGESIA JENKINSAE N. SP., A FRESH-WATER TRICLAD (TURBELLARIA) FROM TEXAS

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BENAZZI, M. & GOURBAULT, N. 1977. *Dugesia jenkinsae* n. sp., a fresh-water triclad (Turbellaria) from Texas. *Trans. Amer. Micros. Soc.*, 96: 540-543. A *Dugesia* species from San Felipe, Texas, with a haploid set of four chromosomes and previously identified as *D. dorocephala* (Woodworth), is now recognized as new and described as *D. (Girardia) jenkinsae* n. sp.

In the autumn of 1971 and 1972, Dr. Marie M. Jenkins (Madison College, Harrisonburg, Virginia) sent to one of us (M. B.) living specimens of *Dugesia dorocephala* (Woodworth, 1897) collected in various localities of the United States. Most of these populations showed the standard diploid set of 16 chromosomes (Benazzi, 1966). Two strains, however, presented a different chromosome set of $2N = 8$ (Benazzi, 1975). One strain from Arizona (Sabino) is represented by slender, asexual specimens; therefore, no thorough taxonomic description of it is possible. The other, from Texas (San Felipe), consists of very large and sexual animals. For a while, there was no doubt that the San Felipe form corresponded to the widely distributed *D. dorocephala* because of similarity of external characters. Failure to cross these two forms, however, in addition to the differences in chromosome sets, suggested the possibility that the San Felipe population could be of a distinct species.

In 1974, Dr. Roman Kenk (Smithsonian Institution) gave to one of us (N. G.) some specimens of *D. arizonensis* Kenk, 1975, a species similar to the San Felipe form in its head shape (Kenk, 1975); it also has the same karyotype. But a study of the reproductive apparatus of the worms from San Felipe has shown that despite the similarities this planarian is a well-defined separate species. We name it in honor of Dr. Marie M. Jenkins.

Dugesia jenkinsae n. sp.
(Figs. 1-5)

Type-material. Istituto di Zoologia e Anatomia comparata dell'Università di Pisa, Italy. *Holotype:* sagittal sections of single specimen posterior to prepharynx (on eight slides). *Paratype:* same, on seven slides. Type-material in possession of the senior author.

External Morphology

Owing to the great resemblance of this species to *D. dorocephala*, a description of the external features seems unnecessary. There need only be noted a slight but evident difference in the shape of the head, which is a sharply pointed triangle with an acute anterior end and two long auricles. In this, *D. jenkinsae* strictly resembles *D. arizonensis*.

Another character shared by these two species is the slight pigmentation of the pharynx (whose inner circular fibers represent 15-20% of the total thickness of the pharyngeal wall). In *D. dorocephala*, the pharyngeal pigmentation is stronger than in *D. jenkinsae*.

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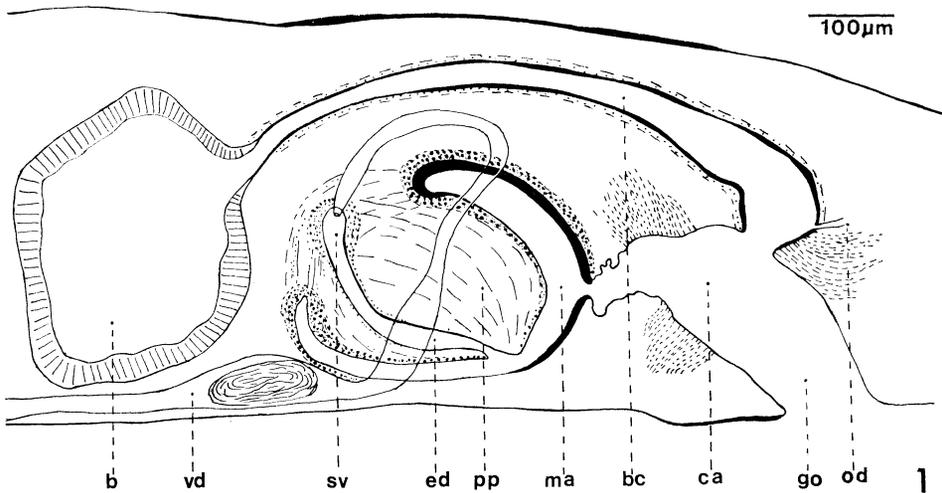


FIG. 1. *Dugesia jenkinsae*, semidiagrammatic view of copulatory system in sagittal section. Legend: b, bursa copulatrix; bc, bursal canal; ca, common atrium; ed, ejaculatory duct; go, gonopore; ma, male atrium; od, common oviduct; pp, penis papilla; sv, seminal vesicle; vd, vas deferens.

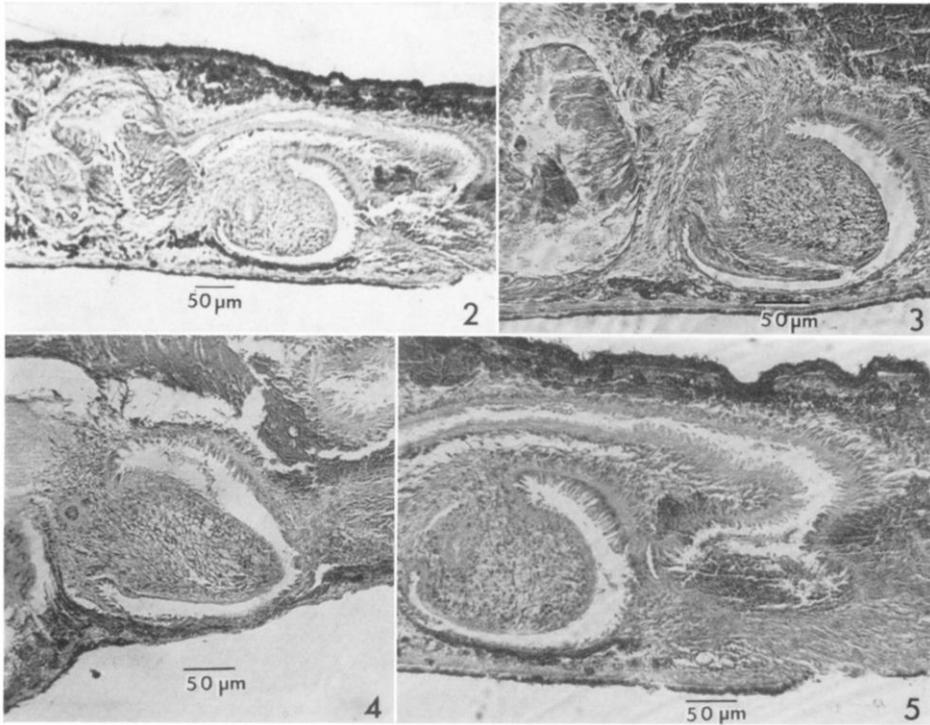
The maximum length of *D. jenkinsae* is ca. 25 mm, a length found in most specimens of *D. dorotocephala*.

Reproductive System

The follicular testes, arranged in two longitudinal rows, are ventral and extend nearly to the posterior end of the body. The penis is characterized by the reduction of the bulb and the asymmetry of the large globular, ovoid papilla. The central part of the flattened, weakly muscularized bulb is occupied by a small seminal vesicle surrounded respectively by a thick musculature and a layer of nuclei. The vasa deferentia, which are recurved (Fig. 1), open dorsally at the top of the seminal vesicle; the latter extends into the ejaculatory duct. The duct runs through the ventral part of the papilla, opening more or less at the tip. It is semi-circular in shape (Figs. 1, 3) and is lined by a rather high infranucleate epithelium overlain by muscular fibers. The dorsal part of the papilla, lined by a flat epithelium, is well developed; superficially, its muscular fiber pattern associated with its mesenchymatous structure resembles an adenodactyl.

The male atrium shows a different structure in its dorsal and ventral parts (Figs. 2, 3). The dorsal wall has a high nucleate cuboidal epithelium surrounded by a thick musculature in continuation with the external fibers of the papilla. The ventral one possesses a very flat epithelium in which two or three rows of nuclei can be observed. The separation of the male atrium consists of a narrow constriction (Fig. 2). The wide common atrium is filled with a great number of eosinophilous gland cells and lined by a nucleate cuboidal epithelium.

The large copulatory bursa shows the usual columnar epithelium; a spermatophore is present in one specimen. The bursal canal is lined by a tall, papillated epithelium (Figs. 2, 5) that has no nuclei; this is surrounded by a layer of circular fibers and a thicker layer of longitudinal muscle. A common oviduct opens into the bursal canal (Fig. 5) just before the latter opens into the



FIGS. 2-5. Sagittal sections of *Dugesia jenkinsae*. Fig. 2. Copulatory system. Fig. 3. Penis bulb, showing the ejaculatory duct and its opening; bursa copulatrix contains a spermatophore. Fig. 4. Penis, showing the flattened bulb and the small seminal vesicle. Fig. 5. Bursal canal and its dorsal opening into the common atrium.

common atrium. The shell glands, numerous and extensive, empty into the bursal canal between the oviductal openings and the atrium.

Taxonomic relations

Dugesia jenkinsae belongs to Ball's (1974) subgenus *Girardia*, represented by numerous American species, two of which, both from North America, can be considered close allied species: *D. dorotocephala* and *D. arizonensis*.

From the latter, *D. jenkinsae* differs in many anatomical characters, *viz.*, the ventral position of the testes, the different morphology of the penis (very flat bulb and globular asymmetric papilla), the tiny seminal vesicle, the different thickness of the epithelium and the musculature of the dorsal and ventral parts of the male atrium, and the presence of an anucleate epithelium lining the bursal canal.

The new species differs also from *D. dorotocephala* in some internal features. In fact, *D. dorotocephala* possesses a spherical muscular bulb and a conical or finger-shaped papilla. Each vas deferens expands within the bulb to form a seminal vesicle, sometimes so well developed that a round cavity with two horns is observed; the two cavities fuse into a large ejaculatory duct. No peripheral muscular fibers surround the bulb, but a thick layer of eosinophilous glands appears at that level. A wide connection usually exists between male and common

atria (not obvious on specimens from Los Angeles, California; but see Ball, 1971, Fig. 6).

We have been able to compare histological sections of *D. jenkinsae* and *D. dorotocephala*. The *D. dorotocephala* belong to a sexual population from Buckhorn Springs, Murray, Oklahoma, and are kept in culture by one of us (M. B.).

Apart from the two North American species considered, another species should be mentioned. This is the Caribbean *D. arimana* Hyman, 1957, re-described by Ball (1971) on the basis of material from Trinidad. In its morphology, this species differs from *D. jenkinsae*, especially by its smaller size and slender elongate shape, and also by the predominantly dorsal position of the moderately numerous testes; yet, we must emphasize the high similarities of the topography and structure of the copulatory system. However, some peculiar features allow us to separate *D. jenkinsae* from it: for example, the flattening of the bulb, the strong asymmetry of the large papilla, and the difference seen in the dorsal and ventral walls of the male atrium. This different structure is still described by Marcus (1946) for *D. arndti*, and the strong asymmetry of the papilla can be observed in *D. hypoglauca* Marcus, 1948.

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