beobachtet; dabei fanden in 79,4% aller Fälle (58 Kopulationen) morphengleiche und in 20,6% aller Fälle (15 Kopulationen) morphenungleiche Paarungen statt. Wenn dabei berücksichtigt wird, dass in diesem Experiment die ökologische Differenz der beiden «Morphen» ausgeschaltet ist, dann erscheint ein 20,6%iger Irrtum im Kopulationsverhalten weniger bedeutend. Ganz offensichtlich werden die Geschlechtspartner durch spezifische Sinnesreize, bei denen ein Unterschied zwischen den «Morphen» besteht, zusammengeführt. Es liegt also ein progamer, ethologischer (pre-mating) Isolationsmechanismus vor. Untersuchungen über die dabei wirksamen Signalreize sind im Gange.

Hältert man ein Männchen der «Morphe» *communis* allein mit einem Weibchen der «Morphe» *vulgaris* und reziprok, so finden unter dieser «Zwangssituation» ohne Wahlmöglichkeit regelmässig Kopulationen und darauf folgende Eiablagen statt. Von 26 solcher Kombinationen erhielten wir 6157 Eier. Aus diesen entwickelten sich nur 3 Larven, das sind weniger als 0,05%. Ob sich aus diesen 3 Larven Imagines (steril oder fertil) entwickeln, ist zur Zeit noch offen. Zum Vergleich sei angeführt, dass sich aus den Eiern, die nach morphengleichen Kreuzungen abgelegt wurden, im Falle von *P. vulgaris* durchschnittlich 58% (15,4%–89,1%) und im Falle von *P. communis* durchschnittlich 45% (6,6%–65,9%) Larven entwickelten. Die aus diesen Larven im weiteren Verlauf der Entwicklung hervorgegangenen Imagines waren stets fertil. Neben einem progamen Isolationsmechanismus liegt also noch ein weiterer metagamer (post-mating) Isolationsmechanismus zwischen beiden «Morphen» vor.

Durch unsere Untersuchung ist sichergestellt, dass *P. communis* und *P. vulgaris* gute biologische Arten darstellen, die reproduktiv durch pro- und metagam wirksame Isolationsmechanismen getrennt sind, unterschiedliche ökologische Nischen bilden, sich jedoch morphologisch nur geringfügig unterscheiden. Eine ausführliche Darstellung der Entstehung dieser beiden Arten – wahrscheinlich Zwillingsarten – und der damit verbundenen morphologischen, biologischen und tiergeographischen Probleme werden an anderer Stelle in Kürze erfolgen.

Summary. *P. communis* and *P. vulgaris* are biological species, reproductively isolated by pre- and post-mating isolation mechanisms. Both species build their own specific ecological niches, but morphologically they differ only very little – perhaps they are sibling species.

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5. August 1974.

Presence of Neurosecretory Cells in the Vegetative Nervous System of *Dendrobaena atheca* Cernosvitov

During the course of the studies on the neurosecretory system of *Dendrobaena atheca*, the authors have discovered neurosecretory cells in the vegetative nervous system. It is well known that the neurosecretory cells which produce physiologically active substances are located throughout the central nervous system of annelids. Relatively little is known about the neurosecretory cells in the vegetative nervous system[1,2] of oligochaetes, but the importance of the neurosecretory products in the physiology of many oligochaetes is apparent from recent reviews.

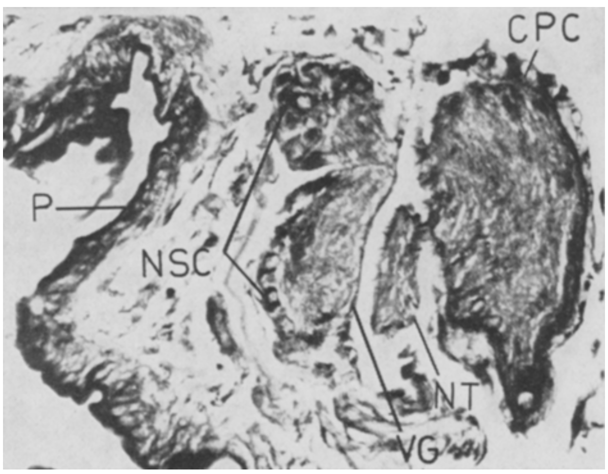

Fig. 1. Horizontal section of the anterior segments of *Dendrobaena atheca* showing vegetative ganglia, circum-pharyngeal commissure and the pharynx. CPC, circum-pharyngeal commissure; NSC, neurosecretory cells; NT, nerve tract; P, pharynx; VG, vegetative ganglion. Bouin, AF, ×220.

The ventral ganglionic chain of *Dendrobaena* has several nerve fibres which innervate the glands, the intestine and the muscles of the tunic of the nervous system itself. A distinct system of several ganglia of different sizes and nerve fibres exists in the wall of the anterior part of the digestive tract, particularly the pharynx. It resembles in many respects the vegetative nervous system of higher animals.

The circum-pharyngeal commissures give off 4 to 6 short thick nerve tracts on each side towards the pharynx. After a short course, these tracts swell into large and small ganglia located in the pharyngeal wall. The ganglia are surrounded by a fibrous sheath and are differentiated into an outer cellular and an inner fibrous layer. Several small ganglia and nerve fibres are very close to the epithelial cells of the pharynx.

Gomori-positive cells have been identified by using CAMERON and STEELE's modifications of Gabe's aldehyde fuchsin (AF) technique[3], BARGMANN's[4] modifications of Gomori's chrome-alum haematoxylin phloxine (CHP) technique, Ehrlich haematoxylin eosin stain and Heidenhain's azan technique[5]. The neurosecretory or Gomori-positive cells are few in number and are mostly distributed towards the pharynx (Figure 1). These cells

[1] B. AROS and B. VIGH, Acta biol. Hung. *12*, 169 (1961).
[2] B. AROS, B. VIGH and I. TEICHMANN, Lenhossé Memory Symp. Biol. Hung. *5*, 303 (1965).
[3] L. CAMERON and J. E. STEELE, Stain Techn. *34*, 265 (1959).
[4] W. BARGMANN, Z. Zellforsch. *34*, 610 (1949).
[5] J. H. HUBSCHMAN, Stain Techn. *37*, 379 (1962).

are oval or elongated with fine or thick axons and measure 16–30 µm and with oval nuclei 8–12 µm in diameter (Figure 2). The cytoplasm shows dense granular structure, full of mitochondria and Nissl bodies. The neurosecretory granules occur in aggregates in perinuclear as well as in the extreme periphery of the cells. The secretory substances, as well as the typical Nissl bodies, are stained with CHP and AF. It is probable that the basophilic substances may be identical with Nissl bodies. Many vacuoles containing conspicuous neurosecretory material appear in the peripheral region of the perikaryon (Figure 2). The neurosecretory granules are released from the cells via the axons or cell membrane. The neurosecretory granules can be traced far into the processes of the nerve cells. In the two large ganglia situated at both sides of the pharynx, numerous Gomori-positive granules may be also observed along the fibres. The vegetative ganglia which are very close to the pharynx and oesophagus contain great amounts of Gomori-positive secretion. The secreted granules can be detected within the nerve fibres. Thus it seems most likely that the vegetative ganglia also contain cells with secretory character and function. Further, accumulation of Gomori-positive material and position of neurosecretory cells in these ganglia suggest that the neurosecretory cells found in them may have some role to play in the digestive system.

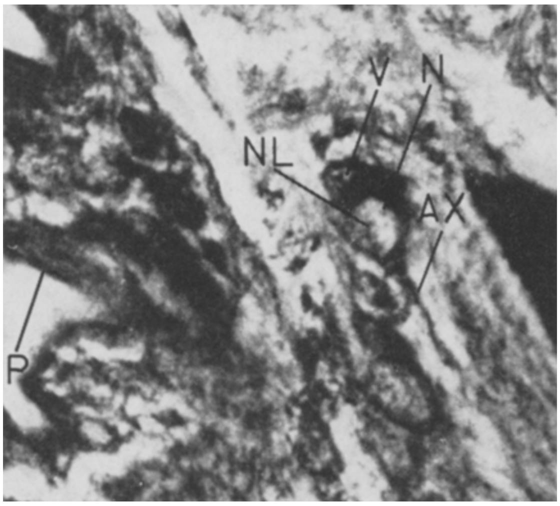

Fig. 2. Horizontal section through the vegetative ganglion showing the neurosecretory cells. AX, axon; NL, nucleolus; N, nucleus; P, pharynx; V, vacuole containing neurosecretory material. Bouin, AF, ×900.

Zusammenfassung. Neurosekretorische Zellen wurden in den vegetativen Ganglien von *Dendrobaena atheca* gefunden. Zahlreiche Gomori-positive Sekretgranulen konnten im Cytoplasma, in den peripheren Vakuolen und im Axon dieser Zellen nachgewiesen werden.

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Gene Amplification and its Effect on the Structure and Function of the Oocyte Nucleus in the Whirligig Beetle *Gyrinus natator* (Gyrinidae, Coleoptera-Adephaga)*

In 1916, Hegner and Russell[1] in a short report described a chromatic extrachromosomal body in the germ-line cells of the Gyrinid, *Dineutes nigrior*, during the oocyte differentiation. According to these authors, this body, as regards its morphology, the time of its appearance in the female germ-line and its behaviour in differential mitoses which give rise to the oocyte and the group of nurse cells associated with it, closely corresponded to the so-called Giardina's body in Dytiscidae. Although whirligig beetles have not been studied cytologically since that time, nevertheless it seems evident to-day that the chromatic body described in *Dineutes* is the extrachro-

* This research was supported in part by funds from the Cytobiology Committe of the Polish Academy of Science.

[1] R. W. Hegner and C. P. Russell, Proc. natn. Acad. Sci. USA *2*, 356 (1916).

[2] J. G. Gall, Genetics *61* Suppl., 121 (1969).

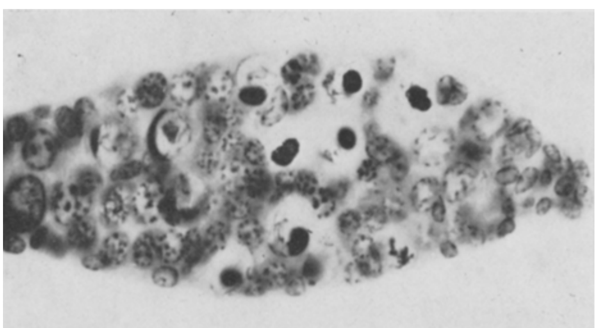

Fig. 1. Longitudinal section through the germarium of an ovariole. The anterior tip of the ovariole is to the right. Each oocyte nucleus contains a deeply stained body of extrachromosomal DNA which is situated in the middle of nucleus or is located excentrically under the nuclear membrane. Oocyte chromosomes are also clearly visible. Feulgen and light green. ×625.

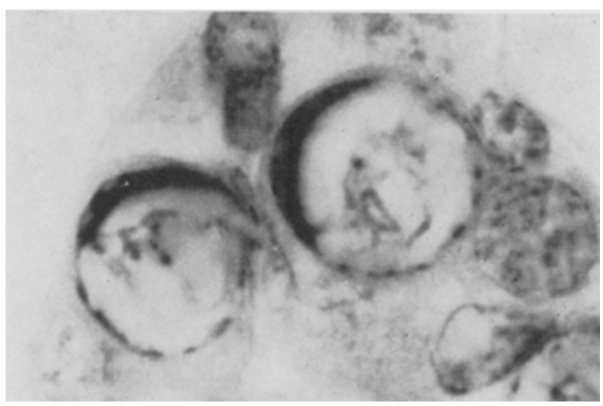

Fig. 2. Two early diplotene nuclei with conspicuous caps of extrachromosomal DNA. Diplotene chromosomes in the middle of the nuclei are clearly visible. Feulgen and light green. ×2050.