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SOMMAIRE

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Le développement des recherches biologiques dans la République Populaire Roumaine au cours des dernières années a imposé la réorganisation des publications de spécialité. L'Académie de la R. P. Roumaine éditait jusqu'à présent, dans le domaine de la biologie, les revues suivantes : à Bucarest – *Revue de Biologie, Studii şi cercetări de biologie,* avec ses 2 séries — biologie animale et biologie végétale ; à Cluj : *Studii şi cercetări de biologie, Studii şi cercetări de agronomie*; à Jassy : *Studii şi cercetări ştiinţifice* (*Biologie şi ştiinţe agricole*) ; à Timişoara : *Studii şi cercetări de biologie şi ştiinţe agricole.*

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ВЛИЯНИЕ ПРОГЕСТЕРОНА НА ВКЛЮЧЕНИЕ НЕОРГАНИЧЕСКОГО ФОСФАТА P^{32} И МЕТИОНИНА S^{35} В ВИЛОЧКОВУЮ ЖЕЛЕЗУ И СЕЛЕЗЕНКУ, А ТАКЖЕ НА ПРОТЕИНОВЫЙ ОБМЕН ЭТИХ ОРГАНОВ

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Инволюции вилочковой железы посвящено большое число исследований, в результате которых в настоящее время довольно обстоятельно изучены морфологические аспекты этого процесса. Остается, однако, много неясного в вопросах биологического значения этого явления, а также в вызывающих его причинах.

Такое положение объясняется отчасти тем, что до сих пор почти совсем не уделялось внимания биохимическим исследованиям этой железы, в особенности в связи с ее различными инволюционными состояниями.

В предыдущих работах нами было показано, что как при возрастной инволюции, так и при инволюции, вызванной кортикостероидными гормонами, протеиновый и минеральный обмен вилочковой железы претерпевает изменения, пропорциональные степени уменьшения железы [1], [2], [3].

В настоящем сообщении излагаются полученные нами результаты, касающиеся вилочковой железы и селезенки крыс, которым хронически вводились различные дозы прогестерона. Мы применили этот гормон, исходя из того, что у беременных самок вилочковая железа атрофируется, а введение мочи этих самок подопытным животным вызывает ее инволюцию. Мнение некоторых авторов о том, что прогестерон оказывает сильное тимолитическое действие только в больших дозах, побудило нас в наших опытах с крысами пользоваться более широким диапазоном доз прогестерона [4].

МАТЕРИАЛ И МЕТОД РАБОТЫ

Опыты проводились с группой в 110 экземпляров молодых крыс-самок весом 70 — 90 г, которым вводился прогестерон крист. ч.д.а., растворенный в изотоническом спиртовом растворе. Раствор впрыскивался подкожно в течение 3 дней дозами в 25, 50 и 100 мг/100 г веса тела. Контрольным животным впрыскивался соответствующий объем растворителя. Через 24 часа после окончания впрыскиваний животные забивались, а вилочковая железа и селезенка взвешивались на аналитических весах. *Радиоактивный фосфат* вводился в изотоническом растворе Na_2HPO_4 в дозе 6,2 μC/100 г. Радиоактивность органов определялась при помощи установки B_2 — 1959. Метионин с S^{35} вводился в дозе 3,5 μC/100 г. Общая радиоактивность вилочковой железы и селезенки определялась на этот раз при помощи счетчика UA — Z 320/2,8 мг/см². Протеины этих органов осаждались и обезжиривались в эфире и ацетоне, затем высушивались при 55°С. После их обработки абсолютным спиртом и испарения последнего радиоактивность протеинов измерялась, как и в случае метионина с S^{35}, в расчете на целые органы.

Свободные аминокислоты: органы гомогенизировались в гомогенизаторе Е. Бюхлера при 20 000 — 30 000 оборотов/мин. Гомогенат депротеинизировался по методу Буланже и Бизерта [5]. Определения производились на ватманской бумаге № 1, а для количественной хроматографии пользовались восходящим методом с повторной системой, описанной в предыдущей работе [6].

Глутамино-щавелевоуксусная и глутамино-пировиноградная трансаминазы определялись по методу Капетанаки [7]. Результаты выражены в μM пировиноградной кислоты, образованной за 1 час 1 г свежей ткани при 40°С.

ПОЛУЧЕННЫЕ РЕЗУЛЬТАТЫ

Из данных нашей работы следует, что при введении прогестерона указанными выше дозами вилочковая железа и селезенка претерпевают инволютивный процесс. Следует отметить, что доза в 100 мг/100 г является чрезвычайно токсичной. Смертность обработанных животных доходит при этой дозе до 69,4%, причем в данном случае наиболее сильно выражена инволюция вилочковой железы (—46,7%, $P<0,01$). У вилочковой железы степень инволюции показывает резко выраженную зависимость от дозы, в то время как у селезенки наблюдается отклонение от такого хода явления (напр., при дозе 50 мг/100 г). Однако возрастающие дозы прогестерона, по-видимому, ускоряют уменьшение веса селезенки. Ввиду того, что селезенка является важным кроветворным органом, трудно утверждать, что уменьшение веса тканей селезенки под действием прогестерона является абсолютным. Поэтому приведенные данные следует рассматривать лишь как ориентировочные.

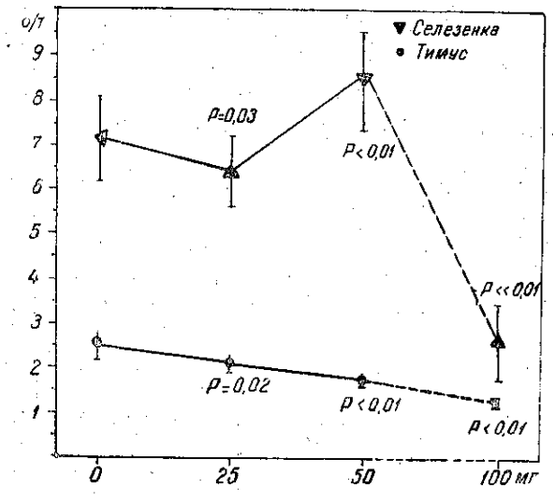

Рис. 1. — Влияние прогестерона на вес тимуса и селезенки. о/т — вес органа в мг на 1 г веса тела.

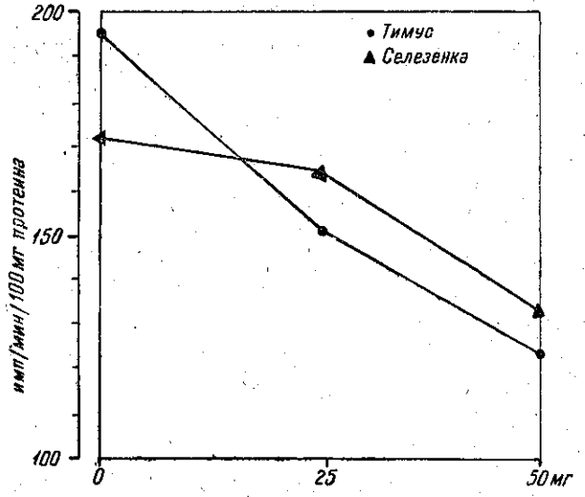

Рис. 2. — Включение метионина — S^{35} в протеины тимуса и селезенки при введении прогестерона. имп/мин/100 мг — импульсы в минуту на 100 мг протеина.

Уменьшение веса этих органов оказывает несомненное влияние на ход их обменных процессов. Из таблиц 1 и 2 можно установить, что обе железы явно теряют способность включения радиофосфата и меченого

Таблица 1

Включение неорганического фосфата P^{32} в вилочковую железу и селезенку крыс при введении прогестерона

Дозы прогестерона мг/100 г		Вилочковая железа				Селезенка			
		Число опытов	Вес органа мг/100 г ±с.к.о*	имп/мин/100 мг	P**	Число опытов	Вес органа мг/100 г ± с.к.о.	имп/мин/100 мг	P
25	контроль	8	206,0±20,8	1288,0±360,0	0,04	8	660,7±12,8	780,0±56,0	<0,01
		8	240,8±29,2	1577,0±220,1	—	8	742,6±39,7	881,4±42,3	—
50	контроль	16	206,9±18,1	1251,8±140,7	<0,01	16	890,0±70,2	562,7±45,5	0,05
		8	247,8±16,3	1503,8±100,8	—	8	675,4±56,8	798,6±106,0	—

* с.к.о. — среднее квадратическое отклонение.
** P дается для обозначения разницы между пробами контроля и подопытных животных.

Таблица 2

Включение метионина S^{35} в вилочковую железу и селезенку крыс при введении прогестерона

Дозы прогестерона мг/100 г		Вилочковая железа				Селезенка			
		Число опытов	Вес органа мг /100 г ± с.к.о.	имп/мин/100 мг	P	Число опытов	Вес органа мг/100 г. ± с.к.о.	имп/мин/100 мг	P
25	контроль	16	151,6±19,6	159,1±22,1	0,05	14	700,0±38,0	115,2±17,0	0,02
		12	172,9±20,4	186,1±51,2	—	12	665,1±80,2	130,4±14,6	—
50	контроль	12	160,7±22,8	132,5±16,8	⩽ 0,01	12	735,0±91,6	107,7±17,3	0,02
		12	196,0±27,8	184,3±17,4	—	12	707,4±44,2	132,8±30,0	—

метионина. У селезенки эффект пропорциональности в отношении дозы выражается наиболее четко для P^{32}, а у вилочковой железы — для метионина S^{35}.

Включение метионина S^{35} снижается также и в протеинах этих желез.

Далее мы проследили количественную и качественную картину содержания свободных аминокислот в вилочковой железе и селезенке. В основном наблюдается возрастание концентрации свободных амино-

Таблица 3

Содержание свободных аминокислот в вилочковой железе и селезенке белых крыс при введении прогестерона (μM/г орган ± с.к.о.)

№	Свободные аминокислоты		ОБЩАЯ ДОЗА В мг /100 г			
			0	25	50	100
1	Аргинин	Вил. ж.	0,66±0,03	1,33±0,12	1,01±0,01	1,52±0,09
		Селезенка	0,82±0,04	0,44±0,08	0,49±0,08	0,39±0,10
2	Лизин	Вил. ж.	0,40±0,01	0,28±0,02	0,50±0,09	1,11±0,08
		Селезенка	0,58±0,03	0,33±0,06	0,38±0,02	0,52±0,04
3	Лейцин	Вил. ж.	1,11±0,02	0,64±0,02	0,59±0,03	2,36±0,13
		Селезенка	1,00±0,04	0,87±0,03	0,67±0,02	2,00±0,11
4	Фенилаланин	Вил. ж.	0,89±0,02	0,80±0,02	0,45±0,07	0,32±0,01
		Селезенка	0,43±0,01	0,49±0,09	0,39±0,08	0,33±0,06
5	Тирозин	Вил. ж.	0,51±0,02	0,67±0,03	0,62±0,04	0,16±0,05
		Селезенка	0,74±0,03	0,89±0,09	0,59±0,04	0,33±0,02
6	Аспарагиновая кислота	Вил. ж.	2,37±0,01	2,08±0,07	2,37±0,05	3,20±0,10
		Селезенка	4,96±0,03	4,75±0,06	3,85±0,07	5,09±0,12
7	Глутаминовая кислота	Вил. ж.	5,18±0,08	5,43±0,13	5,83±0,17	6,01±0,18
		Селезенка	5,55±0,07	5,55±0,10	5,70±0,16	5,01±0,12
8	Глицин	Вил. ж.	2,34±0,01	2,50±0,09	2,03±0,01	2,55±0,11
		Селезенка	2,35±0,03	2,48±0,11	2,63±0,09	3,10±0,11
9	Аланин	Вил. ж.	3,18±0,01	3,21±0,12	3,11±0,11	4,44±0,09
		Селезенка	4,63±0,03	4,11±0,21	3,81±0,12	4,70±0,13
10	Серин	Вил. ж.	0,42±0,01	0,60±0,04	0,50±0,06	0,20±0,02
		Селезенка	0,57±0,07	0,99±0,11	0,89±0,09	0,90±0,04

кислот в вилочковой железе, причем данное явление становится наиболее заметным при высоких дозах прогестерона (100 мг). Исключение составляют две аминокислоты: тирозин и фенилаланин, концентрация которых снижается. Применение двумерной хроматографии позволило выяснить, что при дозе в 50 мг прогестерона поверхность пятен неко-

торых аминокислот, как например аспарагина, гистидина, валина и триптофана, увеличивается. Результаты в отношении селезенки в данном случае не являются в достаточной мере убедительными.

Как видно из таблицы 4, трансаминазная активность возрастает при дозах в 25 и 50 мг прогестерона. Однако, при максимальной дозе

Таблица 4

Трансаминазная активность вилочковой железы и селезенки у крыс при введении прогестерона

Дозы прогестерона мг/100 г		Вилочковая железа		Селезенка	
		ГЩТ* μM/г/60 мин	ГПТ** μM /г/60 мин	ГЩТ μM/г/60 мин	ГПТ μM/г/60 мин
25	контроль	3,01±0,36	2,86±0,09	2,07±0,24	1,60±0,30
	контроль	2,96±0,05	2,46±0,02	1,92±0,04	1,51±0,22
50	контроль	3,22±1,48	3,18±0,96	1,87±0,88	1,43±0,17
	контроль	2,89±0,22	2,37±0,67	1,98±0,55	1,42±0,14
100	контроль	2,27±0,02	0,11±0,02	0,76±0,09	1,14±0,09
	контроль	2,91±0,31	2,54±0,36	1,67±0,17	1,46±0,16

* Глутамино-щавелевоуксусный трансаминаз
** Глутамино-пировиноградный трансаминаз

в 100 мг активность глутамино-щавелевоуксусной трансаминазы снижается на 33%, а активность глутамино-пировиноградной трансаминазы — на 97%. В этом отношении изменения в селезенке становятся заметными лишь при введении максимальной дозы.

ОБСУЖДЕНИЕ РЕЗУЛЬТАТОВ

Процесс инволюции вилочковой железы под влиянием прогестерона характеризуется быстрым уменьшением относительного веса этой железы. Этот процесс выражается не только в изменении ее морфологического и гистологического аспектов, но сказывается также и на биохимических процессах.

Так, под влиянием прогестерона способность включения неорганического радиоактивного фосфата в вилочковую железу явно снижается. Подобные же результаты были получены и при инволюции вилочковой железы после введения АКТГ и кортизона [1].

Сходное явление отмечает также и Схибата [8] при нормальной возрастной инволюции. На основании этих данных можно предположить, что инволюция вилочковой железы отражается, главным образом,

на процессах окислительного обмена. Однако указанное отклонение в обмене, по-видимому, не является единственным, так как подобным же образом снижается и включение метионина S^{35} как в органы как таковые, так и в протеины последних.

Интересно отметить, что биохимические изменения, происходящие в вилочковой железе при ее инволюции под действием прогестерона, в значительной степени зависят от дозы введенного гормона. Так, при дозе в 25 и 50 мг активность глутамино-щавелевоуксусной и глутамино-пировиноградной трансаминаз возрастает, потому что при дозе в 100 мг она резко снижается.

Количество свободных аминокислот в вилочковой железе колеблется как в зависимости от каждой отдельной аминокислоты, так и от дозы прогестерона. За исключением фенилаланина, тирозина и серина количество свободных аминокислот в вилочковой железе возрастает при максимальной дозе в 100 мг. Таким образом, при введении высоких доз прогестерона, в вилочковой железе, по-видимому, имеет место усиленный процесс протеолиза, а также и торможение включения аминокислот. В действительности, половые гормоны влияют также и на рост злокачественных опухолей в результате процесса анаболического торможения [9], [10].

Из данных нашей работы видно, что в отличие от вилочковой железы биохимические процессы, наблюдаемые в селезенке, не подвергаются заметным изменениям. Как известно, вилочковая железа является органом, который реагирует на действие вредных факторов гораздо быстрее и интенсивнее, чем селезенка или лимфатические узлы [11], [12].

Из наших опытов вытекает, что вилочковую железу нельзя отождествлять с простым лимфатическим органом, ввиду того, что ее реакция на прогестерон отличается от реакции селезенки. Этот факт становится тем более очевидным, что школа акад. Тёрё [13] показала, что вилочковая железа осуществляет, в действительности, связь между ретикуло-эндотелиальной и эндокринной системами.

ВЫВОДЫ

Из изложенного выше следует, что инволюция вилочковой железы под действием прогестерона зависит от введенной дозы и выражается:

— в снижении относительного веса органа;

— в снижении включения неорганического радиоактивного фосфата и меченого метионина;

— в возрастании концентрации свободных аминокислот, за исключением 3 из них, и

— в изменении активности некоторых трансаминазных энзимов.

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INVESTIGATIONS CONCERNING SOME OSTEOLOGICAL INDICES IN FOWLS IN DIRECT AND RECIPROCAL CROSSES

by

STELIAN OPRESCU, TIBERIU LÖRINTZ and OLGA POPESCU

In the present paper the results of investigations concerning some osteological indices in the Leghorn and Rhode Island races and in their heterozygotic (F_1) metises are reported.

From the scientific literature concerned with this subject, it appears that the high growth rate of the skeleton is determined by a stage of most intensive growth of the digestive organs, provided the existence of a development in stages is confirmed in chickens. This has been pointed out by I. Tchepulis [1] on the ground of industrial cross breeding experiments of the types ♀ Leghorn × ♂ 1 Mai and ♀ Leghorn × ♂ Rhode Island.

On the other hand, it has been demonstrated that the growth of the bones in weight is related to the race and to the functional activity of the body. Thus, E. S. Kutikov [4] investigated racial differences in the changes of mineral metabolism in the clavicular, femoral and sternal bones of chickens, and found the absolute weight of these bones to be higher in the New Hampshire race, as compared to that in the White Russian race. The relative weight of the bones displayed the converse pattern and were related to the activity of the organism during the initial phase of the egg laying period.

The attempts of some authors to find correlations between certain osteological indices and the productivity of fowls have not as yet led to conclusive results. Thus, M. Wayne Miller and J. S. Carver [5] investigated some correlations between anatomical measurements and egg production in fowls and found no correlation in Leghorn hens between the anatomical characters of the head and body measurements on the one hand, and egg production on the other. In hens of the Rhode Island race the

correlation recorded between head measurements and egg production was negative, of a low order and of little significance.

Some interesting data concerning the relative values, after sacrificing the fowls of various weight classes and races, may be found in the paper of G. Peters [7].

Data concerning changes, as related to age, in the linear growth of the femoral bone have been published by Z. A. Jidkin [3] on the ground of an investigation of growth pecularities in various parts of the skeleton of Moscow Bronze Turkeys.

However, in the literature perused, we have found no report on investigations concerning the type of transmission in breeds, of the values of some osteological indices from parents belonging to pure breeding races of fowls to their metis descendants.

The present paper, mainly aiming at demonstrating the particular characters, as related to age and race, of growth in weight and size of the skeleton in fowls, also gives some information on the type of transmission of the respective indices from the parental races to metises. On the other hand, any knowledge concerning the growth of the skeleton may be useful from a practical point of view for characterizing the comparative meat merits of the fowls.

MATERIAL AND METHODS

The material investigated in 1961 consisted of the skeletons obtained from 3- and 6 month-old female chickens belonging to the Leghorn and Rhode Island races and from F_1 metises of these races, i.e. from the offspring of ♀ Rhode Island × ♂ Leghorn or ♀ Leghorn × ♂ Rhode Island cross breeds.

The fowls were provided for by the "Tunari" Experimental Animal Breeding Farm of the Academy of the R.P.R. The skeletons were prepared by a rather prolonged process of putrefaction (3—4 months in tap water maintained at room temperature and changed at regular intervals) of the muscular and cartilaginous remains adhering to the bones after sacrificing the birds. It may be mentioned that we did not succeed in obtaining intact skeletons from 1-day-old specimens; this age-group was therefore excluded. The number of specimens of each variant investigated amounted to 5 for the age of 3 months and 4 for the age of 6 months old chickens i.e. 36 specimens in all. All the birds whose skeletons were investigated underwent the same diet, and care conditions and as a rule displayed the average body weight of the respective group before sacrificing. The osteological indices were obtained by weighing the skeletons and their constitutive parts and by measuring the various dimensions of the main bones. Paired bones (tibia, metatarsal bone, femur, humerus, radius, ulna, coracoid bone) were weighed together and their total weight compared with that of unpaired ones (sternum, clavicle). The dimensions of paired bones were separately recorded for each member of the pair and the mean of the two values was computed. For the coxal bones the total weight was

recorded and measurements were carried out only on the ilium. The craniocaudal length of the sternum was measured from the episternum to the xiphoid process. Any particulars concerning the dimensions of the other bones are specified in the tables.

The averages of the values recorded are listed in the present paper.

In performing our investigations we have resorted with great advantage to the *Atlas of Comparative Anatomy* of Prof. V. Ghetie and co-workers [2] and to the chapter on the *Anatomy and Physiology of Birds* written by G. P. Dementiev and co-workers in "Selskohoziaistvennaia ptitsa" [8].

RESULTS AND DISCUSSIONS

At the age of 3 months the average total weight of the skeleton (Table 1) amounted to 23.85 g (mean of both races) in the two parental races and to 23.60 g (mean of both variants) in the two variants of metises. At the age of 6 months the metises displayed a higher average total weight of the skeleton (68.83 g, mean of both variants) than the mean of the parental races (65.86 g).

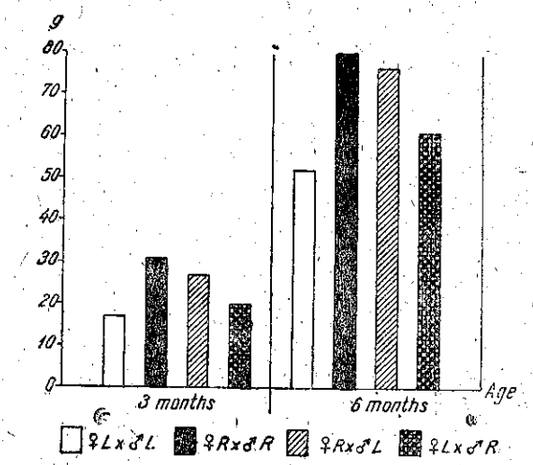

Fig. 1. — Diagram of average total weight (in g) of the skeleton in chickens.

The percentages of the weight of the skeleton in the parental generation (mean of both parental races), the weight of the skeleton in the metises amounted to 98.95 per cent and 104.50 per cent at the age of 3 months and 6 months respectively. The variant ♀ Rhode Island × ♂ Leghorn displayed an average total weight of the skeleton amounting to 88.23 per cent of the average total weight in Rhode Islands at the age of 3 months, and to 95.68 per cent at the age of 6 months. As compared to the same race, ♀ Leghorn × ♂ Rhode Island metises of the same age displayed average total weights of the skeleton amounting to 66.01 per cent and 76.74 per cent respectively, i.e. lower values than the first variant. As compared to Leghorns, the variant ♀ Rhode Island × ♂ Leghorn at the above-mentioned ages displayed average total weights of the skeleton amounting to 157.89 per cent and 147.21 per cent, respectively, while in the variant ♀ Leghorn × ♂ Rhode Island the values were lower than in the former one, i.e. 118.12 per cent and 118.07 per cent respectively.

Table 1

Average total weight of the skeleton (in g) in chickens

Specification			Parental races		Metises		Variant ♀R × ♂L in per cent of:		Variant ♀L × ♂R in per cent of:		Metis variants in per cent of the mean of the parental races
			♀R × ♂R	♀L × ♂L	♀R × ♂L	♀L × ♂R	♀R × ♂R	♀L × ♂L	♀R × ♂R	♀L × ♂L	
Age	3 months	Average	30.60	17.10	27.00	20.20	88.23	157.89	66.01	118.12	98.95
		Range of variation	26.00–34.50	14.50–20.00	25.00–30.50	17.50–22.50					
		Average of 2 chicken variants	23.85		23.60						
	6 months	Average	79.84	51.89	76.39	61.27	95.68	147.21	76.74	118.07	104.50
		Range of variation	75.15–83.52	45.02–59.95	70.15–79.25	55.12–65.73					
		Average of 2 chicken variants	65.86		68.83						

Table 2

Average total weight of the skeleton, as expressed in percentages of the average body weight in chickens

Variants		Average body weight before sacrificing (g)		Average total weight of the skeleton (g)		Average total weight of the skeleton, as expressed in percent of the average body weight before sacrificing	
		At 3 months of age	At 6 months of age	At 3 months of age	At 6 months of age	At 3 months of age	At 6 months of age
Parental races	♀R × ♂R	682.00	1 800.00	30.60	79.84	4.48	4.43
	♀L × ♂L	494.00	1 187.00	17.10	51.89	3.46	4.37
Metises (F_1)	♀R × ♂L	652.00	1 675.00	27.00	76.39	4.14	4.56
	♀L × ♂R	560.00	1 450.00	20.20	61.27	3.60	4.22

The diagram of the average total weight of the skeleton in these birds (Fig. 1) clearly shows the intermediate position of the F_1 metises, as compared to the parental races.

The average total weight of the skeleton, as expressed in percentages of the average body weight of the birds before sacrificing (Table 2), was higher in Rhode Islands (4.48 and 4.43 per cent, at the ages of 3 and 6 months respectively) than in the other parental race, i.e. in Leghorn (3.46 and 4.37 respectively). This is in close connection with the circumstance that at the same ages the average body weights (682.00 g and 1 800.00 g respectively) and the weights of the skeleton (30.60 g and 79.84 g respectively) in Rhode Islands were higher than in Leghorns (494.00 g and 1 187.00 g average body weight and 17.10 g and 51.89 g weight of the skeleton respectively).

As expressed in percentages of the average body weight, the metises variant ♀ Rhode Island × ♂ Leghorn displayed a higher average weight of the skeleton at the ages of 3 and 6 months (4.14 and 4.56 per cent, respectively) than the variant ♀ Leghorn × ♂ Rhode Island (3.60 and 4.22 per cent, respectively). Again, the same close relationship was apparent as upon comparing the parental races to one another, i.e. the average body weight (652.00 g and 1675.00 g respectively) and the weights of the skeleton (27.00 g and 76.39 g respectively) in ♀ Rhode Island × ♂ Leghorn metises were higher than the average body weights (560.00 g and 1450.00 g respectively) and the weight of the skeleton (20.20 g and 61.27 g respectively) in ♀ Leghorn × ♂ Rhode Island metises of the same ages.

The mean values of the osteological indices at the age of 3 and 6 months (Table 3 and 4 and figs. 2 and 3), as referring to the weight and size of each separate bone investigated, were generally higher in Rhode Islands, as compared to the Leghorns, and higher in the ♀ Rhode Island × ♂ Leghorn metises variant, as compared to the ♀ Leghorn × ♂ Rhode Island variant. Among the bones investigated the lowest weight (in g) at both ages considered was displayed by clavicle, and the highest by the tibia; the shortest bone, as measured (in mm) from the proximal to the distal extremity, was the coracoid, and the longest the tibia (Plate I); and the lowest value of the smallest diameter measured (in mm) in the middle third of the diaphysis was displayed by the radius, while the highest was recorded in the femur (Plate II).

At the age of 3 months the length of the humeral (Plate III), metatarsal (Plate IV), clavicular and sternal bones was greater in the metis variant ♀ Rhode Island × ♂ Leghorn, as compared to both parental races. The respective means of both metis variants were likewise higher, although the weights of their bones were lower than in the parental races.

At the age of 6 months the length of all bones without exception was greater in the metis variant ♀ Rhode Island × ♂ Leghorn than in the parents, although only the weights of the radius, the ulna and the sternum exceeded those of their bones in the parental races.

From an analysis of the diagram representing the average weights of the bones in these birds there may be seen that at both ages considered,

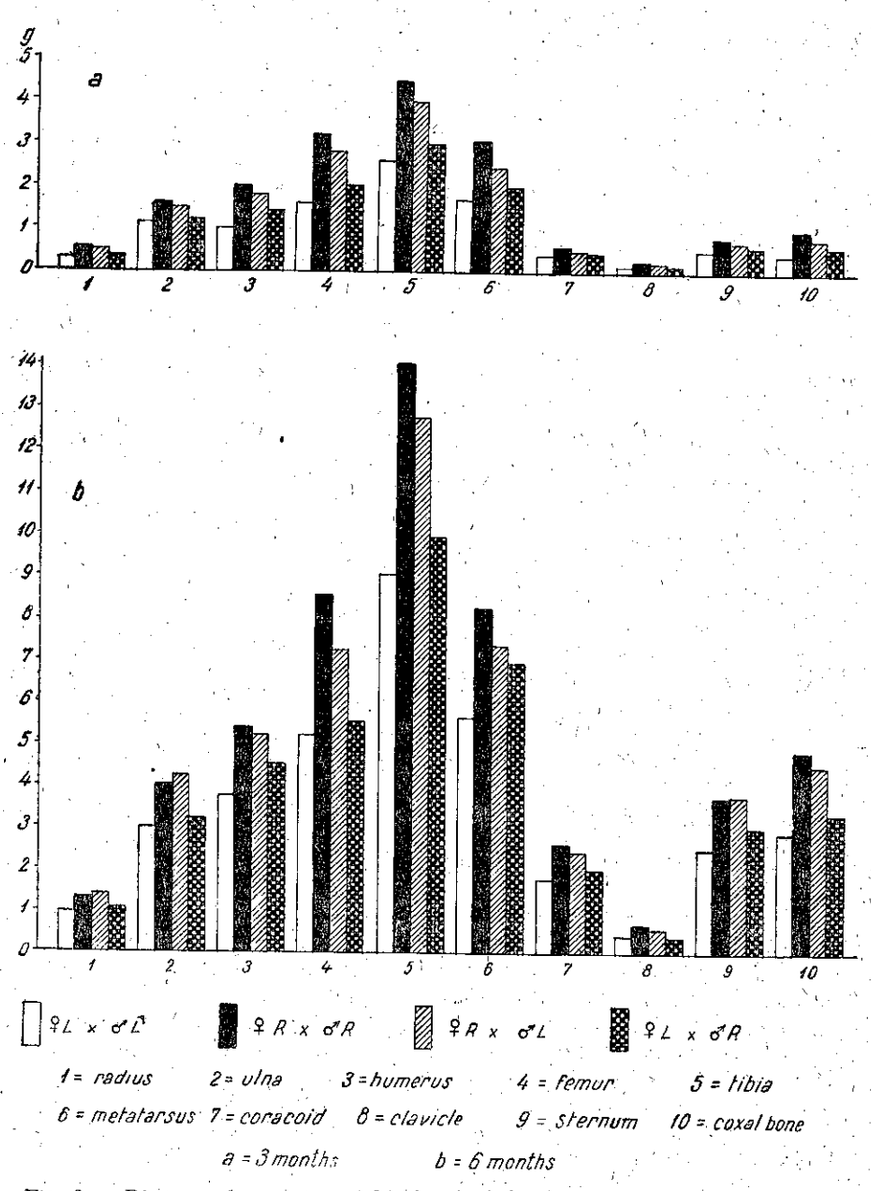

Fig. 2.— Diagram of average weights (in g) of the bones per groups of chickens.

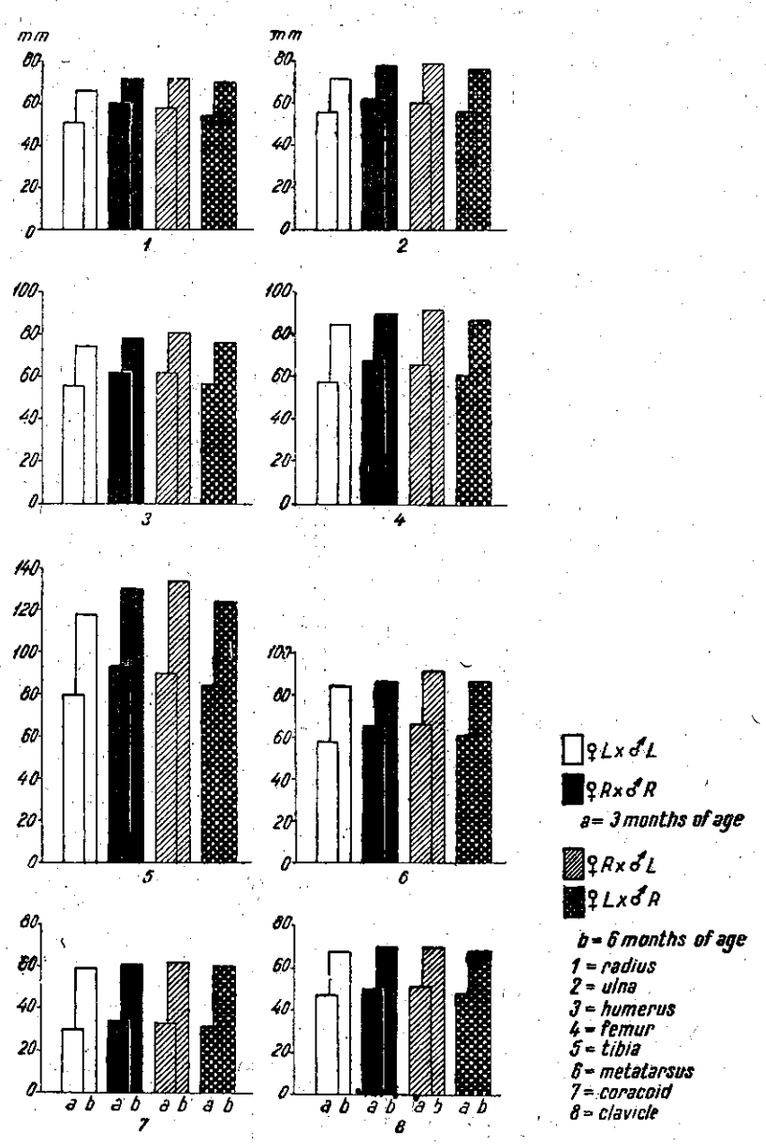

Fig. 3. — Diagram of the average lengths (in mm) of the bones per groups of chickens.

Table 3

Average values of the osteological indices in 3 month-old chickens

Specification		Weight (g)	Length *) of the bone from the proximal to the distal extremity (mm)	Smallest diameter (in the middle third of the diaphysis) (mm)	Greatest width **) of the distal extremity (mm)	Greatest width of the proximal extremity (mm)
Radius	Rhode Island	0.539	59.50	1.78	—	—
	Leghorn	0.312	51.10	1.44	—	—
	♀R × ♂L	0.488	57.50	1.70	—	—
	♀L × ♂R	0.360	53.30	1.46	—	—
Ulna	Rhode Island	1.621	61.70	3.50	—	—
	Leghorn	1.155	55.70	2.90	—	—
	♀R × ♂L	1.491	59.50	3.10	—	—
	♀L × ♂R	1.210	55.20	2.90	—	—
Humerus	Rhode Island	2.049	62.30	4.60	11.60	14.80
	Leghorn	1.090	56.00	3.80	9.70	12.50
	♀R × ♂L	1.804	62.40	4.30	10.80	13.90
	♀L × ♂R	1.370	57.10	3.90	10.40	13.20
Femur	Rhode Island	3.242	67.90	5.90	—	—
	Leghorn	1.603	57.70	4.10	—	—
	♀R × ♂L	2.805	65.70	5.10	—	—
	♀L × ♂R	1.964	61.10	4.90	—	—
Tibia	Rhode Island	4.537	93.20	5.16	12.60	16.90
	Leghorn	2.587	80.60	4.00	10.26	13.30
	♀R × ♂L	4.051	89.84	4.50	11.80	16.00
	♀L × ♂R	2.976	83.30	4.00	10.90	14.60
Metatarsus	Rhode Island	3.113	64.80	—	14.00	14.30
	Leghorn	1.693	57.30	—	11.90	12.30
	♀R × ♂L	2.506	65.60	—	13.00	13.20
	♀L × ♂R	2.034	60.80	—	12.20	12.70
Coracoid	Rhode Island	0.599	33.50	3.20	—	—
	Leghorn	0.378	29.30	2.70	—	—
	♀R × ♂L	0.529	33.20	2.90	—	—
	♀L × ♂R	0.472	31.30	2.75	—	—
Clavicle	Rhode Island	0.262	50.80	—	—	—
	Leghorn	0.149	47.30	—	—	—
	♀R × ♂L	0.222	51.80	—	—	—
	♀L × ♂R	0.153	47.40	—	—	—
Sternum	Rhode Island	0.786	31.10	—	22.50	—
	Leghorn	0.486	30.00	—	21.00	—
	♀R × ♂L	0.685	33.10	—	23.30	—
	♀L × ♂R	0.572	32.10	—	22.60	—
Coxal bone	Rhode Island	1.008	18.10	—	—	—
	Leghorn	0.431	13.80	—	—	—
	♀R × ♂L	0.788	17.50	—	—	—
	♀L × ♂R	0.568	16.10	—	—	—

*) For the sternum and coxal bone the craniocaudal length is recorded.

**) For the sternum the width of the carina from the episternum to the costal edge is recorded.

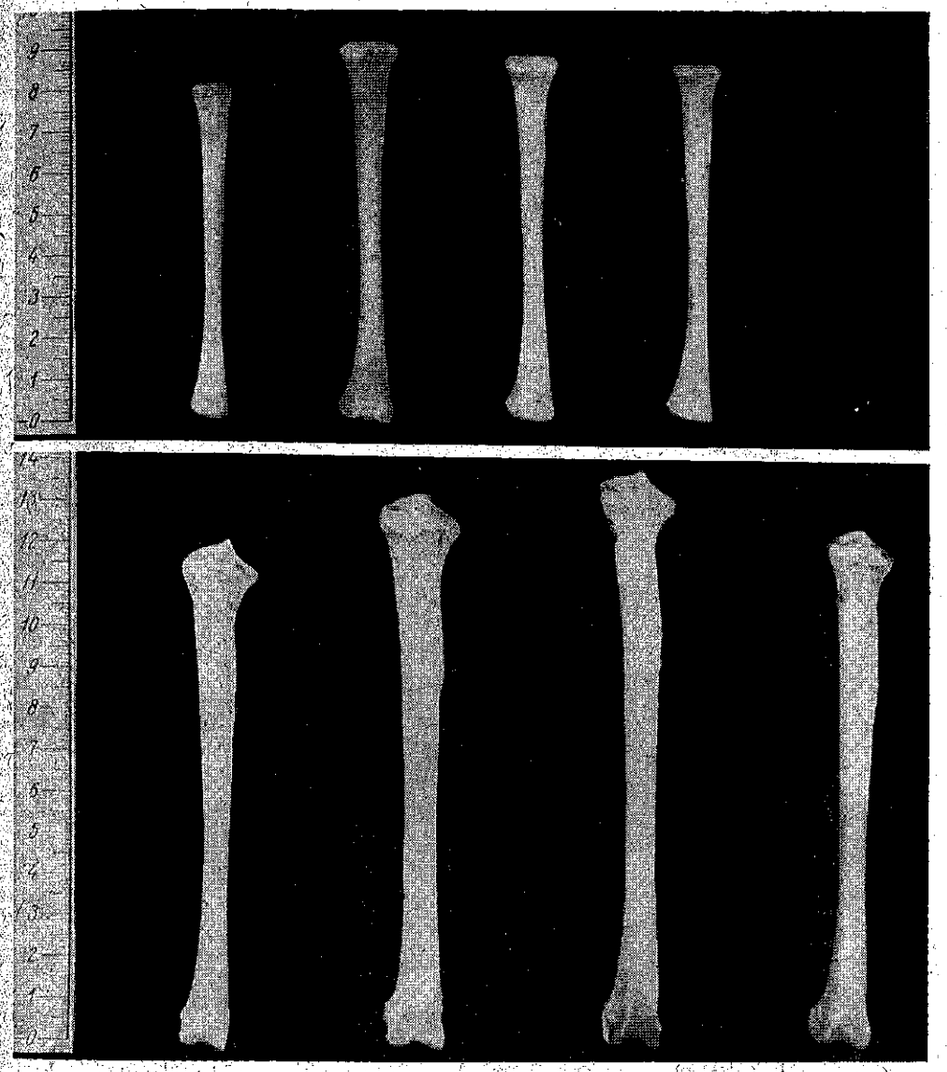

Plate I. — Top : Tibia at the age of 3 months in the groups (from left to right) Leghorn ; Rhode Island.

— Bottom : tibia at the age of 6 months in the groups (from left to right) Leghorn ; Rhode Island.

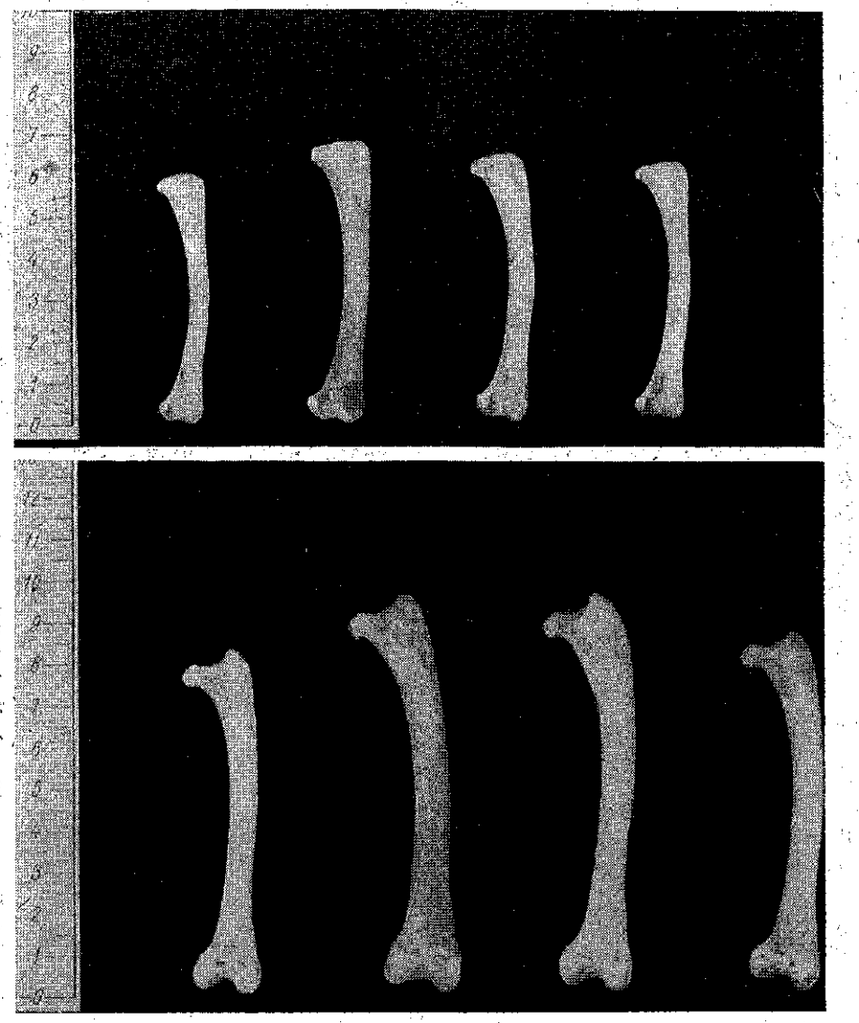

Plate II. — Top : Femur at the age of 3 months
— Bottom : Femur at the age of 6 months } Groups as specified in Pl. I

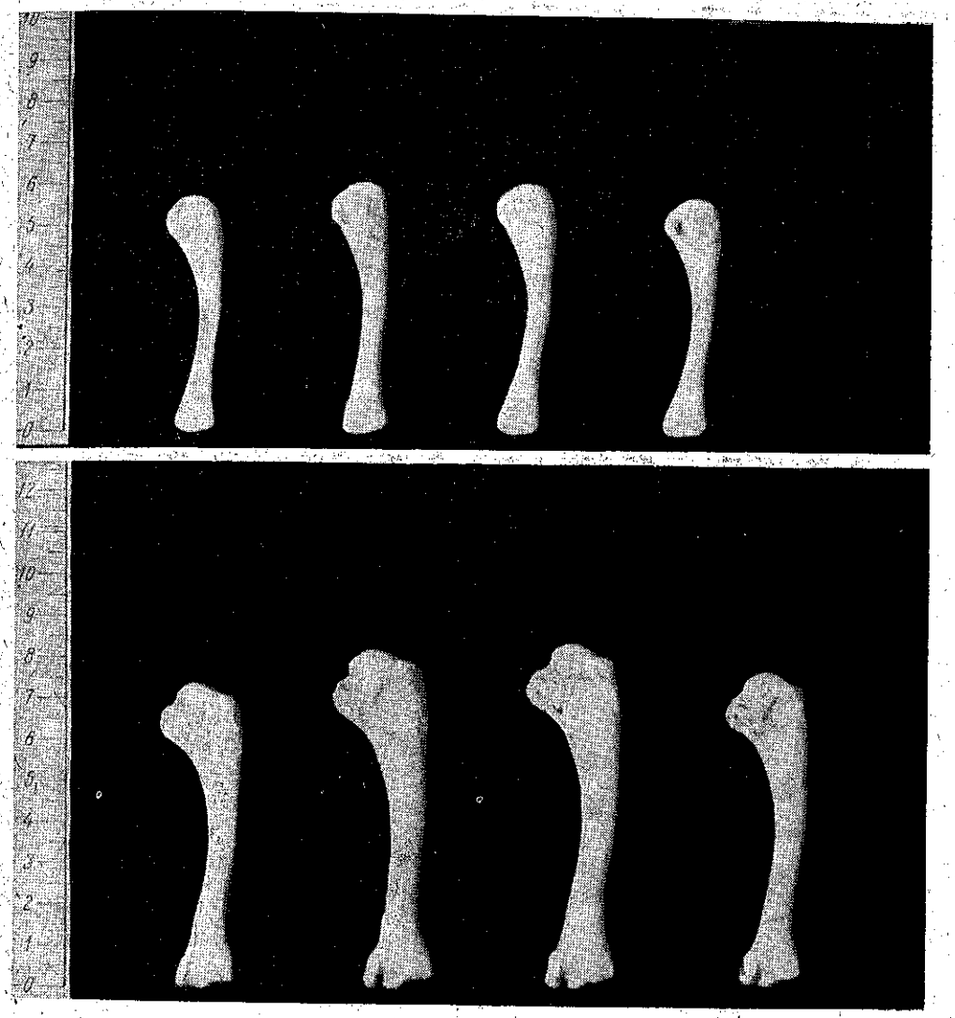

Plate III. — Top : Humerus at the age of 3 months
— Bottom : Humerus at the age of 6 months } Groups as specified in Pl. I

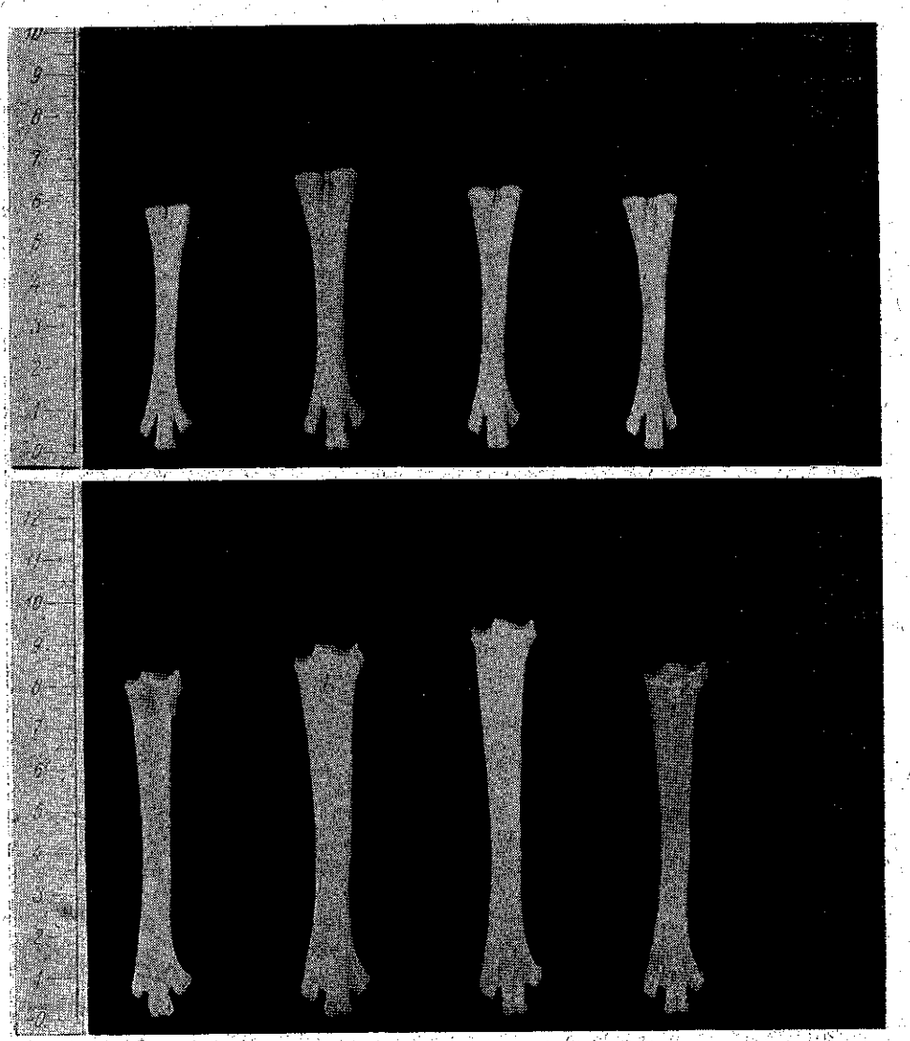

Plate IV. — Top: Metatarsus at the age of 3 months
— Bottom: Metatarsus at the age of 6 months
} Groups as specified in Pl. I

Table 4

Average value of the osteological indices in 6 month-old chickens

Specification		Weight (g)	Length *) of the bone from the proximal to the distal extremity (mm)	Smallest diameter (in the middle third of the diaphysis) (mm)	Greatest width **) of the distal extremity (mm)	Greatest width of the proximal extremity (mm)
Radius	Rhode Island	1.360	71.20	2.40	—	—
	Leghorn	0.978	66.31	2.10	—	—
	♀R × ♂L	1.395	72.10	2.50	—	—
	♀L × ♂R	1.110	70.20	2.30	—	—
Ulna	Rhode Island	3.917	78.60	4.50	—	—
	Leghorn	3.078	72.60	3.90	—	—
	♀R × ♂L	4.252	79.30	4.50	—	—
	♀L × ♂R	3.160	76.40	4.20	—	—
Humerus	Rhode Island	5.430	78.60	6.40	16.20	21.20
	Leghorn	3.753	75.20	5.80	14.70	19.80
	♀R × ♂L	5.186	81.00	6.50	16.40	21.50
	♀L × ♂R	4.444	76.70	6.00	15.50	19.70
Femur	Rhode Island	8.464	89.40	7.70	—	—
	Leghorn	5.214	82.80	6.60	—	—
	♀R × ♂L	7.230	91.60	7.40	—	—
	♀L × ♂R	5.438	86.80	6.70	—	—
Tibia	Rhode Island	13.993	129.20	7.10	14.00	23.80
	Leghorn	9.031	117.90	5.90	12.20	19.90
	♀R × ♂L	12.718	133.70	6.30	13.20	23.90
	♀L × ♂R	9.911	124.50	6.40	13.10	22.90
Metatarsus	Rhode Island	8.162	86.40	—	16.30	17.00
	Leghorn	5.636	83.90	—	14.10	14.60
	♀R × ♂L	7.293	91.10	—	15.20	15.60
	♀L × ♂R	6.879	85.50	—	15.00	15.70
Coracoid	Rhode Island	2.542	61.20	4.70	—	—
	Leghorn	1.831	59.00	4.10	—	—
	♀R × ♂L	2.345	62.20	4.50	—	—
	♀L × ♂R	2.039	60.50	4.20	—	—
Clavicle	Rhode Island	0.672	69.00	—	—	—
	Leghorn	0.461	67.50	—	—	—
	♀R × ♂L	0.587	70.70	—	—	—
	♀L × ♂R	0.427	67.90	—	—	—
Sternum	Rhode Island	3.624	57.20	—	36.20	—
	Leghorn	2.514	61.50	—	33.80	—
	♀R × ♂L	3.655	74.10	—	34.80	—
	♀L × ♂R	2.976	62.30	—	35.50	—
Coxal bone	Rhode Island	4.827	94.20	—	—	—
	Leghorn	2.790	83.50	—	—	—
	♀R × ♂L	4.466	95.90	—	—	—
	♀L × ♂R	3.365	86.60	—	—	—

*) For the sternum and coxal bone the craniocaudal length is recorded.
**) For the sternum the width of the carina from the episternum to the costal edge is recorded.

each separate bone displays values increasing from the Leghorn race to the Rhode Island race, the metises holding an intermediate position. The exception is the clavicle with the lowest value in the ♀ Leghorn × ♂ Rhode Island variant, and the radius, ulna and sternum with higher values at the age of 6 months in the ♀ Rhode Island × ♂ Leghorn variant than in the Rhode Island race. On the other hand, from an analysis of the diagram representing the average length of the bones in the same birds, there may be seen that at the age of 6 months especially the values increase from the Leghorn race towards the metis variant ♀ Rhode Island × ♂ Leghorn, the Rhode Island race and the metis variant ♀ Leghorn × ♂ Rhode Island holding intermediate positions.

An analysis of the results of the present investigation shows that higher body weights are associated in the fowl variants under consideration with higher weights of the skeleton and with higher relative weights of the skeleton, as expressed in percentage of the body weights before sacrificing, and *vice versa*. This applies to the Rhode Island race, as compared to the Leghorn race, and to the metis variant ♀ Rhode Island × ♂ Leghorn, as compared to the reciprocal variant ♀ Leghorn × ♂ Rhode Island. Hence, our findings agree with those of G. Peters [7] who, as mentioned above, investigated the relative merits as meat producers of fowls belonging to various weight classes and races, and found the weight of the skeleton to account for a lower percentage of the total net body weight in light races (Leghorn and Italian) than in heavy ones (Sussex, New Hampshire, White Rock). However, the limits he reports (9.00—12.8 per cent) are lower than those recorded by us (3.46—4.56 per cent).

We further noticed that in both (F_1) metis variants the weight of the skeleton is lower, as expressed in percentage of this weight in Rhode Islands, and considerably higher than in Leghorns. This applies in particular to the variant ♀ Rhode Island × ♂ Leghorn at the ages investigated. The fact that at the age of 6 months the metis variants display an average total weight of the skeleton amounting to 104.50 per cent of the corresponding average in the parental races should be correlated with the heterosis phenomenon.

The average total weight of the skeleton is transmitted to metises by intermediate inheritance. It is closer to that of the Rhode Island race in the variant ♀ Rhode Island × ♂ Leghorn, hence in the mating in which the maternal partner is Rhode Island, and closer to that of the Leghorn race in the variant ♀ Leghorn × ♂ Rhode Island in which the maternal partner belongs to the Leghorn race. This feature was recorded in both ages investigated.

We consider that this behaviour should be correlated with the type of intermediate inheritance of body weights, as recorded in the same races and their metis offsprings and reported previously by N. Teodoreanu and S. Oprescu.

The fact that at the age of 6 months all the metises belonging to the variant ♀ Rhode Island × ♂ Leghorn display a greater length of the bones than the parental races while in the metis variant ♀ Leghorn × ♂ Rhode Island the lengths of the bones are closely similar to those in Rhode Islands,

although this is not apparent at the age of 3 months, shows that in the course of their growth the metises tend towards a greater height and to a greater development in the depth of the body associated with slight thinning of the bones investigated, as clearly apparent from a consideration of the smallest diameter measured in the middle third of the diaphysis.

CONCLUSIONS

Gravimetrical and biometrical investigations concerning some osteological indices in chickens belonging to the Leghorn and Rhode Island races and in their (F_1) metises have led to the following conclusions:

1) At the age of 3 months the average total weight of the skeleton in the parental Leghorn and Rhode Island (mean of both races) was almost the same as that in the metis descendants (23.85 g and 23.60 g respectively). At the age of 6 months the metises displayed a higher average total weight of the skeleton than the mean of the parental races (68.83 g as against 65.86 g). The weight of the skeleton in each separate metis was inherited from the parental races according to the type of intermediate inheritance.

2) As expressed in percentages of the live body weights at the ages of 3 and 6 months, the average total weight of the skeleton was higher in the Rhode Island race (4.48 and 4.43 per cent respectively) than in the Leghorn race (3.46 and 4.37 per cent respectively), and higher in the metis variant ♀ Rhode Island × ♂ Leghorn (4.14 and 4.56 per cent respectively) than in the variant ♀ Leghorn × ♂ Rhode Island (3.60 and 4.22 per cent respectively). This feature was closely related to the body weight of the birds.

3) Both at the age of 3 and of 6 months the average total weight of the skeleton as well as the average weight of each separate bone displayed values increasing from the Leghorn race to the Rhode Island race, the two variants of metises holding intermediate positions.

4) The average length of the bones in these birds, at the age of 6 months in particular, displayed values increasing from the Leghorn race to the metis variant ♀ Rhode Island × ♂ Leghorn (this is an evidence of the heterosis phenomenon), the Rhode Island race and the metis variant ♀ Leghorn × ♂ Rhode Island holding intermediate positions.

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NEW STUDIES ON THE LEPIDOPTERA OF NORTHERN AND SOUTHERN DOBRUDJA

BY

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In a previous paper [23] published in 1959, we have presented a comprehensive review of the studies devoted to the Lepidoptera of Dobrudja since Joseph Mann's studies [22] published in 1865 in Vienna; in 1960 we published [24] further data.

In 1962 we studied partially the Danube Delta (the isle of Letea and the surroundings of Sulina), the environs of Babadag, the sandy area near the Marine Zoology Station at Agigea, as well as the Comorova and Hagieni forests in the neighbourhood of Mangalia. On that occasion we collected an abundant material including series of many rare species and some new ones for the Rumanian fauna. Biogeographically, several of these species reach in Dobrudja their north-eastern limit for Europe; moreover, some of them represent great rarities in the lepidopterous fauna of Europe.

Our collectings in the Danube Delta were carried out in the periods of June 22—26, 1962 and July 10—16, 1962. We paid special attention to the Letea forest (both its northern end — the forest strips among the sand dunes at Periprava — and southern limit, in the environs of C. A. Rosetti). From July 17 to 19, 1962 we collected at Sulina, by light, with surprisingly good results, while from July 20 to 22, 1962 we collected during the day and by light in the forest south of Babadag. During the periods May 29 — June 6, August 7—16 and October 27—31, 1962 we collected during the day and mostly by light, both at the Zoological Station of Agigea and at the extreme south-eastern part of Dobrudja in the Comorova and Hagieni forests near Mangalia.

All the above-mentioned localities present very distinct and typical biotopes, quite unique in their kind in Rumania. Thus, for instance, Letea forest occupies a vast sand bank of fluvial-maritime origin of which about 60 per cent is made of semi-mobile dunes of marine sand, reaching here

and there 3 to 4 meters in height. These are covered with scanty vegetation typical of the semi-desert and steppe regions. Narrow strips of forest (called "Haşmacuri") are growing on fixed areas between the dunes. These grounds, unwonted not only in Rumania but in all Europe as well, convey to visitors the impression of a tropical desert, where besides semi-mobile dunes and semi-desert vegetation there are dense forests with the most varied species of trees (poplars, willows, black-alders, ashtrees, oaks, elms and many others). Their trunks and crowns are crammed with creepers (Virginia creeper, ivy, the oriental liana /*Periploca graeca* L./, etc.).

There is a quite different biotope at Sulina, as this town is situated near the sea. To the east it is bordered by a vast beach of fluvial-maritime sand fixed in its major part by semi-desert vegetation and scattered shrubs of *Tamarix*; to the north are the Danube (Sulina arm) and several lakes and backwaters which make up the southern end of the Letea isle, heavily invaded by dense reed plots; to the south and south-west the town is bordered with compact reed plots.

Babadag forest is situated on the heights and slopes of several hills (about 150 m high) on which oak and elm are prevailing. An abundant vegetation of herb plants grows among the trees, accommodating many insect species. In a vast glade on a hill slope south of the town there is a chalet. During the night we captured lots of moths by its lamp lights.

The Agigea Station is situated on a sand bar of marine origin with scattered sand dunes fixed by semi-desert plants (*Ephedra distachya* L., *Alyssum borzaeanum* Nyd., *Elymus sabulosus* L., etc.), areas with cultivated acacia-trees (*Robinia pseudacacia* L.) and *Acer pseudoplatanus* L., *Fraxinus excelsior* L., *Gleditschia triacanthos* L. a.o., and a rich herbaceous vegetation among the trees.

Comorova forest and especially the Hagieni forest have very specific and varied biotopes. At Hagieni there are hills covered with steppe and forest-steppe plants, and furrowed by rather deep valleys. On their bottom lie scattered lakes and marshlands partly occupying the bed of the former river which once supplied lake Mangalia. This bed is heavily covered with alluvial deposits, being covered with strips of dense and very damp forest. The dominating species here are *Acer campestre* L., *Fraxinus excelsior* L., *Fraxinus ornus* L., *Crataegus monogyna* Jacq., *Robinia pseudacaeia* L., *Ailanthus glandulosa* Desf., *Rosa canina* L., etc. Among the trees grow many herb plants which shelter a fauna quite different from that of the damp forest in the valleys or that of the barren areas on the heights and slopes.

Owing to the diversity of these biotopes, which are quite unique in Rumania and in which human interference was negligible so far, our expectations were fulfilled when we discovered a series of lepidopterous occurrences surprising for both Rumanian fauna and that of Europe.

We shall mention in the following only a minor part of the elements found in those regions, and only the most significant ones.

PIERIDAE

Euchloe belia gigantea Car. (figs. 1 and 2). — 2♀♀ Hagieni forest (Mangalia) June 5, 1962. The nominate race has been recorded by Mann from Tulcea in 1866. However, our specimens belong to the subspecies described by A. Caradja from Baltchik; this race has typical white spots, larger than in the nominate race, on the underside of the fore wing, and green pattern on the underside of the hind wing, which is yellowish green in coloration. In the female specimens the yellow admixture on the underside of the hind wing is less conspicuous, while the black discal spot on the fore wing is much larger. Our specimens have wing expanse between 49 and 53 mm. Ponto-Mediterranean element distributed throughout the Mediterranean countries to Armenia. Northern limit of its European distribution in Dobrudja. *New for Rumanian fauna.*

SATYRIDAE

Hipparchia statilinus Hfn. — 12 fresh male specimens were collected in the clearings of the Hagieni forest on August 12, 1962. Wing expanse between 45 and 47 mm. A circum-Mediterranean preglaciar relict reaching northwards the Baltic Sea. Occurring as a rarer species in Rumania, and recorded in scant specimens from Mehadia, Herculane, Turnu-Severin, Tulcea and Murfatlar.

NOTODONTIDAE

Cerura vinula L. — 1 ♀ Agigea May 8, 1962. A rather surprising occurrence for the Rumanian sea-coast area, being mostly known from hilly areas. We assume that the species was introduced with the poplar plantations.

Exaereta ulmi Den. et Schiff. Frequently occurring by light at Agigea throughout May and beginning of June.

NOCTUIDAE[1]

Ochropleura renigera Hbn. — Numerous ♂♂ and ♀♀ specimens at Agigea by light all through May and beginning of June. Species considered as rare; Iranian — Ponto-Mediterranean origin, known from Spain, south of France, from northern Italy to Switzerland, Carynthia, Hungary, Bosnia, Asia Minor, Syria, Iran, Armenia a.o.

Mamestra cappa Hbn. — Frequent at Agigea from May 15, to July 10, 1962 with two generations. Species considered as rare, typical of the steppe areas in southern Europe and Asia Minor to Altai Mts.

[1] We adopted the nomenclature and classification of F. Aubert and Ch. Boursin [4].

Hadena irregularis Hfn. — 1 ♂ from C. A. Rosetti June 24, 1962 and 1 ♀ from Hagieni, June 14, 1961 (leg. N. Săvulescu). Rare Ponto-Mediterranean species, recorded exclusively by Caradja from Stînca — Iaşi. Known from Central and southern Europe, south of U.S.S.R., Asia Minor and Turkestan.

Chryphia rectilinea Warr. — 5 ♂♂ and 4 ♀♀ Eforie Sud, August 11 — August 24, 1948—1949, the species is frequent in August. Formerly recorded by one of us [23] as *Bryophila ravula* Hbn., but C. Boursin having revised part of our specimens, ascertained them as belonging to *rectilinea* Warr., which is specific of south-east Europe and usually confused with *Cr. ravula* Hbn., which is characteristic of the west European regions. Therefore, all specimens previously recorded in Rumania as *Cr.* (= *Br.*) *ravula* Hbn. must be corrected as *Cr. rectilinea* Warr. *New species for Rumanian fauna.*

Eremobia ochroleuca Esp. — 1 ♂ Agigea, June 22, 1962 (leg. Vl. Brădescu). This rare species was first recorded by Mann [22] from Tulcea and by A. Caradja [12] from Efori-Sud, however, the respective specimens are not to be found in any of the Rumanian collections. European endemic element which although very localized, occurs in several European countries, spreading to Armenia.

Epimecia ustula Frr. (fig. 3). — Frequent at Agigea, May 3 — June 4. Forewing dark grey-brown with part of veins furnished with brown-black scales; whitish stripe appearing in medial portion of basal half of median cell. In apical portion a clear stripe obliquely to higher end of discal cell. Maculae hardly marked by whitish spot. Hind wing whitish. Wing expanse 30—34 mm. Mediterranean element, strictly localized, distributed particularly in southern Europe (Spain, southern France, Italy, Dalmatia, Tyrol, Hungary, Bulgaria and Sarepta — U.S.S.R.). *New genus and species for Rumanian fauna.*

Archanara geminipuncta Haw. — 1 ♂ Sulina, July 19, 1962 by light. Variable in coloration ranging from ochre-grey to reddish brown and even blackish brown; characteristic white dot covering lower portion of reniform spot. Our specimen is rather reddish brown, thus partially corresponding to *f. rufa* Tutt. Rare species, recorded in Rumania only from Comana forest (Montandon) and Banat (from Timişoara, Vinga, Bărăteaz and Satchinez) whence König [21] collected and bred larvae and pupae. Rare endemic European element distributed from south of Scandinavia to northern Italy. Larva on stems of *Phragmites communis* Trin.

Eublema suava Hbn. — 2 ♂♂ and 1 ♀ Agigea, August 8—10, 1962. In Rumania recorded by Rebel [26] from Mehadia, Herculane and Orşova, and by A. Caradja [15] from Eforie-Sud. Rare Mediterranean species known from Spain, southern France, Italy, Carynthia, Croatia, Hungary and Balkan peninsula.

Clytie syriaca Bugn. — 5 ♂♂ Agigea, May 27 and August 8, 1962. Recorded by one of us [23] in 1959 as new for Rumanian fauna on the basis of one pair collected from Eforie-Sud. Rare Ponto-Mediterranean species reaching at Agigea its northernmost limit in south-east Europe.

Occurs in two generations: a scarcer one in May, and a more frequent one in August.

Syneda cailino Lef. — 1 ♂ by light, C. A. Rosetti (Letea forest) June 24,1962 (leg. N. Săvulescu). Recorded only once by A. Caradja [13] from Eforie-Sud. Rare Ponto-Mediterranean species. Distribution: from Spain and North Africa to Asia Minor, Syria and trans-Caspian regions.

ARCTIIDAE

Rhyparioides metelkana Led. (fig. 4). — 1 ♂ C. A. Rosetti (Letea forest) by light, June 24, 1962 (leg. N. Săvulescu); 1 ♂ Sulina June 6, 1954 (leg. E. Niculescu). Very rare species recorded in 1952 as new for Rumanian fauna by Al. Alexinschi [2] on the basis of a male specimen collected from Agigea, June 15, 1950. This species is known with certainty only from Hungary, France and Rumania. In the Far East, i.e. in the Amur basin, Korea, Japan, Riu-Kiu Islands a.s.o., there occurs a different subspecies. So far, this is the third specimen known from Rumania.

Callimorpha quadripunctaria Poda — 2 fresh female specimens were collected in Babadag forest on July 21, 1962 from shrubs of a rocky valley. Captured also by Mann from the rocky valley at Tulcea. The species occurs mainly in hilly areas, while in northern Dobrudja it represents a relic element.

AMATIDAE

Dysauxes famula pontica Friese — 2 ♂♂ and 3 ♀♀ Ciufitu forest (Oltina village in south-west Dobrudja), June 28, 1956; 2 ♂♂, Valul Traian, June 19, 1958; 2 ♂♂, Hagieni forest, June 19, 1962. A daylight flyer in forest meadows; has been repeatedly recorded from this country under the name of *Dysauxes punctata* ab. (et var.) *hyalina* Frr. While revising in 1959 the races of *Dysauxes punctata* (F.) and *D. famula* (Frr.), Gr. Friese [19] found out that most of the specimens recorded from a number of countries as *D. punctata* (F.) actually belonged to *D. famula* (Frr.), a quite separate species. In the same paper he mentioned that all specimens captured from Orşova and Mehadia and belonging to the Oldenberg collection, as well as the specimens he captured in Vienna, belong to a new subspecies of *D. famula* (Frr.) characteristic of the pontic regions, which he described as ssp. *pontica* Friese. In 1961, Gr. Friese revised the material we collected from Dobrudja and ascertained it to belong integrally to the same mentioned subspecies. Therefore all specimens collected from Rumania as well as those recorded by various authors as *D. punctata ab. hyalina* Frr. shall be considered to belong to *D. famula pontica* (Friese). The former species is to be cancelled from the Rumanian faunal list.

GEOMETRIDAE

Dasycorsa (= *Dasycephala*, nomen praeoccupandum) *modesta* Stgr. (figs. 5 and 6) — 4 ♂♂ and 1 ♀ Agigea, April 22—27, 1962. More frequent in May. Fore wing fuscous or reddish brown, sprinkled with minute dots or fine blackish stripes. Hind wing and underside with lighter coloration than fore wing. Black discal spot on fore and hind wings, conspicuous on underside as well. Wing expanse in the ♂♂ specimens: 36—39 mm, in the ♀ specimen 30 mm. Rare species, of Pontic origin, known from the seacoast of Dalmatia, Hertzegovine, Bulgaria (Varna, Burgass, Slivno a.o.), Asia Minor and Syria. *New genus and new species for Rumanian fauna.*

Eupithecia breviculata Donzel. Very frequent at Agigea and Mangalia; by light on May 26—June 3, 1962. Was considered a rare species.

Rhodostrophia tabidaria Z. — 3 ♂♂ and 1 ♀ during the day, from the meadows of Hagieni forest. June 5—13, 1961 and 1962. Recorded by Mann [22] from northern Dobrudja and Babadag, and by Rebel [26] from Herculane. Pontic element characteristic of the meadows of the steppe woods.

CRAMBIDAE[1]

Pediasia aridella caradjaellus (Rbl.)—1♂ Agigea, May 31, 1962. Rare species recorded only from Sulina and Tecuci; according to Błeszyński and Collins [6] it is known from Central and south-east Europe.

Metacrambus carectellus (Zell.) (fig. 7) — 2 ♂♂ Agigea, May 31 — June 24, 1962; 4 ♂♂ and 1 ♀ Agigea, August 7, 1962. Wing expanse of our specimens from 17 to 21 mm. Ponto-Mediterranean element widely distributed throughout the Balkan peninsula and Middle East.

Euchromius ocelleus (Haw.) (figs. 8 and 9) — 1 ♂ and 1 ♀ by light, C. A. Rosetti (Letea forest) July 14—15, 1962; 7 ♂♂ and 3 ♀♀, Agigea, August 7—9, 1962. Range of ground colour from straw yellow to fuscous. Nine black dots present in submarginal band of fore wing. Readily distinguished from *E. bellus* (Hbn.) by silver band in median portion of fore wing outlined on either sides by complete yellow stripe while fore wing is narrower and more elongate. Wing expanse in our specimens 21 to 23 mm. We have also 2 ♂♂ from Bucharest (Băneasa forest), 10 ♂♂ and 2 ♀♀ from Suceava, September 8—26, 1962 (leg. Nemeș) as well as 6 ♂♂ and 2 ♀♀ from Craiova collected by I. Stănoiu between September 5 and 30, 1962. A cosmopolitan species which, according to Błeszyński and Collins [6] is widely distributed in Europe, Asia to China, Africa and U.S.A. *New for Rumanian fauna.*

Cephis galleriellus Ragonot (fig. 10) — 2 ♀♀ Sulina, July 19, 1962 by light (det. St. Błeszyński). Species considered as rare. Female specimens have grey fore wing and costal margin lighter in colour. A clear submarginal stripe marked on either side by blackish brown dots obliquely from near apical portion toward inner angle. Two characteristic orbicular spots at end of discal cell. Hind wing concolorous brown-gray. Our female specimens have wing expanse between 38 and 39 mm. Formerly this species has been often confused with other species and described under different names, but Błeszyński and Collins [6] established all the synonymies. The species is known from south Europe (France), North Africa, the Near East, Central Asia, India and Ceylon, and is characteristic of the psamophilic steppe regions. This is the first time it is ascertained in Eastern Europe. *New genus and species for Rumanian fauna.*

Chilo luteellus (Motschulsky) (fig. 11) — 2 ♀♀ by light, State Farm Mangalia, June 6, 1962 (det. St. Błeszyński). The species is resembling *Chilo phragmitellus* (Hbn.). Fore wing concolorous brown-yellow, apex of fore wing slightly pointed but not as elongate as in *phragmitellus*. Hind wing whitish. Our ♀♀ specimens have wing expanse between 36 and 37 mm. Rare species which, according to Błeszyński and Collins [6], is known in Europe only from Italy; also occurring in North Africa, the Near East, Central Asia, eastern Siberia, Korea, China and Japan. *New for Rumanian fauna.*

[1] For the superfamily *Pyraloidea* we adopted the classification suggested by H. Marion in *Revision des Pyraustidae de la Faune française*. (Rev. Franç. de Lépidoptérologie. 1954, 13—14, p. 188), which we consider more accurate.

PHYCITIDAE

Ephestia modestella Led. (fig. 12) — 1 ♀ Agigea, May 31, 1962. In Rumania recorded once by Caradja [12] from Eforie-Sud. To date it reaches its north-easternmost European distribution at Agigea.

Salebria amoenella Zell. — 1 ♀ Sulina, July 19, 1962 on *Tamarix*; 4 ♂♂ and 2 ♀♀ Agigea, August 7, 1962 by light. Rare Ponto-Mediterranean species, recorded by one of us [23] in 1959 as new for the Rumanian fauna. Sulina is the north-westernmost reach-point of its range in Europe.

Myelois cribratella Zell. (fig. 13) — 1 ♂ Agigea June 22, 1962. A more robust species, distinguished from *M. cribrella* Hbn. by the pale cream coloration of fore wing and larger black dots on fore wing. Reaches 31 mm in wing expanse. Rare Ponto-Mediterranean species occurring in Sicily, Balkan peninsula, Uralsk, etc. Caradja's [11] record states "Rumania" without any locality.

PYRALIDAE

Aglossa signicostalis Stgr. (fig. 14) — 1 ♂ Babadag, July 21, 1962, by light. Found again after a lapse of nearly sixty years; A. Caradja [10] recorded it as the first on the basis of two specimens collected by A. L. Montandon from Comana in 1903. Rare, myrmecophilous species, in ant nests, known from few specimens, after Szent-Iványi [30] only from Lebanon, Greece and Hungary (Urgonya, Tihany and Isaszég), in the latter country reaching its north-west limit in Europe. Recorded recently by Klimesch (1956) from Macedonia (by light, Matka, end of June). In the

Worell collection (Sibiu) there is 1 ♂ specimen collected by Diószeghy from Ineu (Arad) on July 18, 1935 (unpublished).

Herculia fulvocilialis Dup. —1♂and 1♀Comorova forest (near Mangalia), July 15, 1962. In the Caradja collection there is one specimen collected from Amara by Fr. Salay on July 31, 1903. In Rumania recorded only by Szent-Iványi [30] from Ineu (Arad) and Băile Herculane. Ponto-Mediterranean element known from southern France, Hungary, Dalmatia, Albania, Bulgaria, Asia Minor, Syria and Armenia.

Stenia stigmosalis H. S. — Numerous ♂♂ and ♀♀ specimens were collected in evening in a meadow bordered with acacias (*Robinia pseudacacia* L.) from Agigea, May 29 — June 2, 1962, or during the day in the meadows of Comorova forest (Mangalia), June 2—6, 1962. Recorded by Caradja [9] under the name of *Amaurophanes stigmosalis* H. S. on the basis of a specimen collected by J. Mann (1865) from Tulcea; found again by Alexinschi (unpublished) and by us about hundred years later. Pontic element, known only from the south of U.S.S.R., Armenia, Asia Minor and Bulgaria (Rebel), Budapest and Zagreb (Sz.-Iványi), and Macedonia Okhrida, Stari Dojran) (Klimesch).

PYRAUSTIDAE

Schoenobius gigantellus f. *spurcatellus* Wlk. — 1 ♂ Oltina, July 22, 1957; 1 ♀ Medgidia, September 12, 1931; 1 ♀ Eforie-Sud, July 30, 1932; 1 ♂ Agigea, May 31, 1962 and 2 ♀♀ Mangalia State Farm, June 1, 1962. This form occurs in all the breeding places of the type, and is characterized by numerous dark brown dots present on upper side of fore wing. Occurs in both generations of the species. *New for Rumanian fauna.*

Euclasta splendidalis H. S. (fig. 15) — 2 ♂♂ Periprava, during the day, July 12, 1962, on the fixed sand of the dunes bordering the northern strips of the Letea forest. Wing expanse: 31—32 mm. Psamophilic rare species which, according to Caradja's [15] statement may be considered as a preglaciar relic of the Eurasian subtropical fauna. Known from Tunis, Gafsa, Brussa, Amasia and Kwanhsien (Setshwan). In Europe it was recorded only once, by Caradja [15] from Baltchik; Gr. Friese captured 2 specimens from Varna (*in verbis*). Species characteristic of the tropical psamophilic steppes. The Danube Delta is the northernmost limit of their distribution in Europe. *New genus and species for Rumanian fauna.*

Ephelis pustulalis orientalis Car. (figs. 16 and 17) — 16 ♂♂ and 8 ♀♀, C. A. Rosetti, during the day, in the meadows of Letea forest, July 14—17, 1962. Our specimens belong to ssp. *orientalis* described by A. Caradja [11] in 1916. Distinguished from the nominate race by smaller and sometimes even less yellowish white spots on upper side of fore wing, as well as by a great similarity in size; wing expanse: 16—18 mm (average 17 mm). On comparing the ♂ and ♀ genitalia of our specimens with those of the specimens of the nominate race (Caradja collection) we found no distinctions between the two. The nominate race is specific of Central Europe, whereas the form described by Caradja belongs to the psamophilic pontic regions (Armenia, Asia Minor, Syria, Bulgaria and Macedonia) to which we ascribe our specimens from the Danube Delta as well. The nominate race was recorded by Caradja [9] from Grumăzești. *New for Rumanian fauna.*

Cybalomia dulcinalis Tr. (fig. 18) — 8 ♂♂ and 5 ♀♀ Agigea, April 23 — June 5, 1962. Pontic element characteristic of psamophilic regions, known from Armenia, Amasia, Konia, the Balkan peninsula and Hungary, where it reaches its north-west limit in Europe. *New genus and species for Rumanian fauna.*

Nascia cilialis simplalis Car. (fig. 19) — 2 ♂♂ Mangalia State Farm, June 3 and 4, 1962, by light. Wing expanse: 23—24 mm. This subspecies has been described by Caradja [11] in 1916 on the basis of several specimens from Hungary (Iszák, leg. Schmidt) as an aberration lacking a distinct pattern. Actually, it is the race specific to Eastern Europe, the nominate race breeding only in Central Europe. *New genus and species for Rumanian fauna.*

TORTRICIDAE

Cnephasia orientana Alph. (fig. 20) — 1 ♀ Agigea, June 23, 1957; 3 ♂♂ and 1 ♀ Valul Traian (near Constanța), June 22, 1962 (leg. Palade); 1 ♂ Palas, June 21, 1962. Wing expanse of our specimens: 17—19 mm. In Rumania it was recorded only once by Caradja [16] on the basis of a specimen collected by A. Popescu-Gorj from Eforie-Sud on June 16, 1932. Steppe element known from the southern regions of the U.S.S.R. (Van, Erevan, Kassikoparan, Sarepta, etc.).

GELECHIIDAE

Atremaea (= *Limnaecia*) *lonchoptera* Stgr. (fig. 21) — 32 ♀♀ specimens Sulina, July 12—19, 1962 by light (det. L. Gozmány). The female specimens are very common in the Letea forest (at Periprava and C. A. Rosetti), from July 1 to 12; male specimens are much scarcer. Our female specimens are very varied in wing expanse: 23 to 30 mm. The species is characteristic of the swampy and halophilic areas, and is considered a rare one being recorded only from southern France and Hungary. *New genus and species for Rumanian fauna.*

ETHMIIDAE

Ethmia aurifluella Hbn. (fig. 22) — 2 ♂♂ and 2 ♀♀, Hagieni forest (Mangalia), June 5—7, 1962, captured during the day in the meadow on the right side of the road known as the "red road". Wing expanse in the ♂♂ : 22 mm, in the ♀♀: 25 mm. Our specimens are slightly differing from those in the Caradja collection originating from the Near East. Ponto-Mediterranean species considered rare, known from southern

France, Spain, Sardinia, Italy, Albania, Bulgaria, Asia Minor, Armenia, etc., reaching in Rumania its north limit in Europe. *New for Rumanian fauna.*

TINEIDAE

Trichophaga abruptella Woll. — Frequent at Agigea, May 31, 1962; 4 ♂♂ Mangalia, June 2—4 and August 7, 1962; 2 ♂♂ C. A. Rosetti (Letea forest), July 14, 1962, and frequent in Letea forest at Periprava, July 30, 1962. Readily distinguished from *Tr. tapetzella* L. by its dark basal field with straight outer margin, as well as by a minute black discal dot present on fore wing. Ponto-Mediterranean element reaching westwards the Canaries and Madeira, and eastwards India.

Deuterotinea casanella Ev. (fig. 23) — 10 ♂♂ Agigea, October 17, 1962 and November 14, 1961; 6 ♂♂ Comorova forest (Mangalia), October 29, 1962 by light. 2 ♂♂, Hagieni forest, October 30, 1962. In our specimens the wing expanse varies from 20 to 24 mm. Furthermore, the pattern is slightly variable. The species is considered very rare, and usually is missing from the European collections, probably due to the fact that it breeds in late autumn. Only one record by Mann in 1866 from Tulcea [22] on the basis of a single specimen. Now, after nearly a century, it was found again. Breeding in Sarepta, Amasia and Bulgaria (A. Caradja has recorded one specimen from Baltchik).

★

In conclusion, as a result of our field investigations during the last years in the Danube Delta (Letea forest at Periprava and C. A. Rosetti) and the environs of Sulina, at Babadag and the sand dunes at Agigea, as well as in the south-east forests of Dobrudja (Comorova and Hagieni near Mangalia), we discovered seven new genera for the Rumanian fauna: *Epimecia, Dasycorsa, Cephis, Euclasta, Cybalomia, Nascia* and *Atremaea*, as well as 15 species and one form, also new for the Rumanian fauna, i.e. *Euchloe belia gigantea* Car., *Cryphia rectilinea* Warr., *Epimecia ustula* Frr., *Dasycorsa modesta* Stgr., *Euchromius ocelleus* (Haw.), *Cephis galleriellus* Ragonot, *Chilo luteellus* (Motsch.), *Myelois cribratella* Zell., *Schoenobius gigantellus* f. *spurcatellus* Wlk., *Euclasta splendidalis* H. S., *Ephelis pustulalis orientalis* Car., *Cybalomia dulcinalis* Tr., *Nascia cilialis simplalis* Car., *Atremaea* (= *Limnaecia*) *lonchoptera* Stgr. and *Ethmia aurifluella* Hbn.

Moreover, such species as *Eremobia ochroleuca* Esp., *Syneda cailino* Lef., *Ephestia modestella* Led., *Aglossa signicostalis* Stgr., *Stenia stigmosalis* H. S., *Cnephasia orientana* Alph. and *Deuterotinea casanella* Ev., considered as great rarities, were re-discovered after a lapse of more than 30 or 60 years, and even after one century from their first recording.

The biotopes of the Danube Delta (Letea forest—Periprava and C. A. Rosetti) and Agigea being strongly psamophilic and partially swampy while those of Sulina are nearly exclusively swampy, we can explain the great abundance of the psamophilic steppe elements occurring in the

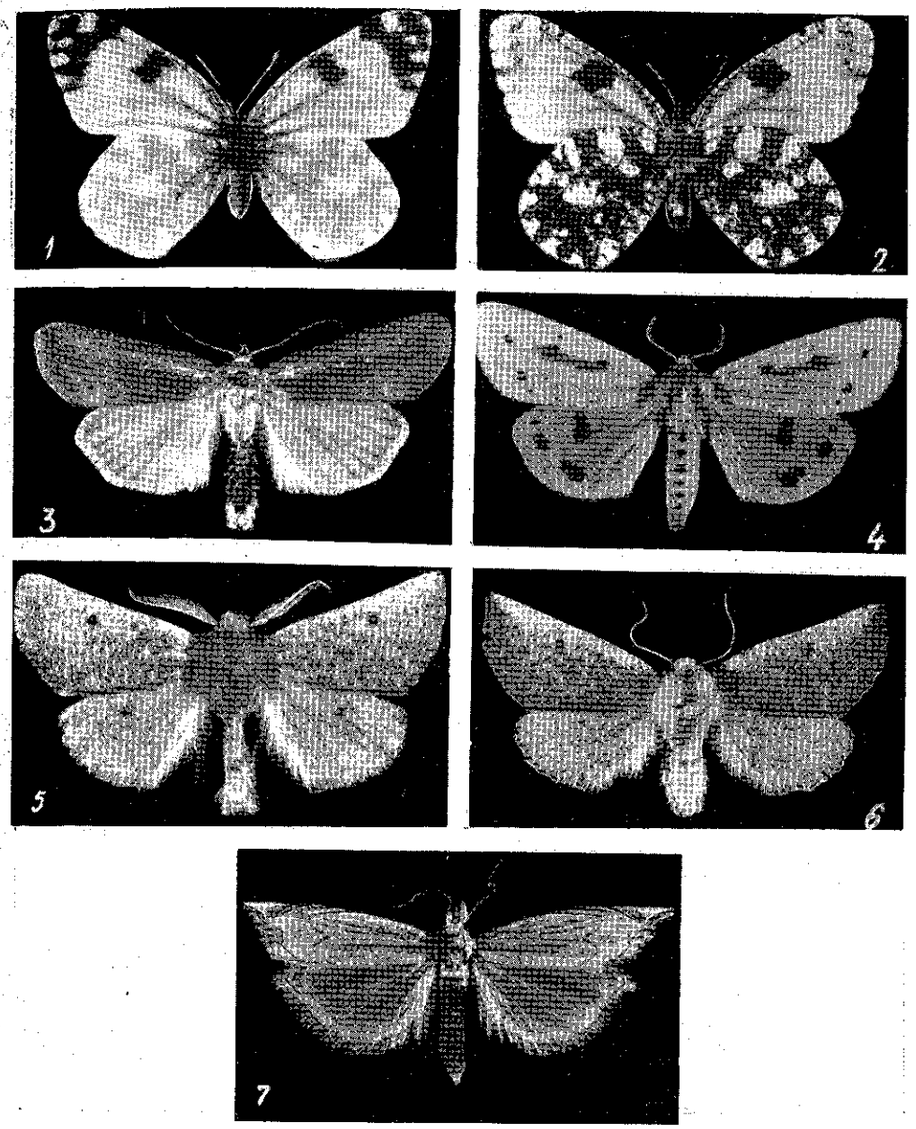
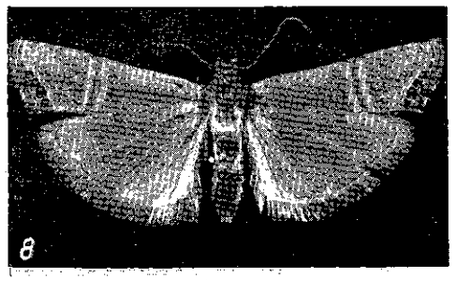
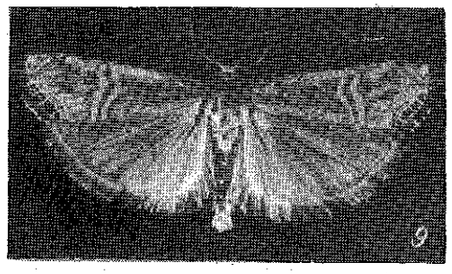
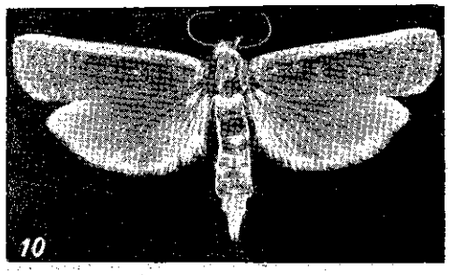


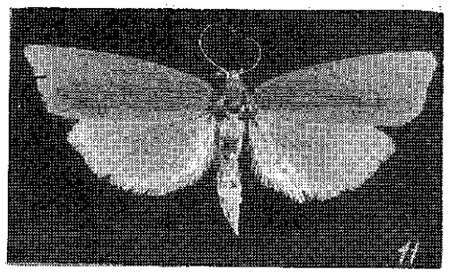
PLATE I*) 1. *Euchloe belia gigantea* Car.: ♀ Hagieni forest (Mangalia), 5.VI.1962; 2. Same—underside; 3. *Epimecia ustula* Frr.—♂ Agigea, 8.V.1962; 4. *Rhyparioides metelkana* Led.—♂ C. A. Rosetti, 24.VI.1962; 5. *Dasycorsa* (= *Dasycephala*) *modesta* Stgr.—♂ Agigea, 22.IV.1962; 6. *Dasycorsa modesta* Stgr.—♀ Agigea, 22.IV.1962; 7. *Metacrambus carectellus* (Zell.)—♂ Agigea, 7.VIII.1962.

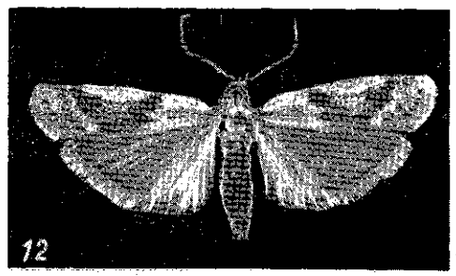
*) Photos by our colleague Dr. N. Săvulescu, to whom the best thanks are due. Size of figures larger than normally.

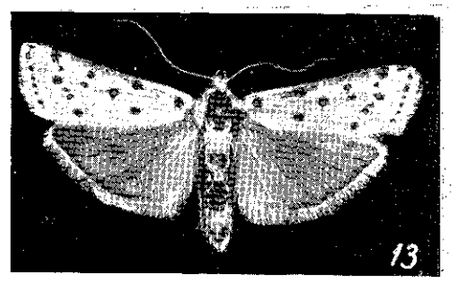


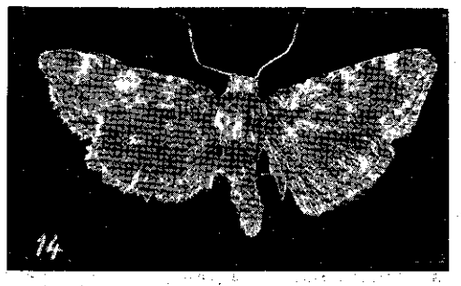












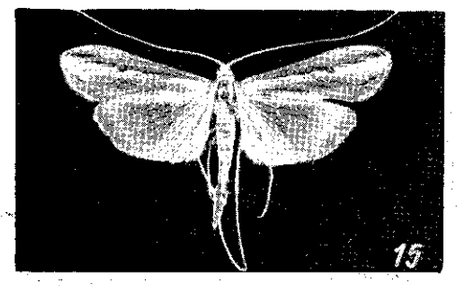
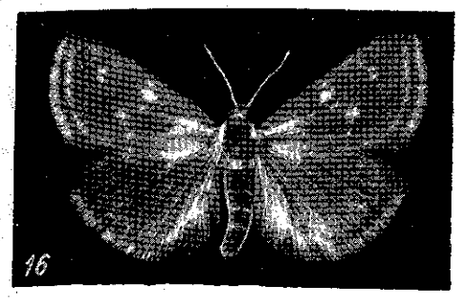
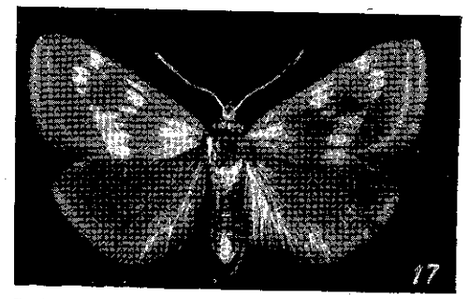
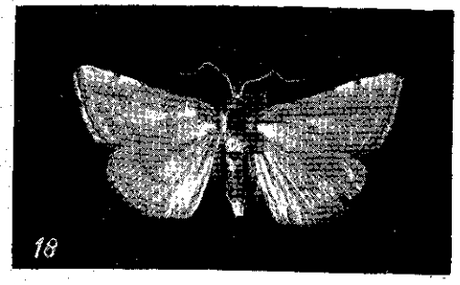
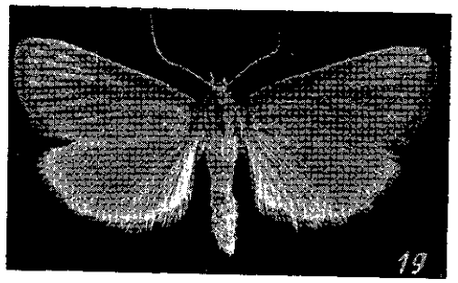


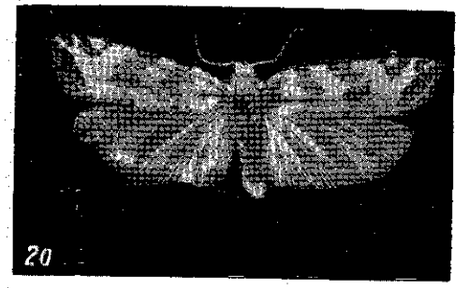
PLATE II 8. *Euchromius ocelleus* (Haw.). — ♀ Agigea, 8.VIII.1962; 9. *Euchromius ocelleus* (Haw.). — ♂ Agigea, 7.VIII.1962; 10. *Cephis gallerietlus* Ragonot. — ♀ Sulina, 19.VII. 1962; 11. *Chilo luteellus* (Motschulsky). — ♀ State Farm, Mangalia, 6.VI.1962; 12. *Ephestia modestella* Led. — ♀ Agigea, 31.V.1962; 13. *Myelois cribratella* Zell. — ♂ Agigea, 22.VI.1962; 14. *Aglossa signicostalis* Stgr. — ♂ Babadag, 21.VII.1962; 15. *Euclasta splendidalis* H. S. ♂ Periprava (Letea forest) 12.VII.1962.

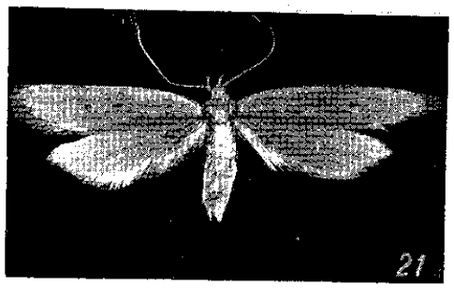












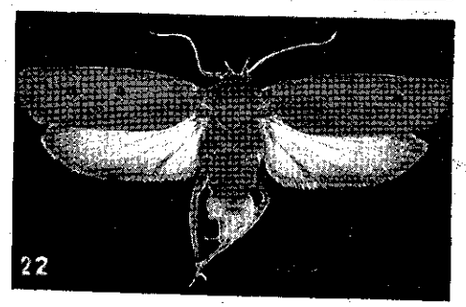


PLATE III 16. *Ephelis pustulalis orientalis* Car. — ♂ C. A. Rosetti, 15.VII.1962; 17. *Evergestis pustulalis orientalis* Car. — ♀ C. A. Rosetti 16.VII.1962; 18. *Cybalomia dulcinalis* Tr. — ♂ Agigea, 30.V.1962; 19. *Nascia cilialis simplalis* Car. — ♂ State Farm, Mangalia, 4.VI.1962; 20. *Cnephasia orientana* Alph. — ♂ Valul Traian, 22.VI.62; 21. *Atramaea* (= *Limnacica*) *tonchoptera* Stgr.: ♀ Sulina, 19.VII.1962; 22. *Ethmia aurifluella* Hbn. — ♀ Hagieni forest (Mangalia), 5.VI.1962; 23. *Deuterotinea casanella* Ev. — ♂ Comorova forest (Mangalia), 29.X.1962.

first two mentioned collecting localities as well as the great abundance of those definitely swampy at Sulina. As the biotopes of these areas are extremely interesting, their further study as well as studies of other insect groups and in different seasons are expected to yield still more surprising results.

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BIOLOGISCHES STUDIUM DER ARTEN *NASSA RETICULATA* L. UND *CYCLONASSA NERITEA* (L.) IM SCHWARZEN MEER (RUMÄNISCHER KÜSTENBEREICH)

VON

MARIAN-TRAIAN GOMOIU

Nassa reticulata L. und *Cyclonassa neritea* (L.) sind euryhaline, atlantisch-mediterrane Arten, die im Infralitoral[1] mit beweglichem Grund vorkommen.

Diese Gastropoden erreichen an manchen Stellen im Schwarzen Meer ziemlich hohe Dichten; so charakterisiert z. B. *C. neritea* aus der feinsandigen Zone des rumänischen Litorals, neben *Aloidis maeotica* Mil., eine sehr wichtige Biozönose als trophogene Zone [1], [2].

Die Untersuchung dieser Arten aus mehreren Gesichtspunkten [2], [4], [9], [19] war möglich, da sie eine reichliche Bevölkerung bilden, die in der unmittelbaren Nähe der Küste zu sammeln ist. Ferner sind diese Arten groß genug und gegen die Lebensbedingungen nicht zu anspruchsvoll, so daß sie im Aquarium verfolgt werden können.

Obwohl die Taxonomie dieser Arten als gänzlich geklärt scheint, ist der systematische Wert der von verschiedenen Autoren für das Schwarze Meer angegebenen Varietäten ([3], [10], [16] usw.), wie weiter unten ersichtlich, zweifelhaft.

In der vorliegenden Arbeit bringen wir einige Daten über die Biologie der Arten *Nassa reticulata* L. und *Cyclonassa neritea* (L.) vom rumänischen Küstenbereich, die wir durch Versuche im Aquarium und periodische Verfolgung ihrer Anwesenheit an gewissen Punkten in der *Aloidis*-Zönose erhielten.

[1] Bionomische Terminologie nach Pérès: *Océanographie biologique et biologie marine*, Paris, 1961.

DARSTELLUNG DES MATERIALS

Bevor wir die Ergebnisse darlegen, danken wir an dieser Stelle Dr. M. Băcescu für die ständige Leitung und die vielseitige Unterstützung in der Bearbeitung vorliegenden Studiums.

Nach verschiedenen Autoren ist *Nassa reticulata* im Schwarzen Meer durch 3 Varietäten vertreten: var. *mediterranea* Mil., var. *modesta* Mil., und var. *pontica* Monterosato. Scheinbar besitzen aber nur die zwei ersten einen systematischen Wert, während letztere zweifelhaft ist.

Obwohl Milaschewitsch [16] als Biotop der var. *pontica* die Tiefe von 13—18 m angibt, zeigt Bekman [3], daß *N. reticulata* var. *pontica* sämtliche Zonen bis zum phaseolinoiden Facies bewohnt. Diese Form ist am meisten verbreitet und erreicht eine Maximaldichte zwischen den Isobathen von 10 und 40 m.

Für den rumänischen Küstenbereich erwähnen die neuesten Molluskenlisten [6], [11] nur var. *mediterranea* und *modesta*; an der bulgarischen Küste werden von Kynewa-Abadshjewa auch nur dieselben Varietäten angegeben [12]. Unseren Beobachtungen gemäß bewohnt *N. reticulata* var. *mediterranea* die kleineren Tiefen und ist in der sandigen *Aloidis*-Zone sowie in der Übergangszönose zum mytiloiden Schlick, wo der Sandprozent ziemlich hoch ist, einheimisch.

Die Varietät *modesta* hat die Zone der Maximaldichte in der schwarzschlammigen Gegend der Miesmuschel-Grund, neben anderen Cocoenonten wie *Venerupis*, *Cardium* u.a.

Das Supra- und das Medio-Litoral enthalten in ihren Thanatozönosen zahlreiche Schalen der var. *mediterranea* und widerspiegeln derart die Lage des Infralitorals; nur nach großen Stürmen ist auf dem Strand auch die var. *modesta* anzutreffen. Die Größen der im rumänischen Küstenbereich lebenden *Nassa reticulata* wurden an Bevölkerungen von 100 Exemplaren für jede Varietät gemessen, auf dem Diagramm aber nur die kennzeichnenden Werte aufgezeichnet (Abb. 1).

Aus der Untersuchung der Messungen geht deutlich hervor, daß var. *modesta* viel kleiner (10—24 mm hoch und 6—12 mm breit) als var. *mediterranea* (22—29 mm hoch und 14—18 mm breit) ist. Aus den graphischen Darstellungen kann man auch die Wachstumstendenz dieser Arten verfolgen, die bei beiden Varietäten allometrisch ist (Abb. 1).

Eine besondere Bedeutung für die Biologie dieser Art hat auch die Epibiose. Die Varietät *modesta* dient, solange die Schnecke lebendig ist, als Grundlage für Hydroiden wie *Podocoryne carnea* M. Sars, die die Schale mit einer weißrosa filzigen Masse bekleidet und *Cyliste viduata* Wright, sowie für einige benthale Microphyten.

Die Varietät *mediterranea* hat im allgemeinen eine reine Schale, nur selten trägt sie je ein Exemplar von *Balanus improvisus* Darwin.

Die Schalen von *N. reticulata* var. *modesta* dienen dem Krebstier *Diogenes pugilator* (Roux) als Unterkunft. Dieses bringt sie aus der freien See, in das Gebiet der Zugnetze (8 m Tiefe), woher sie dann, infolge der Wellen, Strömungen und Stürme in die Thanatozönose des Supralitorals

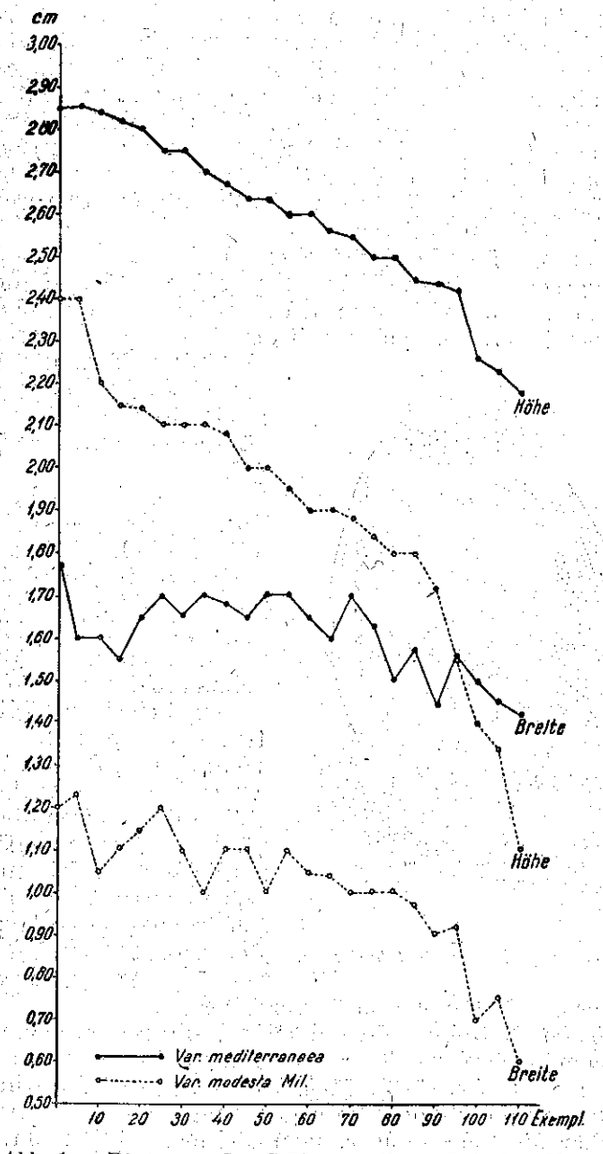

Abb. 1. — Diagramm der Größenvariationen bei den *Nassa reticulata* L.-Varietäten (Orig.).

eindringen. Wir haben in Schalen von var. *mediterranea* nie Einsiedlerkrebse getroffen. R. und M. Codreanu [8] zeigen ebenfalls, daß sich *Diogenes* größtenteils in die 10—25 mm langen Schalen von *N. reticulata*, die auf die Größe der var. *modesta* deuten unterbringt. Die toten Schalen, die Einsiedlerkrebse beherbergen, bilden eine ideale Unterlage für *Balanus improvisus*; dieser befestigt sich in einer so großen Anzahl (30—50 Exemplare auf je ein Exemplar von *Nassa reticulata*), daß er bis zu 50% des Gesamtgewichtes (Schale + Einsiedlerkrebs + Cirripedien) beträgt.

Die Fortpflanzung von *N. reticulata* wurde in verschiedenen Gegenden [4], [13], [18], [19] studiert, wobei die Autoren im allgemeinen zu ähnlichen Schlüssen gerieten.

Was das rumänische Küstenbereich betrifft, erstreckt sich die Fortpflanzungszeit von April bis September, die Zeit der Maximalentwicklung liegt im Juni bis August. Unsere Daten entsprechen im großen und ganzen den Literaturangaben mit dem Unterschied, daß sich im Vergleiche zu Karadag die Eiablage um einen Monat verlängert und zwei Monate früher als in den dänischen Gewässern [18] anfängt [4].

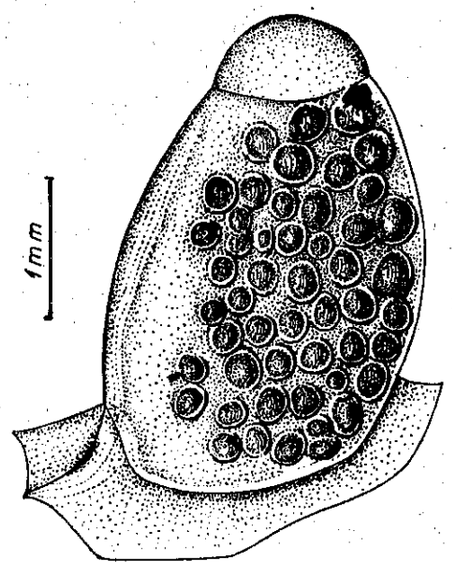

Abb. 2.— Eikapsel von *Nassa reticulata* (Orig.).

Die Eikapseln haben die Form eines rhombischen Beutels mit Deckel, sind 2,5—3,5 mm hoch, hornig, durchsichtig, abgeplattet (Abb. 2) und enthalten durchschnittlich 65 Eier, von 0,13 mm Durchmesser. Die Embryonalentwicklung erfolgte in 18 Tagen, bei einer täglichen Mitteltemperatur von 20°C. Das Ausschlüpfen erfolgte in 72 Stunden; am ersten Tage verließen fast die Hälfte der Larven die Kapsel, am nächsten Tag ungefähr 2/3 der restlichen, am dritten die letzten. Scheinbar ist das allmähliche Ausschlüpfen eine ergänzende, außer den von Bekman bereits erwähnten [4] Anpassungen, die das Überleben der Nachkommenschaft versichert.

N. reticulata hat eine schwimmende Velig r-Larve, die ebenso wie die atlantischen Exemplare dieser Art auf dem Velum ein gut entwickeltes violettes Pigment besitzt [13], [18]. In dieser Hinsicht stimmen unsere Daten mit denen von Winogradowa [19] und Tschuchtschin [7] überein, bestätigen aber die Schlußfolgerungen Bekmans [4] nicht. Dieser bestreitet das Vorhandensein des violetten Farbstoffes bei der Larve von *N. reticulata* im Schwarzen Meer und sieht darin gewaltige physiologische Unterschiede zur atlantischen Form. Es ist zu bemerken, daß obwohl

Bekman [4] und Winogradowa [19] mit der Varietät *pontica* arbeiteten, ihre Daten über die Fortpflanzung der Art *N. reticulata* im allgemeinen mit denen über die Bevölkerung anderer Meere übereinstimmen und unseren ziemlich nahe sind. Aus obigem geht also hervor, daß sich der systematische Wert von Varietät nur auf die morphologischen, nicht auch auf die physiologischen Merkmale bezieht.

Die Gattung *Cyclonassa* wurde bis jetzt im Schwarzen Meer mit 3 Arten angegeben: *C. neritea* (L.), *C. kamyschiensis* Chenu und *C. brusinai* (Andrussow) Mil. ([10], [16] usw.). Anscheinend haben aber nur die erst- und die letzterwähnte Art einen vollen systematischen Wert und sind also echte Arten.

In dem reichhaltigen untersuchten Material konnten wir *C. kamyschiensis* noch nicht feststellen. Wir bemerken jedoch, daß eine flüchtige Beobachtung junger Exemplare von *C. neritea* zu einer Verwechslung dieser Art mit *C. kamyschiensis* führen kann. Winogradowa [19] verfolgte die Entwicklung dieser Gastropoden, fand jedoch keine wichtigen Unterschiede zwischen *C. neritea* und *C. kamyschiensis*: Eiablage, Eier, Embryonalperiode, usw. sind fast identisch.

C. kamyschiensis lebt im rumänischen Küstenbereich nicht; manche Autoren erwähnen [5], [10] sie trotzdem, aber nur auf Grund von leeren Schalen, die von der Strömung herangespült wurden. Auf den neuen Molluskenlisten der rumänischen Küste [12] ist diese Art nicht angegeben. Man kann also behaupten, daß hier nur *Cyclonassa neritea* vorkommt, der auch unsere vorliegenden Untersuchungen gewidmet sind.

C. neritea bewohnt besonders die kleinen Tiefen der Sandzone mit *Aloidis*. Das Gebiet ihrer Maximaldichte befindet sich zwischen dem 4 und 8 m tief gelegenen Streifen.

Im Jahre 1962, gelegentlich der halbmonatlichen Verfolgungen der Dynamik verschiedener Tierbevölkerungen an bestimmten Punkten der Isobathen von 4, 8, 12 und 16 m, konnte festgestellt werden, daß *Cyclonassa* in den tiefer als 8 m gelegenen Zonen nur äußerst selten und in sehr wenigen Exemplaren anzutreffen ist.

Hinsichtlich der allgeimenen Dynamik der *C. neritea*-Bevölkerung ist aus Angaben von 3 Jahren in erster Linie zu entnehmen, daß die niedrigsten monatlichen Mitteldichten gewöhnlich im Monat Juli zu beobachten sind (Abb. 3). Des weiteren wird bemerkt, daß die Dichte der Exemplare in den tieferen Wasserschichten zunimmt, wenn die Art in 5 m Tiefe fehlt oder in kleiner Anzahl vorzufinden ist. Diese Tatsache deutet derart auf eine typische Sommerwanderung der Art hin, die wahrscheinlich durch die im Laufe des betreffenden Monats um 1°—2°C gesunkene Wassertemperatur verursacht wird. Diese beschränkte Wanderung ist sicherlich anderer Natur als die von Giordani-Soika [9] geschilderte.

Aus der allgemeinen Tendenz der Dichte [1] (Abb. 3) bemerkten wir während des Zeitabschnittes von 3 Jahren eine lange zweijährige Periode

[1] Die Ermittlung der Zentraltendenz [15], [17] ist in Tabelle 1 veranschaulicht.

zwischen August 1960 und August 1962 mit hohen Dichten und zwei Perioden mit kleineren Dichten.

Nach den kumulativen Kurven der relativen Frequenzen der monatlichen Mitteldichte zu schließen, kann in den 3 Jahren (Abb. 4) von 1960 bis 1962, eine Verschiebung nach links, also gegen die erste Jahreshälfte,

Tabelle 1

Ermittlung der Zentraltendenz der Dichte bei *Cyclonassa neritea* (L.) i.J. 1962 an einem fixen Punkt (8 m Tiefe)

Monat	Ordnungsnummer der Monate (t_i)	Reale Grössen in Exemplaren m² (y_i)	Ermittlung der Zentraltendenz: Zeit (t'_i)	Produkt ($t'_i y_i$)	Produkt (t'^2_i)	Zentraltendenz ($Y=a+bt'_i$)	Parabolische Tendenz $Y_p=a+bt'_i+ct'^2_i$	Bemerkungen
I	1	90	−5	−450	25	131	201	Für die Ermittlung der Zentraltendenz [1]) angewandte Formel
II	2	220	−4	−880	16	133	162	
III	3	120	−3	−360	9	135	131	
IV	4	150	−2	−300	4	138	110	
V	5	140	−1	−140	1	142	99	
VI	6	80	0	0	0	143	96	
VII	7	190	+1	+190	1	146	103	Für die Ermittlung der parabolischen Tendenz angewandte Formel [2])
VIII	8	130	+2	+260	4	148	121	
IX	9	85	+3	+255	9	151	145	
X	10	150	+4	+600	16	153	181	
XI	11	220	+5	+1100	25	155	225	
Σ	—	1575	0	+275	110	1575	1575	$t_i=\frac{t_i-\bar{t}}{i}$

[1]) $a=\frac{\Sigma y_i}{n}$; $b=\frac{\Sigma t'_i y_i}{t'^2_i}$

[2]) $a=\frac{\Sigma t'^4_i \cdot \Sigma y_i - \Sigma t'^2_i \cdot \Sigma t'^2_i y_i}{n\Sigma t'^4_i - (\Sigma t'^2_i)^2}$; $b=\frac{t'_i y_i}{\Sigma t'^2_i}$; $c=\frac{n\Sigma t'^2_i y_i - \Sigma y_i \cdot \Sigma t'^2_i}{n\Sigma t'^4_i - (\Sigma t'^2_i)^2}$

Die graphische Darstellung der Daten wird in Abb. 7 gegeben.

bei den meisten Exemplaren die in der Zönose vorhanden sind verfolgt werden, während 1960 der Mittelwert der Dichtefrequenzen (d.h. 50% der während des ganzen Jahres untersuchten Bevölkerung) im September liegt. Im Jahre 1961 liegt er im April, während er im Jahre 1962 im März registriert wird. Auch diese Feststellung hebt noch einmal sowohl die kleineren Dichten der ersten Hälfte des Jahres 1960 und der zweiten Hälfte des Jahres 1962 hervor, als auch diejenigen, die zwei Jahre zwischen diesen Perioden hoch bleiben. In 3 Jahren erscheint also ein vollständiger Zyklus der Maximaldichte zwischen zwei Minimalperioden.

Die Epibiose ist viel ärmer als bei *N. reticulata* und ist besonders durch *Balanus*, benthale Mikroflora, und seltener durch *Gongrosira* gebildet.

Die Größen der einzelnen *C. neritea*-Exemplare einer Bevölkerung von 100 Exemplaren sind auf dem Diagramm der Abbildung 5 eingetragen. Es ist zu bemerken, daß unsere Zahlen im allgemeinen den Angaben der Literatur entsprechen; dazu ist noch das Wachstum, das auch bei dieser Art allometrisch ist, hervozuheben.

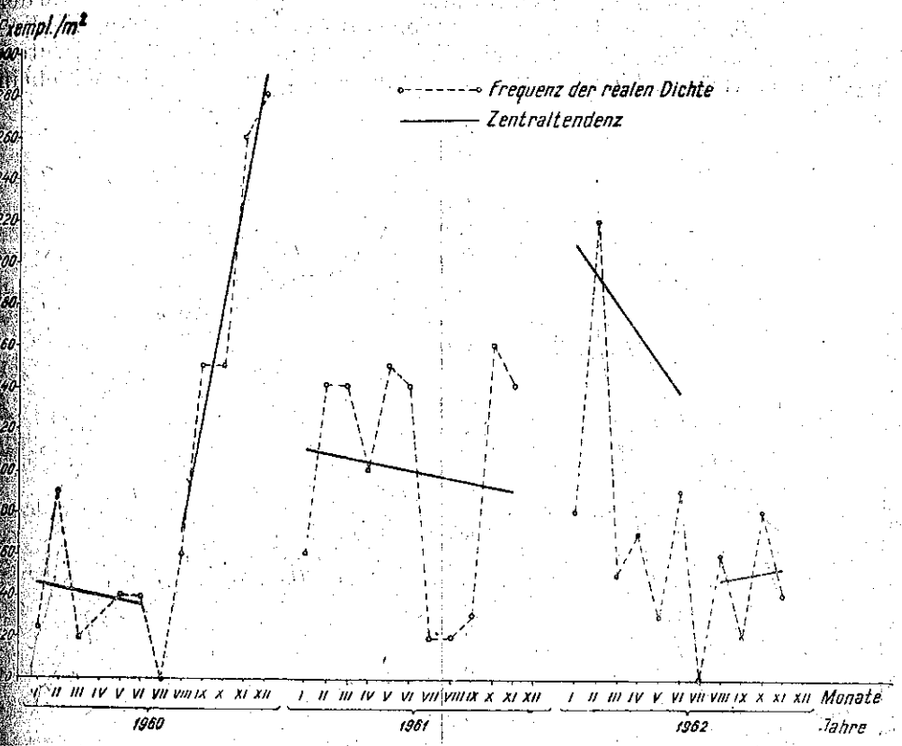

Abb. 3. — Darstellung der Veränderung monatlicher Mitteldichten und der Zentraltendenz der Dichte bei *Cyclonassa neritea* (L.) in den Jahren 1960—1962 (Orig.).

Die Fortpflanzung dieser Art ist im Schwarzen Meer von Bekman [4] und Winogradowa [19], deren Angaben im allgemeinen mit unseren übereinstimmen, erforscht worden.

Die Eikapsel von *C. neritea* ist durchsichtig, abgeplattet, elliptisch in Form einer abgerundeten Tasse mit Deckel, die auf einer breiten Unterlage fixiert ist (Abb. 6). Der Deckel ist mit zwei kleinen senkrechten Vorsprüngen versehen. Die Eikapsel ist von einer festen Hautmembran umhüllt. In jeder Eikapsel befindet sich gewöhnlich ein einziges schwach gelbliches Ei; wir trafen aber auch einige Kapseln mit zwei Eiern.

C. neritea gehört zu denjenigen Mollusken deren Gesamtentwicklung im Inneren der Kapsel stattfindet; das pelagische Stadium fehlt. Aus den

Eiern, die nährstoffhaltig und von einer Kapsel geschützt sind, entwickeln sich die jungen Schnecken, die sofort dasselbe Leben wie die ausgewachsenen führen.

Die Größe der Eikapseln ist veränderlich und etwas kleiner als von Winogradowa [19] angegeben wurde (Tabelle 2).

Die Eikapsel wird für gewöhnlich an Festkörpern befestigt. In der sandigen *Aloidis*-Zone legen die *Cyclonassa* die Eier fast ausschließlich auf Exemplaren dieser Art ab. Beim Zählen der Kapseln wurde die „Unterlage" nach Größen klassiert und dabei bemerkt, daß im allgemeinen in

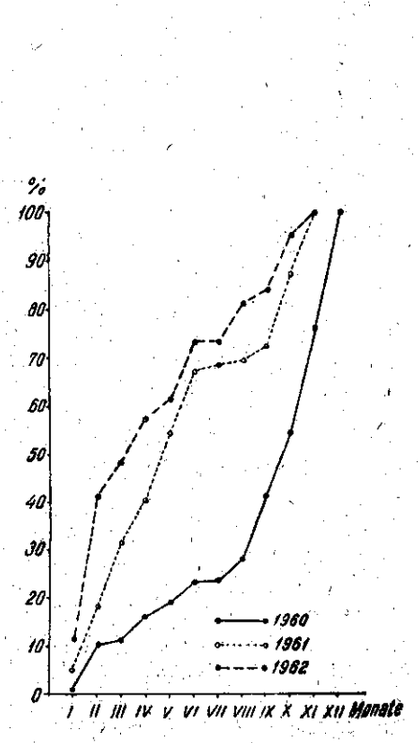

Abb. 4. — Die kumulativen Jahreskurven der relativen Dichtenfrequenz bei *Cyclonassa neritea* (L.) für die Jahre 1960—1962 (Orig.).

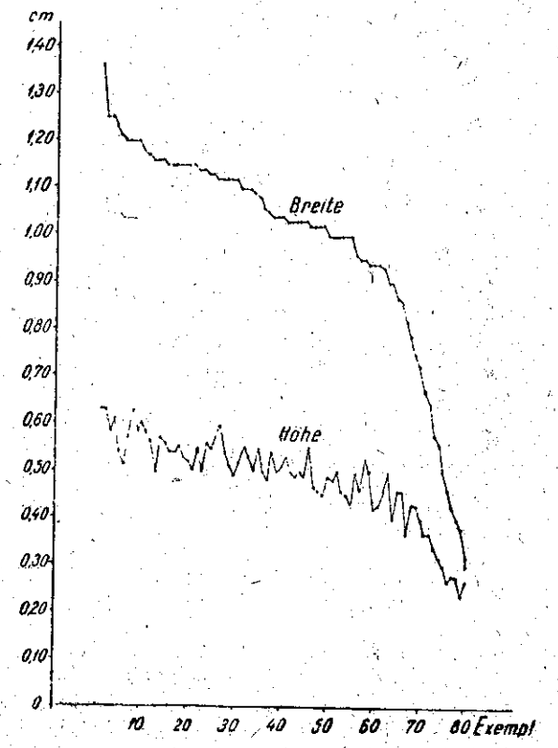

Abb. 5. — Diagramm der Größenvariationen bei *Cyclonassa neritea* (L.) (Orig.).

8 m Tiefe die *Aloidis*-Exemplare von 6 mm, in 4 m Tiefe aber diejenigen von 3—4 mm ausgesucht werden.

Die Zahl der von einem *C. neritea*-Weibchen abgelegten Eier wurde im Laboratorium verfolgt [4], [19]. Wir haben diese Zahl nach der Naturlage berechnet, und die Kapselanzahl zur Gesamtzahl der in der

Probe vorkommenden *Cyclonassa*-Exemplare bezogen. Obwohl die männlichen Exemplare nicht beachtet wurden, ist das erhaltene Mittel der Eierzahl viel größer (Tabelle 3) als die Angaben der Literatur [19].

Im rumänischen Küstenbereich beginnt die Eiablage einen Monat später als im sowjetischen, d.h. im April, wenn die Wassertemperatur 10°—11°C erreicht.

Die Angaben des Jahres 1961 zeigen eine Zunahme der Eiablagen bis Juni, wenn der Maximalwert registriert wird (Tabelle 3). Im Juli beobachtet man eine Abnahme, dann im August wieder eine massive Eiablage, die nachher in den Monaten September und Oktober sehr stark abnimmt. Scheinbar wird die verminderte Juli-Eiablage durch das Sinken der Wassertemperatur verursacht, das auch eine Wanderung der Art fördert.

Abb. 6. — Eikapsel von *Cyclonassa neritea* (L.) (Orig.).

In normalen Temperaturverhältnissen dauert die Embryonalperiode bei *C. neritea* ungefähr 5 Wochen (Tabelle 3).

Nach der Eiablage konnte man im Aquarium nach 2 Tagen gut sichtbare Bewegungen des Embryos im Innern der Kapsel beobachten. Nach weiteren 3 Tagen bildete sich das zweilappige Mundsegel mit den Zilien, dank deren Vibration sich das Embryo bewegt. Allmählich erscheinen am Mundsegel violette Ränder.

Tabelle 2

Die Größen der Eikapsel von *C. neritea* (L.) in mm (für 10 charakteristische Exemplare und der Mittelwert).

Die Elemente der Eikapsel		Die gemessenen Exemplare und der Mittelwert in mm										nach Winogradowa
		1	2	3	4	5	6	7	8	9	10	Mittelwert	
Eikapsel	Länge	1,09	1,08	1,07	1,07	1,07	1,06	0,99	0,99	0,96	0,96	1,03	1,1
	Höhe	0,96	0,94	0,90	0,86	0,82	0,90	0,85	0,88	0,80	0,80	0,87	0,8
	Länge der Deckel	0,85	0,86	0,80	0,86	0,74	0,73	0,75	0,64	0,75	0,66	0,76	
Das Ei (Durchmesser)		0,50	0,44	0,47	0,43	0,48	0,48	0,53	0,48	0,43	0,56	0,48	0,6

Tabelle 3

Mittelzahl der von *C. neritea* monatlich abgelegten Eier (Kapseln) sowie die registrierten Temperatur- und Salzgehalt-Mittelwerte im Jahre 1961

	Monate						
	IV	V	VI	VII	VIII	IX	X
4—6 m	10	17	24	9	—	—	—
8—10 m	11	18	35	15	28	2	+
T°C	11°2	14°7	21°4	20°9	22°6	18°6	14°4
S $g^0/_{00}$	16,77	14,84	12,58	15,21	15,62	17,37	15,66

Die kleine vollentwickelte Schnecke hebt den Deckel der Kapsel, die sie verläßt und kriecht dann am Gefäßboden um sich selbständig zu ernähren. Nach dem Ausschlüpfen sind die Jungen höher als lang. Während der Laborversuche fallen Wimperinfusorien der Gattung *Euplotes* fast alle Eikapseln an, um sie nachher zu zerstören, wodurch sie deren Entwicklung unterbrechen.

SCHLUSSFOLGERUNGEN

Im rumänischen Küstenbereich fanden wir folgende *Nassidae*:

1. *Nassa reticulata* L. var. *modesta* Mil. bewohnt Tiefen unter 20 m und bevorzugt die Miesmuschelzönose.

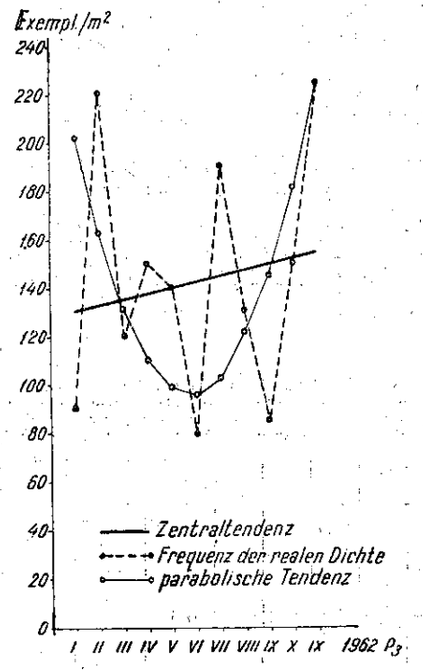

Abb. 7. — Graphische Darstellung der Angaben aus Tabelle 1: Variation der monatlichen Mitteldichten und der Zentraltendenz der Dichte bei *Cyclonassa neritea* (L.) an einem fixen Punkt (P_3) im Jahre 1962 (Orig.).

2. *Nassa reticulata* L. var. *mediterranea* Mil. besitzt ein Verbreitungsareal, das auf die infralitorale und die obere circalitorale Zone mit beweglichem sandigem Grund (0—25 m) beschränkt ist.

3. *Cyclonassa neritea* (L.) ist eine im sandigen Infralitoral gemeine Art und für die *Aloidis*-Zönose charakteristisch. Auf Grund unserer Untersuchungen und der vergleichenden Literatur, nehmen wir an, daß *Nassa reticulata* L. var. *pontica* Mil. und *Cyclonassa kamyschiensis* Chenu die von verschiedenen Autoren ([3], [16] u.a.) erwähnt werden, keinen wirklichen systematischen Wert besitzen.

Die Ergebnisse unserer Beobachtungen über die Fortpflanzung und Entwicklung der Nassiden-Bevölkerung am rumänischen Küstenbereich bestätigen die für die Bevölkerung anderer Meere oder Stellen des Schwarzen Meeres bekannten Angaben, so daß es sich nicht um eine besondere ökologische Anpassung an das pontische Becken handelt.

In der sandigen *Aloidis*-Zone führt die starke Eiablage der warmen Jahreszeit durch die Veliger-Larven (*Nassa*) zu einer deutlichen Produktionssteigerung an organischem Stoff im Benthos und besonders im Plankton. Die Richtung der Dynamikentwicklung bei den *C. neritea*-Bevölkerungen wurde durch die Anwendung der mathematischen Rechenmethode der Zentraltendenz gut hervorgehoben (Abb. 3 und 7).

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KURT EHRENBERG, *Über Grenzen und Gliederung der Speläologie.* « *Die Höhle*, Zeitschrift für Karst- und Höhlenkunde », 13. Jahrgang, Heft 1, März 1962.

Par cet ouvrage, le spéléologue autrichien fait ressortir clairement la complexité de la Spéléologie comme discipline synthétique telle que la Limnologie, l'Océanographie, etc. Il nous signale aussi l'intérêt croissant pour ce domaine qui en Autriche a fait l'objet de trois congrès internationaux successifs et où, au dernier, tenu à Vienne, avec la participation, entre autres, des délégués de l'Institut de Spéologie « Emil Racoviță », les débats ont porté non seulement sur la terminologie spéléologique courante, mais aussi sur le nom exact de cette discipline comme science indépendante, à savoir Spéléologie ou Spéologie. Quant à lui, il se prononce en faveu du premier terme comme étant le plus habituel, l'emploi du second se résumant à quelques pays.

D'aucuns faisant de la Spéléologie un simple chapitre de la Karstologie, en étroite connexion avec la Géologie et la Géomorphologie, l'auteur s'oppose à cette interprétation car — tout en admettant que la majorité des grottes soient des phénomènes karstiques — il souligne que les grottes primaires, c'est-à-dire les soi-disant « grottes de lave » des roches magmatiques, les « grottes de récifs » d'origine organogène et nombre de « grottes à tuf » n'ont aucun rapport avec le phénomène karstique. D'autant plus que les grottes n'étant pas des espaces vides, elles contiennent toujours des éléments solides ou liquides comme la glace, le guano, des restes fossiles, des objets préhistoriques ou archéologiques, etc. qui eux n'ont rien à voir avec les dits phénomènes.

« Ein völliges Subsumieren der Speläologie — remarque l'auteur — unter den Begriff Karstforschung, eine Eingliederung jener in diese scheint also ohne unzulässige Überdehnung des Begriffes Karstforschung ausgeschlossen, und die Auffassung, dass die Speläologie nur einen Ausschnitt aus dem grossen Gebiete der Karstforschung darstelle (s.o.) muss daher als unzutreffend endgültig abgelehnt werden ».

Ensuite, il expose en premier lieu la classification de la Spéléologie selon Waldner : I. *Spéléologie spéciale* (1. découverte, 2. exploration, 3. ouverture) et II. *Spéléologie générale* : 1. Spéléologie théorique (*a.* historique de la Spéléologie ; *b.* Spéléographie ; *c.* Spéléotopographie ; *d.* Spéléomorphologie ; *e.* Spéléogenèse ; *f.* Spéléobiologie ; *g.* Spéléologie culturelle-historique). 2. Spéléologie pratique. 3. Spéléologie économique.

En second lieu suit la division plus simple de Trimmel : I. Généralités ; II. Spéléologie théorique (1. Géospéléologie, 2. Biospéléologie, 3. Anthropospéléologie) ; III. Spéléologie appliquée ; IV. Spéléologie pratique ; V. Spéléologie régionale ; VI. Grottes artificielles.

Ces deux classifications de la Spéléologie sont également rejetées par l'auteur, la première pour la manière inadéquate de l'emploi des termes « spécial » et « général » et la seconde pour son point de vue exclusivement pratique.

Pour obvier à ces inconvénients il propose une nouvelle classification, la sienne, bien plus précise et plus complète :

I. *Spéléologie technique* : 1. Prospection des grottes [descentes dans les grottes (équipement), moyens d'éviter les accidents]; 2. Mesurage des grottes; 3. Fouille des grottes; 4. Spéléophotographie.

II. *Spéléologie historique* : 1. Historique de la Spéoléologie; 2. Personalia; 3. Organisation des recherches spéléologiques.

III. *Géospéléologie* : 1. Spéléographie; 2. Spéléotopographie; 3. Spéléologie régionale; 4. Spéléomorphologie; 5. Spéléogenèse; 6. Spéléohydrologie; 7. Spéléométéorologie; 8. Spéléocryologie; 9. Concrétions et autres formations minéralogiques; 10. Sédiments.

IV. *Biospéléologie* : A. Spéléologie néobiologique (1. Spéléologie écologique, 2. Spéléologie zoologique, 3. Spéléologie phytologique). B. Spéléologie paléobiologique (1. présence et conservation des restes fossiles des grottes, 2. Spéléologie paléoécologique, 3. Spéléologie paléozoologique, 4. Spéléologie paléophytologique).

V. *Anthropospéléologie* : 1. Découvertes anthropologiques dans les grottes; 2. découvertes préhistoriques dans les grottes; 3. les grottes, les animaux et l'homme dans les temps préhistoriques; 4. les grottes et l'homme préhistorique; 5. mythologie des grottes; 6. inscriptions des grottes; 7. noms des grottes.

VI. *Spéléologie appliquée* : 1. Les grottes et le karst; 2. économie des eaux des grottes; 3. dépôts des grottes; 4. autres emplois des grottes, grottes aménagées, grottes artificielles; 5. législation en rapport avec les grottes et la protection des grottes. Peut-être aurait-il fallu mentionner aussi la Spéléothérapie.

Cette classification prouve que la Spéléologie est une discipline fort complexe, telle que l'a conçue Racovitza.

Certes, la systématique d'Ehrenberg est valable pour les données actuelles des connaissances spéléologiques. A l'avenir elle pourra s'améliorer, voire se modifier, selon les progrès continuels réalisés par la Spéléologie.

C. Motaș

Ю. А. АБДУРАХМАНОВ, Рыбы пресных вод Азербайджана (The fresh-water fish of Azerbaidjan). Изд. Академии Наук Азербайджанской ССР, Baku, 1962.

After a brief introduction and a historical survey of ichthyological investigations in the S.S.R. Azerbaidjan (10 pages), the author gives a description of the local fresh-water fish species in view of their zoological classification. A number of 58 species (7 of which are represented by 2—3 subspecies) belonging to 39 genera and 15 families are described. The family represented by the largest number of species is that of the *Cyprinidae* (20 genera, 31 species). Two of these species have been introduced into the water courses of Azerbaidjan : *Gambusia affinis holbroocki* and *Mugil auratus*. A new subspecies is described : *Noemacheilus angorae lenkoranensis*. The description of each species includes : the scientific, Russian and Azerbaidjan names, a list of synonyms, a detailed description of the characters accompanied by biometrical tables (in a series of species the biometrical data are recorded separately for the specimens

of the various river drainages), biological data (migration, growth rate, reproduction, food), comments on economic importance. These detailed descriptions are all the more valuable as some of the fish species under discussion (*Gobio ciscaucasicus, Rutilus atropatenee*) were very little known both from the systematical and biological points of view.

It should be noticed that the author lists *Chondrostoma schmidti* as a synonym of *Ch. cyri*. In his survey of the ichthyofauna of the Azerbaidjan S.S.R. the author includes besides the fish of the Kura basin also those living in the rivers situated north of the main Caucasian chain (e.g. *Chondrostoma oxyrhynchum, Barbus ciscaucasicus*, a.o.) On the other hand, he does not discuss the species living in the Kura basin outside the Azerbaidjan S.S.R. (e.g. the endemic genus *Leucalburnus*). The book closes by three synthetic chapters concerning the distribution of fish in the river drainages of Azerbaidjan (pp. 346—359), the origin of the Azerbaidjan ichthyofauna (pp. 362—376) and the biology of reproduction in fish (pp. 377—392).

We agree with the opinion of the author that most of the fish species in Azerbaidjan, and in the Mediterranean European-sub-region generally, originate from the tertiary fauna of Siberia, while the genera *Barbus* and *Varicorhinus* are of southern origin.

This is a fundamental book on the fish species of Azerbaidjan which is all the more valuable as the fresh-water fish of northern Caucasia and Transcaucasia were hitherto much less studied than those of other areas of the Soviet Union.

Petru Bănărescu

Code International de la Nomenclature Zoologique adopté par le XV^e Congrès International de Zoologie, publié pour la Commission Internationale de la Nomenclature Zoologique par le Trust International pour la Nomenclature Zoologique, Londres, 1961, pages I—XVIII + 1—176.

Le travail est rédigé, parallèlement, en anglais et en français; il est spécifié que les deux textes parallèles « sont équivalents en force, signification et autorité ».

La publication de ce volume, qui remplace toutes les publications similaires plus anciennes, représente un événement de grande importance dans l'histoire de la zoologie, marquant une étape décisive dans la solution de l'épineux problème de la nomenclature zoologique. Représentant le résultat de l'effort prodigieux accompli par le Comité Editorial du XV^e Congrès International de Zoologie (Londres, 1958), par la Commission Internationale de la Nomenclature Zoologique et par une série de comités et sous-comités ayant eu pour tâche l'élaboration de divers aspects du problème, le Code offre pour la première fois un instrument complet, rigoureux et en même temps assez élastique, à tous ceux utilisant dans leur travail des noms zoologiques.

Nous allons extraire de la préface et de l'introduction du Code quelques passages pouvant donner un aperçu sur les buts qu'il s'est proposé d'atteindre et sur les méthodes utilisées.

"... the Code recognizes none as paramount to its fundamental aim, which is to provide the maximum universality and continuity in zoological nomenclature compatible with freedom in taxonomic practice. It seeks to provide the name which every zoologist, now and hereafter, under whatever circumstances may be imposed by his personal taxonomic judgement, shall apply to any given taxon. It especially seeks to provide that, under the same circumstances, that name shall remain permanently the same".

"The Code refrains from infringing upon taxonomic judgement, which must not be made subject to regulation or restraint".

"The failure of the Code to deal with names of higher rank than superfamily or of lower rank than subspecies arises from no failure to recognize the necessity of such names. It exists because the practice of zoologists in regard to them is not sufficiently uniform to permit the formulation of rules covering them at this time".

"Conceiving nomenclature rules as tools useful only to the point where they provide the maximum stability compatible with taxonomic freedom, certain measures have been adopted to prevent them from becoming tyrannical...".

"... the... Code will give zoologists improved means to approach the naming of the several million more animal species on the planet than the present approximately million and a quarter with which taxonomists today deal".

Le volume comprend le Code proprement dit, les Appendices et le Glossaire.

Le Code proprement dit se compose d'un préambule suivi de 87 articles, groupés par sujets en XVIII « Titres ». Les titres sont les suivants : I. De la nomenclature zoologique ; II. Du nombre de mots dans les noms zoologiques ; III. Des critères de publication ; IV. Des noms utilisables ; V. De la date de publication ; VI. Des noms valides ; VII. De la formation et de l'émendation des noms ; VIII. Des taxa du groupe-famille et de leurs noms ; IX. Des taxa du groupe-genre et de leurs noms ; X. Des taxa du groupe-espèce et de leurs noms ; XI. De l'auteur ; XII. De l'homonymie ; XIII. Du concept de type ; XIV. Des types dans le groupe-famille ; XV. Des types dans le groupe-genre ; XVI. Des types dans le groupe-espèce ; XVII. De la Commission Internationale de la Nomenclature Zoologique ; XVIII. Règlements régissant le présent Code. Les 87 articles consistent en règles obligatoires ; un article peut se composer d'un unique paragraphe ou comporter des sections et des sous-sections subordonnées. Des recommandations sont adjointes aux articles ; les recommandations indiquent la meilleure procédure à suivre dans les cas qui ne sont pas couverts par la stricte application des règles.

Les appendices sont les suivants : A. Ethique ; B. Transcription et latinisation des mots grecs ; C. Latinisation des noms géographiques et des noms propres ; D. Recommandations sur la formation des noms ; E. Recommandations générales.

Le volume est complété par un glossaire et un index.

Je veux insister sur le fait que le Code ne doit pas être superficiellement feuilleté, mais bien étudié sérieusement et dans les menus détails par chaque zoologiste (néontologiste ou paléontologiste) utilisant dans son activité les noms zoologiques. Ce sont les Titres VII, VIII, IX, X, XII, XIII, XIV, XV, XVI, ainsi que les Appendices D et E qui méritent une lecture particulièrement attentive. Dans certains cas, en dépit de son style sobre et élégant, le Code n'est pas d'une lecture aisée. Mentionnons aussi que, si on le compare aux essais similaires plus anciens, le Code se caractérise par le niveau supérieur de la solution que trouvent des problèmes clef, comme ceux de la priorité, de l'homonymie, de l'émendation des noms, des types dans les trois « groupes » dont il est question (le groupe-famille comprenant la tribu, la sous-famille, la famille et la superfamille ; le groupe-genre comprenant le genre et le sous-genre ; le groupe-espèce comprenant l'espèce et la sous-espèce).

L'on peut espérer que, par l'application consciencieuse du Code, l'on obtiendra enfin l'unité en nomenclature zoologique, en évitant les innombrables erreurs de toute sorte que commettent dans leurs travaux certains zoologistes.

L. Botoşăneanu

И. Ф. ИВАНОВ и П. А. КОВАЛЬСКИЙ, *Гистология с основами эмбриологии домашних животных*, Moscou, 1963.

Les ouvrages *Общая гистология с основами эмбриологии домашних животных*, du professeur I. F. Ivanov et *Частная гистология домашних животных с основами эмбриологии*, du professeur P. A. Kovalskii, ont paru en seconde édition réunis dans un seul traité complexe de spécialité.

Compte tenu des succès obtenus en vue de la réalisation des méthodes de recherche, les auteurs ont modifié le contenu de plusieurs chapitres.

Les améliorations consistent dans l'introduction des plus récentes données sur la microscopie électronique, sur l'application des isotopes radioactifs, etc.

On a de même recherché et réussi à exposer d'une manière systématisée la multitude des problèmes soulevés par l'étude de l'histologie et de l'embryologie.

Ce livre, de 659 pages, contient 2 parties : l'une intitulée : « Histologie générale avec les fondements de l'embryologie » (360 pages) et l'autre « Histologie spéciale avec les fondements de l'embryologie » (220 pages).

Dans la première partie, après l'introduction, sont exposés les problèmes de la cytologie générale (avec les chapitres ayant trait aux propriétés physico-chimiques de la matière vivante, à la structure et à la physiologie de la cellule), de l'embryologie générale (cellules sexuelles et fécondation, étapes du développement embryonnaire) et à l'étude des tissus, pour laquelle sont consacrés 4 chapitres (notions générales des tissus, tissus trophiques et de soutènement, tissu musculaire, tissu nerveux).

La seconde partie comprend 8 chapitres destinés aux problèmes spéciaux du système nerveux, des organes des sens, de l'appareil circulatoire, des organes à sécrétion interne, etc.

L'ouvrage est illustré par 467 figures, bien choisies et parfaitement imprimées, formées par des schémas suggestifs, ainsi que des microphotographies en partie originales.

Un développement plus ample des chapitres de spécialité aurait été certainement souhaitable surtout pour les chercheurs, qui y auraient trouvé un guide précieux dans leur travail, mais il est probable que l'intention des auteurs n'a été que d'exposer d'une manière succincte les problèmes de base nécessaires aux étudiants pour mener plus loin leur activité scientifique.

Sous cet aspect, l'ouvrage correspond de tous les points de vue aux fins proposées.

E. Hîrlea

Entre le 7 et 28.VI.1963, Dinu Paraschivescu, de l'Institut de Biologie « Traian Săvulescu » de l'Académie de la R.P.R., a accompli un voyage dans la République Démocratique Allemande en vue de s'informer sur les problèmes de l'écologie expérimentale des insectes.

A cette fin il a visité l'Institut de Recherches Forestières de Eberswalde (Section de la Protection des Forêts contre les Ravageurs), l'Institut de Phytopathologie et de Culture des Plantes (Section d'Entomologie), etc.

Dans ces instituts, D. Paraschivescu s'est mis en relation avec les spécialistes et s'est informé sur les divers problèmes de l'écologie des insectes et tout spécialement sur les travaux concernant l'élevage de formicidés dans les conditions artificielles de laboratoire, de leur nutrition, du marcage des individus et de la colonisation des fourmis utiles.

De même, il a visité les riches collections des musées zoologiques de Berlin et de Dresde.