Zeitschrift: Acta Tropica
Herausgeber: Schweizerisches Tropeninstitut (Basel)
Band: 33 (1976)
Heft: 4

Artikel: Miscellanea : Isoelectric focusing in the taxonomy of bulinid snails
Autor: Saladin, B. / Degrémont, A. / Weiss, N.
DOI: https://doi.org/10.5169/seals-312240

Nutzungsbedingungen
Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Siehe Rechtliche Hinweise.

Conditions d'utilisation
L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. Voir Informations légales.

Terms of use
The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. See Legal notice.

Download PDF: 13.03.2025

ETH-Bibliothek Zürich, E-Periodica, https://www.e-periodica.ch

Miscellanea

Swiss Tropical Institute, Socinstrasse 57, CH-4051 Basel, Switzerland

Isoelectric Focusing in the Taxonomy of Bulinid Snails*

B. SALADIN, A. DEGRÉMONT and N. WEISS

The identification of Bulinid snails is still difficult and their taxonomy is not always well established (SOUTHGATE & KNOWLES, 1975). Field workers who are not familiar with morphological taxonomy are frequently confronted with this problem. This was the case in Madagascar, where it was very difficult to distinguish *Bulinus obtusispira,* the intermediate host of *Schistosoma haematobium,* from *B. liratus* (DEGRÉMONT, 1973).

Several attempts to develop serological and biochemical taxonomy have been made (WRIGHT, 1966) using different methods such as electrophoresis on cellulose acetate membranes (WRIGHT & ROSS, 1967), enzyme electrophoresis (COLES, 1970), gel diffusion (BURCH & LINDSAY, 1970) and disc electrophoresis (DAVIS & LINDSAY, 1967). We have already studied the abilities of all the methods mentioned above to distinguish between Bulinid snails from Madagascar (WEISS et al., 1974). Recently, the method of isoelectric focusing was used in bacterial (MATTHEW & HARRIS, 1975) and bird taxonomy (FRÉLIN et al., 1973).

The concept of isoelectric focusing in gels (IEF) was developed by SVENSSON (1961). We used the method described by RIGHETTI & DRYSDALE (1974) employing the Multiphor (LKB 2117) apparatus and Ampholine^R polyacrylamide gel plates with the pH-range from 3.5 to 9.5 (PAG plate Nr. 1804-101 by LKB). The d.c. power supply was a PS 10A multistab capable of delivering 1000 V.

The snails studied were: *Bulinus obtusispira* and *Bulinus liratus* (Tanandava, Madagascar). We compared their patterns with those of snails of three Bulinid groups, namely: *Bulinus tropicus*[1] (Zambia), *Bulinus cernicus*[1] (Mauritius) and *Bulinus nasutus* (Ifakara, Tanzania). For the experiment an egg-clutch was simply crushed on a filter-paper, which was laid upon the PAG plate. The number of eggs per clutch should be between three and ten to get the main bands and between ten and twenty to get the minor bands. Up to 48 samples could be examined on one plate. The egg clutches can be preserved in tap water at 4 °C, in glycerol or in physiological salt solution at room temperature to inhibit the development of the snail embryos.

The patterns obtained are presented in figures 1 and 2. With the IEF-method we found at least twice the number of separated proteins as with disc-electrophoresis. With the procedure described above the reproducibility was very good. Although the general pattern is very complex, some of the most characteristic bands are easily identified. In agreement with the systematics of the Bulinid group *B. liratus* and *B. tropicus* are showing very similar patterns. The pattern of *B. obtusispira* is completely different from that of *B. (Physopsis) nasutus.* The distinction between *B. obtusispira* and *B. liratus* can be made accurately with only one egg-clutch. *B. cernicus* shows the pattern of a species belonging to the *forskalii* group.

---

* Supported by a grant of the Schweizerischer Nationalfonds (3.764.72)

[1] Kindly supplied by G. Mandahl-Barth (Danish Bilharziasis Laboratory, Charlottenlund, Denmark).

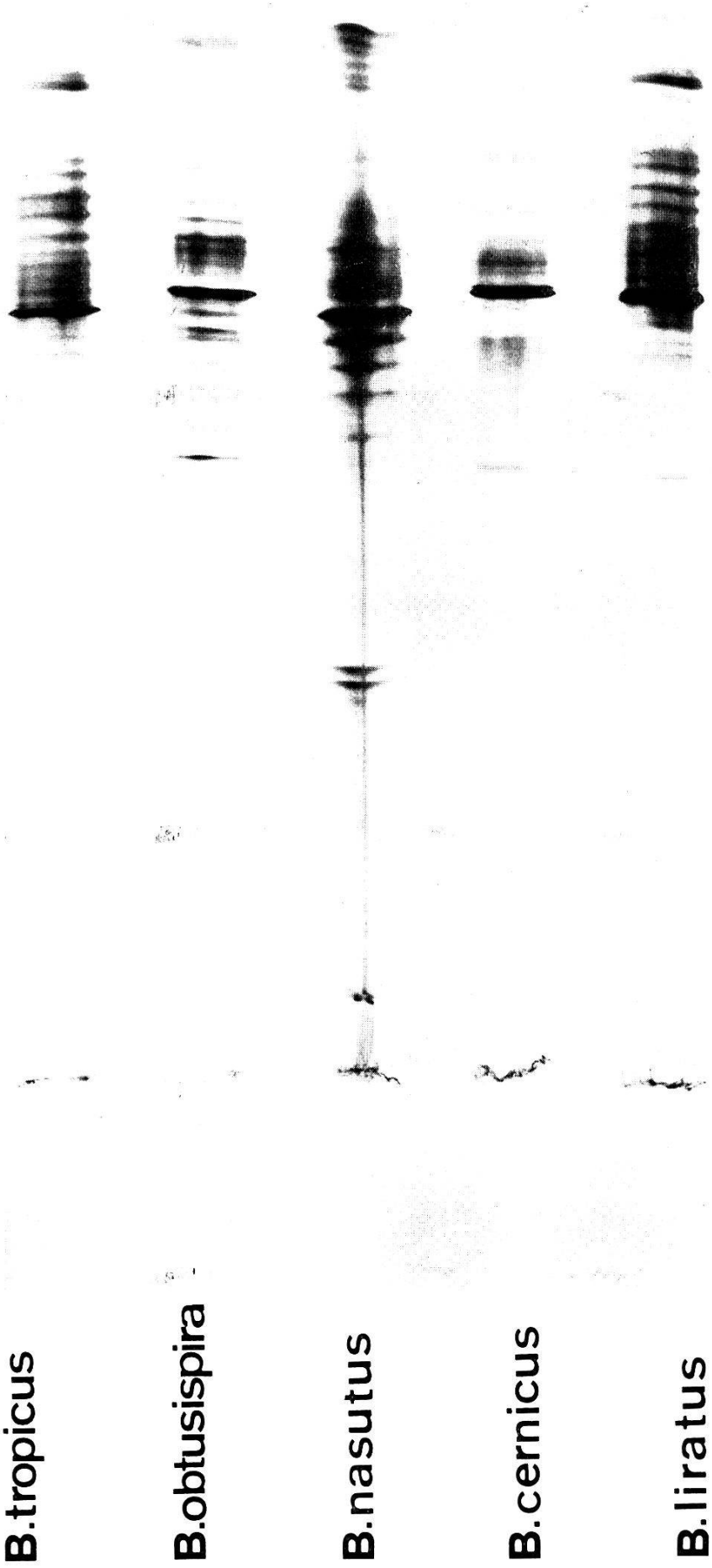

Fig. 1. IEF patterns of egg proteins from different Bulinid snails.

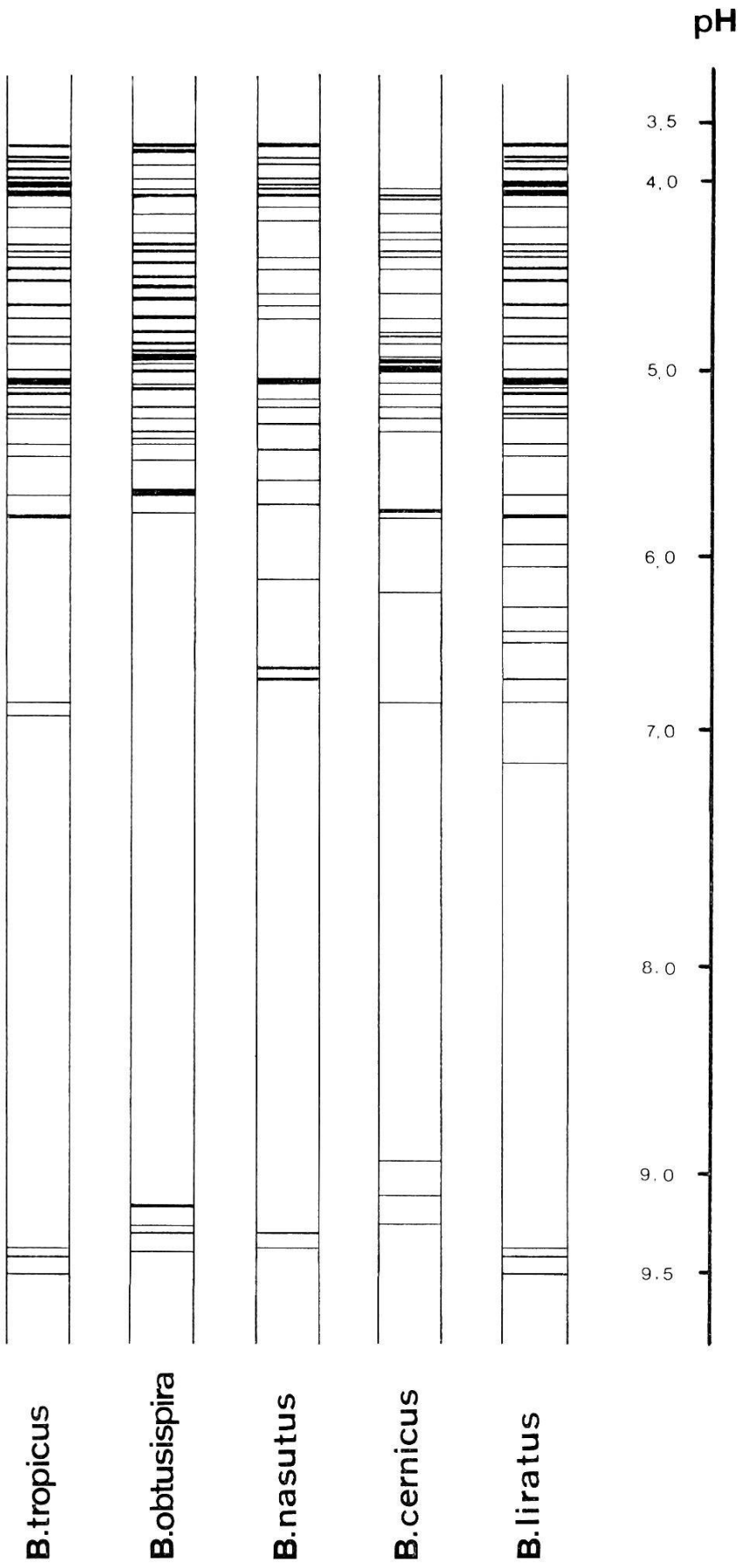

Fig. 2. Schematic representation of IEF shown in fig. 1.

With eggs stored for two weeks the results were not modified as long as the embryogenesis had been blocked.

In conclusion, isoelectric focusing appears to be an accurate and reliable technique for snail taxonomy. It has the advantage that a large number of specimens can be tested simultaneously and in a short period of time. Although this method is rather sophisticated, the facts that commercial plates are available and that eggs or living snails can be stored or posted, make it especially useful for taxonomical research and epidemiological work at large scale.

References

BURCH, J. B. & LINDSAY, G. K. (1970). An immuno-cytological study of Bulinus species. – Malacol. Rev. *3,* 1–18.

COLES, C. G. (1970). Enzyme electrophoresis and speciation of Schistosoma intermediate hosts. – J. Parasit. *61,* 19–25.

DAVIS, G. M. & LINDSAY, G. K. (1967). Disc electrophoretic analysis of molluscan individuals and populations. – Malacologia *5,* 311–334.

DEGRÉMONT, A. A. (1973). Mangoky Project, 273 pp. – Basle: Swiss Tropical Institute.

FRÉLIN, C., GASQUEZ, J. & DORST, J. (1973). Taxinomie. Essai d'utilisation de la focalisation iso-electric en taxinomie animale et végétale. – C. R. Acad. Sci. Paris, *277,* 17.

MATTHEW, M. & HARRIS, A. M. (1976). Identification of β-lactamases by isoelectric focusing: Correlation with bacterial taxonomy. – J. gen. Microbiol. *94,* 55–67.

RIGHETTI, P. G. & DRYSDALE, J. W. (1974). Isoelectric focusing in gels. – J. Chromatogr. *98,* 271–321.

SOUTHGATE, V. R. & KNOWLES, R. J. (1975). The intermediate hosts of *Schistosoma bovis* in western Kenya. – Trans. roy. Soc. trop. Med. Hyg. *69,* 356–357.

SVENSSON, H. (1961). Isoelectric fractionation, analysis and characterization of ampholytes in natural pH gradients. I. The differential equation of solute concentrations at a steady state and its solution for simple cases. – Acta chem. scand. *15,* 325.

WEISS, N., DEGRÉMONT, A. A., TANNER, K. & ZUMSTEIN, A. (1974). Susceptibility to *Schistosoma haematobium* and comparative antigenic analysis of two closely related Bulinus species from Madagascar. – ICOPA, München.

WRIGHT, C. A. (1966). Experimental taxonomy: A review of some techniques and their applications. – Int. Rev. gen. exp. Zool. *2,* 1–42.

WRIGHT, C. A. & ROSS, G. C. (1967). Serological studies on the taxonomy of planorbid snails. – J. Zool. (London) *151,* 489–495.