on different insects was studied by several authors, is more active on mosquitoes than on chironomids. The unformulated compound affects 50% of treated mosquito larvae at the concentration equal to or lower than 0.0001 ppm[7,8] but 50% of treated chironomid larvae at concentrations 0.01 ppm (*Chironomus stigmaterus*)[9], 0.05 ppm (*Ch. stigmaterus* and *Tanypus grodhausi*)[10], and 0.1 ppm (present study), respectively. Field application of formulated compound II against mosquitoes reportedly caused only a few chironomids to die[9]. Hence, midges should not be seriously endangered by the use of compound II against mosquitoes providing that the minimal concentrations effective on mosquitoes are used.

Zusammenfassung. Applikation aktiver Juvenoidverbindungen während des letzten Larvenstadiums von *Chironomus annularis* Meig. und *Ch. dorsalis* Meig. verursachte die Entwicklung von Übergangsformen zwischen Larve und Puppe. Der formulierte 3,7,11-Trimethyldodeca-2,4-dien-Carbonsäure-Isopropylester beeinflusste 50% der Tiere bei einer Konzentration von 0,001 ppm.

I. GELBIČ and F. SEHNAL[11]

Entomological Institute, Czechoslovak Academy of Sciences, Viničná 7, CS-12800 Praha 2 (Czechoslovakia), 26 April 1974.

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Mineralogical Differences in Populations of *Thais lapillus* Linné (Gastropoda: Prosobranchiata)[1]

Bivalve mineralogy has been shown to be influenced by the external environment[2–4]. But, conflicting evidences have also been presented by EISMA[5] and KENNEDY, TAYLOR and HALL[6] who believe that the primary control is 'clearly genetic'; KOBAYASHI's finding[7] that crystal structures in bivalves depend on the number of protein fractions in the extrapallial fluid, tends to support this. However, it has been pointed out by WISE[8] that statements concerning bivalve mineralogy may not be applicable to gastropods.

In this study, the polymorphic forms of calcium carbonate in the shells of *Thais lapillus* from 5 North American populations were analyzed as part of an overall effort designed to understand intraspecific variations in this species. Relative amounts of calcite versus aragonite expressed as mean ratios were used to compare the populations.

Materials and methods. The populations studied were obtained from Acadia Park, Owl's Head, Pemaquid Point and Cape Elizabeth, all in Maine, and Watch Hill, Rhode Island. These collecting sites range from latitude 44.20 *N* to 41.18 *N*.

Clean shells were initially measured (maximum height), then cracked open to remove soft parts, and ground individually by hand in a ceramic mortar to obtain a fine powder. The powder was then thinly smeared on clean glass slides with the aid of acetone and a glass rod. A total of 60 shells, each prepared on a separate slide, was examined. All samples were processed within 24 h after the snails were sacrificed.

A GE XRD-5 X-ray diffraction unit with a recorder and goniometer was used for determining the calcite/aragonite ratio. The apparatus consisted of a 1° beam slit and an 0.2° pick-up slit. A single nickel filter with copper radiation was employed. The apparatus was operated at 50 kv and 20 mA. Goniometer speed was set for 2 degrees per min for all runs. The intensities of the X-ray reflections were recorded on a chart using either 2000 or 5000 γ-radiation counts per sec, depending on the quantities presented in any given sample. Samples were scanned between 26° and 32° only, since this was sufficient to produce major calcite and aragonite peaks.

Calcite/aragonite ratios were calculated for each sample by dividing the area under the major calcite peak (3.03 Å) by the area under the major aragonite peak (3.40 Å). By using the ratio in this manner, the problems resulting from variation in absolute amounts of the minerals from one sample to the next are eliminated. Also, as a check, 2 slides were prepared from the same powdered shell. The ratios obtained (5.38 and 5.40) showed excellent agreement. The variation appears to be well within the limit of less than 4% errors in measurement using X-ray diffraction[9].

Results. Calcite/aragonite ratios obtained from analysis of the 5 populations are listed in the Table. Two different samples from Owl's Head were used. The first contained small, thin-shelled immatures, the second contained large, thick-shelled adults. These 2 groups were tested in an attempt to determine the influence of shell size, thickness, and maturity on the calcite/aragonite ratio. Since comparison of the means showed that there was no significant difference between the two series ($p < 0.1$), they were combined and treated as a single group. A Student-Newman-Keuls Test[10] was used to compare the mean ratios of the 5 populations (Table). The difference in the calcite/aragonite ratio of the shells from either Watch Hill or Owl's Head was highly significant when compared with the values obtained for the Cape Elizabeth, Acadia Park or Pemaquid Point populations ($p < 0.05$). The 3 populations of small-sized snails could not be separated on the baiss of these data, nor could the 2 populations of larger-sized snails.

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A comparison of the calcite/aragonite ratios found in 5 populations of *Thais lapillus*

Localities	Mean Ratio ± 1 S.D.	Mean Shell Length ±1 S.D.	*n*	Latitude (*N*)
Acadia Park (AP)	6.70 ± 1.80[a]	16.4 ± 2.7	10	44.20
Owl's Head (OH)				44.04
Young	12.79 ± 4.07	14.6 ± 1.1	10	
Adult	16.20 ± 5.10	29.8 ± 4.0	10	
Total	14.50 ± 4.82[a]	22.2 ± 8.1	20	
Pemaquid Point (PP)	5.99 ± 0.94[a]	15.9 ± 2.3	10	43.53
Cape Elizabeth (CE)	6.77 ± 1.60[a]	17.2 ± 2.6	11	43.37
Watch Hill (WH)	18.25 ± 7.22[a]	24.2 ± 2.5	9	41.18

[a] Student-Newman-Keuls Test: PP AP CE, OH WH ($p < 0.05$).

Water temperature records[11] indicated only a slight year-round difference among the 4 localities in Maine. Temperature alone was not sufficient to cause the observed difference since populations from the 2 extreme areas in Maine (Acadia Park-coldest; Cape Elizabeth – warmest) had the most comparable ratios. Comparison of Watch Hill and Owl's Head populations, where temperature differences may be more than 5 °C during the spring and summer, also supported the view that temperature was not an important factor governing the calcite/aragonite ratio in *T. lapillus*.

Discussion. The evidence presented in the Table shows that thickshelled populations are mineralogically different from thin-shelled ones. That such a phenomenon is not an artifact due simply to greater size or thickness itself, is shown by the results from thin-shelled immatures of the Owl's Head population. Maturity also had no effect on the ratio, despite contrary evidence in *Patella*[12]. Although temperature did not influence the ratios, other physico-chemical factors were not determined. However, separation of *T. lapillus* populations based on calcite/aragonite ratios agrees excellently with separations based on physiological, morphological and ecological criteria[13]; and STAIGER[14] has shown that the morphological and ecological differences have a genetic basis. Thus, it seems quite possible that these mineralogical differences may have genetic basis, although the effect of other environmental factors cannot be excluded entirely.

Zusammenfassung. Auf Grund des Verhältnisses Calcit/Aragonit in den Schalen von *Thais lapillus* können die 5 Populationen aus den Gewässern von New England in 2 Gruppen (5.99–6.77 und 14.50–18.25) aufgeteilt werden, was mit den morphologischen Eigenschaften dieser Schneckenschalen korreliert ist. Das Alter des Gastropods und die Wassertemperatur scheinen keinen Einfluss auf das Verhältnis Calcit/Aragonit der vorliegeneden Art zu haben. Ob andere Umweltfaktoren dabei beteiligt sind, bedarf noch weiterer Untersuchungen.

R. A. WHARTON[15, 16] and S. Y. FENG[17]

Marine Research Laboratory, University of Connecticut, Noank (Connecticut 06340, USA), 18 June 1974.

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[16] Present address: Department of Entomological Sciences, University of California, Berkeley, California 94770, USA.
[17] To whom reprint request should be addressed.

Experimental Data on the Taxonomical Value of an Electrophoretical Protein Component from the Eye-Lens of Birds

After our report on a typical song bird lens protein pattern obtained by agar electrophoresis, and especially on a particular component that also occurred in a few other avian orders[1], extensive disagreement with out entire work was expressed by SIBLEY and BRUSH[2], who used starch gel as a separation medium.

Although it is not difficult to refute their arguments one by one, we will not start a discussion on this matter here. Suffice it to mention that other authors[3] have already clearly pointed out that starch gel electrophoresis is not the appropriate method to examine the high-molecular lens proteins, the sequence of which is thoroughly changed by the molecular sieving effect. Especially HOENDERS[4] explained in detail: «Die umständliche Technik und die lange Laufzeit, vor allen Dingen aber die sehr bescheidenen Ergebnisse, machen die Stärkegel-Elektrophorese unter den angewandten, allgemein üblichen Bedingungen für die Analyse der Linsenproteinen ungeeignet».

This paper deals with the more positive criticisms put forward by some British investigators[5], which run as follows. No doubt the agar lens patterns as a whole, among Passeriformes and some non-Passeriformes, are similar. But the similarity of the individually corresponding fractions was not demonstrated, except by precise mobility measuring. For instance the typical song bird component (TSBC) was found in several orders where it had the same mobility. The possible explanations for this are: first, the animals have identical genes that code for the same protein, thus the amino acid sequences would be identical and one would conclude similarity.

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