ODONATOLOGICAL ABSTRACTS

1971

(488) DEVAI, G., 1971. Die Libellen- (Odonata-) Fauna der toten Flussarme der Bodrog bei Sárospatak. Teil II. Acta biol. debrecina 7-8: 153-160. – *(Inst. Zool., L. Kossuth Univ., Debrecen-10, HU).*
A list of 41 spp., based on a collection of 4953 specimens, brought together from 1960 through 1968 at Sárospatak, Hungary.

(489) PAVLJUK, R.S., 1971. O zarazhennosti imaginal'noi stadii strekoz (Odonata) parazitami v usloviyah zapadnyh Ukrainy. (On the infestation grade of adult dragonflies [Odonata] by parasites in the western provinces of the Ukraine). Proc. XIII Int. Congr. Ent. (Moscow 1968) 2: 88-89. (Russian). – *(Dept. Invert. Zool., Lvov Univ., 4 Shcherbakov Str., 290005 Lvov, Ukraine, USSR).*
In 5220 examined specimens, referable to 47 odon. spp. the following parasites were found: Arrhenurus larvae, metacercariae, larvae of Tatria decacantha (Cestodes), solitary mermithid larvae. In the muscles of 14 spp. eggs were discovered of an unknown insect. For more common parasites maximal degrees of infestation are given.

(490) SAPKAREV, J.A., 1971. Contribution to the knowledge of macrozoobenthos from Katlanovo Marsh, Macedonia. Godišnji Zborn. Fac. Sci. Nat. Univ. Skopje (Biol.) 23: 19-23. – (In Macedonian, with Engl. s.). – *(Dept. Zool., Univ. Skopje, Gazi Baba, YU-91000 Skopje).*
A list is given of benthic macroinvertebrates collected in spring 1959 and 1960 at the Katlanovo Marsh near Skopje, Macedonia, Yugoslavia, including 3 odon. spp. (larvae), viz. Ischnura elegans, Lestes barbarus and Sympetrum sp.

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(491) AGUESSE, P. & P. TESTARD, 1972. L'importance du facteur alimentaire dans l'écologie des larves d'Odonates. Proc. XIII Int. Congr. Ent. (Moscow 1968) 3: 334-335. – *(Lab. Zool., Fac. Sci., Univ. Orléans, Château de la Source, F-45 Orléans).*
In the temperate zone, larvae of spp. dwelling in eutrophic environment pass, as a rule, all stages from hatching to imago within 3 months, while those inhabiting oligotrophic basins require more than one year to complete their development. It is shown experimentally, on the basis of Anax parthenope and Aeshna cyanea (as examples of respectively rapidly and slowly developing spp.) that the former possesses a high productivity, while in the latter it is low. The phenomenon is explained in terms of adaptation to the food availability in the biotope.

(492) ANDRIES, J.C., 1972. Remaniements de l'intestin moyen chez les Odonates au cours de la métamorphose. Bull. Soc. Zool. Fr. 97 (3): 377-385. – *(Lab. Biol. anim., Univ. Sci. Techn. Lille-I, B.P. 36, F-59650 Villeneuve d'Ascq).*

Studies concerning the reorganisation of the dragonfly midgut during metamorphosis were carried out on Aeshna cyanea. Both the imaginal midgut epithelium and the reticular tissue differentiate from the regenerative cells. In the case of the imaginal cells to be, differentiation involves cell growth and multiplication of the cell organelles present in the regenerative nidi. The main features of the reticular tissue are (1) the vacuolate appearance, (2) the well-developed membrane network, (3) the small number of mitochondria and Golgi bodies and the small amount of rough ER, (4) the presence of structures isolated from the normal cells of the tissue and enclosing more or less spherical masses of granular material, the latter surrounded by loops of ER. The larval epithelium shows typical histolysis at this time: formation of vesicles in the ER, changes in the mitochondria, and production of numerous autophagic structures.

(493) ASAHINA, S., 1972. Indian paddy field Odonata taken by Miss I. Hattori. Mushi 46 (10): 115-127. – (*Totsuka III-123, Shinjuku-ku, Tokyo, 160, JA*).
An annotated list is given of 56 spp. of 8 families, collected from 1970 through 1971. In addition, a comparison is made between the odon. faunas of the Indian and the Japanese rice fields.

(494) ASAHINA, S., T. WONGSIRI & A. NAGATOMI, 1972. The paddy field Odonata taken at Bangkhen, Bangkok. Mushi 46 (8): 107-109. – (*Totsuka III-123, Shinjuku-ku, Tokyo, 160, JA*).
A list of 14 spp. of the families Coenagrionidae and Libellulidae.

(495) BEESLEY, C., 1972. Investigations of the life history and predatory capacity of Anax junius Drury (Odonata: Aeschnidae). Thesis, Univ. California, Riverside, 114 pp. – (*Author's address unknown*). – Microfilm or xerox copy available (refer to Order No. 72-31, 484) at University Microfilms, Dissertation Copies, P.O.B. 1764, Ann Arbor, Michigan 48106, USA (for USA) and at University Microfilms Ltd., Tylers Green, High Wycombe, Buckinghamshire, UK (for Europe and others).
(Verbatim abstract from Diss. Abstr. 33, 6 [1972]: 2639-B): Laboratory growth and development of A. junius was shown to alter considerably with changes in ambient water temperature. Eggs that were oviposited in cold water (13-17°C) were slow to hatch, and the proportion hatching was less than that for those eggs oviposited in warm water (20-30°C): 40-50% compared to 87% hatch, respectively. Eggs were also found to survive a month of 5°C temperature with 30% hatch. The duration of the immature stages was reduced from 234 days at 21°C to an average of 60 days at 31°C. Not only was this duration reduced in time by the increased temperature, but the number of instars was reduced from 13 at 21°C to 11 at 31°C. Regardless of the ambient temperature, last instars were still the same length. Laboratory mortality at both temperatures was highest during the egg stage, first two instars and last instar. Mortality was considerably higher at 21°C than 31°C; only 32% of the naiads developed through to emergence at 21°C compared to 63% emergence at 31°C. In behavior tests larvae were found to rest frequently on vertical straws and were usually located in the lower half of the water. Larval orientation was commonly away from the surface of the water, i.e., their longitudinal axis was directed downward. Laboratory predation tests indicated that naiad food consumption increased with age or size and with an increase in water temperature. Larvae also increased their food consumption with increased prey density, although larval growth was not significantly altered with this increase in food consumption.
Field growth of larvae was comparable to that determined in the laboratory, with several naiads emerging within a total immature life cycle duration of 50 days. The sex ratio was also similar to that in the laboratory, approximately 50:50. Field predation tests reflected laboratory predation tests, where larvae increased their food consump-

tion with age and with increased prey density. Seasonal appearance of A. junius was similar to that reported on the Northeast Coast of North America. Migrant adults appeared in early summer and gave rise to one or two summer generations and a third, overwintering generation. Larvae were found to overwinter in all instars. Eggs were capable of tolerating desiccation for 24 hrs while in the stems of Echinochloa crusgalli (Barnyard grass: Gramineae) and up to a week in the stems of Oryza sativa (Rice: Gramineae). There was evidence of plant selection by ovipositing females, for eggs were not necessarily in the most abundant plant form at a particular site.

(496) BENKE, A.C., 1972. An experimental, field study on the ecology of coexisting larval odonates. Thesis, Univ. Georgia, 149 pp. – *(Dept. Biol., Univ. Georgia, Athens, Georgia 30601, USA)*. – Microfilm or xerox copy available (refer to Order No. 72-34, 041) at University Microfilms, Dissertation Copies, P.O.B. 1764, Ann Arbor, Michigan 48106, USA (for USA) and at University Microfilms Ltd., Tylers Green, High Wycombe, Buckinghamshire, UK (for Europe and others). (Verbatim abstract from Diss. Abstr. 33, 7 [1973]: 3036-B): An association of dragonfly larvae was studied for three consecutive years in an old farm pond in South Carolina, USA. A descriptive and an experimental field study were combined to examine aspects of interspecific interactions between coexisting odon. spp.

The descriptive study was based upon quantative benthic samples which were collected every 2-4 weeks from June 1968 to March 1970. All of the common spp. were members of the family Libellulidae. Larval development curves, larval survivorship curves, and food preferences were determined for the dominant spp., Ladona deplanata, Celithemis fasciata, and Epitheca spp. Emergence and adult flight patterns were determined for the dominant spp. as well as for other common spp. including Libellula incesta, Perithemis tenera, Celithemis ornata, Lepthemis simplicicollis, and Pachydiplax longipennis.

All of the common spp. were univoltine, and the dominant spp. as well as a few of the other spp. had a synchronous development. Those spp. with similar microhabitats and food preferences were found to be temporally separated in their life histories, as seen from larval development, emergence patterns, and flight patterns. Odon. were categorized into two somewhat distinct groups called "Early" (emerging), and "Late" (emerging), based upon their temporal separation.

Survivorship curves for Epitheca spp., Ladona deplanata, and Celithemis fasciata showed a constant percentage loss throughout time. Mortality was between 90-95% per annum for most spp. each year. This constant numerical decline was coupled with a dramatic increase in total biomass for each species. Temporal separation between spp. contributed to a wide size distribution throughout the year for the odon. group as a whole. Total odon. standing crop was on the average over 2 gm dry wt/m^2, with a maximum in late fall and a minimum in the spring. This represented a standing crop over twice that of the prey of Odon. Total odon. annual production using Allen curve estimates was about 9 gm/m^2.

In order to examine the importance of the interspecific relationships described in the first part of this study, a field experiment was designed in which odon. spp. composition was manipulated. Ten contiguous 4 x 4 meters pens were constructed along the northern shore of the pond. The occurrence of Early or Late species within a given pen was managed by covering specific pens with screen covers to prevent egg-laying of adults during their respective flight seasons.

The experimental manipulations resulted in highly significant initial densities for each treatment. Differences in survivorship between treated and untreated pens for the Early spp. indicated a density-dependent mortality for Odon. The presence of Early spp. had a significant inhibiting effect on both numbers and total biomass of Late spp. However, differences in dragonfly densities had no apparent effect on the density of non-odonate prey.

The combined results of descriptive and experimental studies lead to the following conclusions: (1) Niche differences between the dominant odonate spp. were distinct, but greatly overlapping, suggesting that interspecific interactions are likely to be significant within the group; (2) Field experiments showed that interactions between odon. spp. which are temporally separated are important in maintaining the relative abundance of spp.; (3) Experimental results suggest that odon. mortality is density-dependent, and numbers are limited by substrate availability (hiding places) rather than food; (4) Actual consumption of prey by Odon. in the field is only a small proportion of their potential consumption, and the prey populations are apparently saved from annihilation by hiding places, protective cases, etc.; (5) Given high odon. production and low standing crop of their prey, prey turnover ratios were shown to be extremely high.

(497) BUCCIARELLI, I., 1972. Interessanti reperti in Basilicata. (IV Contributo alla conoscenza degli Odonata). Boll. Soc. ent. ital. 104 (4-5): 86-87. – *(Mus. Civ. Stor. Nat., Corso Venezia 55, I-20121 Milano)*.
Annotations on 2 spp., collected in June, 1971 at the Remmo lake, nr. Lagonegro, Potenza, Italy (alt. 1500 m) are given. The most noteworthy record is that of an immature ♀ of Cordulia aenea. This is by far the southernmost record of this sp. in Italy. The Remmo lake is situated some 1000 km south of the hitherto known Italian limit of distribution of C. aenea. Since the general aspect of the odon. fauna of the lake also gives the impression of a fauna of a northern Italian locality, it is suggested, that the Remmo odon. fauna may be of a pleistocene relic character.

(498) CAMPANELLA, P.J., 1972. The evolution of mating systems in dragonflies (Odonata: Anisoptera). Thesis, Syracuse Univ., 284 pp. – *(Dept. Biol., Syracuse Univ., Syracuse, N.Y., USA)*. – Microfilm or xerox copy available (refer to Order No. 72-9507) at University Microfilms, Dissertation Copies, P.O.B. 1764, Ann Arbor, Michigan 48106, USA (for USA) and at University Microfilms Ltd., Tylers Green, High Wycombe, Buckinghamshire, UK (for Europe and others). (Verbatim abstract from Diss. Abstr. 33, 10 [1973]: 4766-B): The behavioral ecology of Plathemis lydia (Drury) and Libellula luctuosa (Burm.) (Anisoptera) was studied in upstate New York, USA. Both spp. were territorial, but not in the usual sense of single males maintaining an exclusive area. Rather, the territories were traditional areas utilized by more than one male for the purpose of mating. All ♂♂ on the area interacted aggressively with each other within the framework of a dominance hierarchy and each individual appeared to recognize and maintain the integrity of the territorial boundaries. The organizational system allowed conspecific trespassers which showed submissive behavior within the defended area. In each species the dominant male had an advantage, relative to the subordinate conspecifics at the site, in clasping and copulating with ♀♀ which flew into the area. The dominance hierarchy on a traditional mating area specifically ordered reproductive competition among ♂♂ and appeared to increase the reproductive efficiency of the dominant ♂. This type of organization is referred to as a temporal lek. Temporal is used to suggest a system where several males co-occur at one point in space, and the temporal appearance of a male on that site within the day is determined by his relative dominance. This type of system may be contrasted to a lek system where the males are located on many contiguous territories and the spatial position of a male at any one time is determined by his relative dominance. The use of temporal also points out the contrast between rapid replacement of dominants within the day as opposed to long maintenance of an area as is common on many mammal or bird leks.
It is suggested that the evolution of species specific mating strategies in Odon. is related to at least three factors: (1) the spatial distribution of resources or factors determining

appropriate places to mate and/or oviposit, (2) the characteristic rate of arrival of ♀♀ to these sites and (3) the energy available to a male for defense of the mating area.
P. lydia differentially utilized restricted areas of the ponds and ♀♀ occurred in a predictable daily time period. L. luctuosa showed no differential usage pattern at either pond and females were both spatially and temporally unpredictable. Libellula had a longer life span than Plathemis. The organization of the leks in the two spp. was different in that Plathemis ♂♂ defended only one site at the pond while Libellula ♂♂ defended several areas. Further differences existed in the time spent at each site and the relative abilities of the 2 spp. to re-establish dominance during the day. Plathemis individuals rarely left the patrolled area unless they were displaced by more aggressive ♂♂. Once they left they seldom returned to the site that day. Libellula ♂♂ alternated their time between perching and flying and ♂♂ re-established their dominance numerous times within the day.
The evolution of mating strategies is explained in terms of natural selection acting on individuals who minimize the ratio between energy expended per amount of genetic contribution to future generations (Cf. also *OA* No. 363).

(499) ERIKSSON, U., 1972. The invertebrate fauna of the Kilpisjärvi area, Finnish Lapland. 3. Odonata. Acta Soc. Fauna Flora fenn. 80: 41-43. – (*Moisö, SF-02380 Svinö*).
This is a partial report on the insect fauna of the Kilpisjärvi area in the northwest of Finnish Lapland. The 5 spp. listed are: Aeshna coerulea, A. juncea, Somatochlora arctica, S. alpestris and Leucorrhinia sp. Save for A. juncea and Leucorrhinia sp. (that were found in larval stage only), all spp. were recorded in adult and larval stage. Out of the 10 types of water bodies occurring in the area, the odon. larvae were recorded in 3 types only. Detailed collection data are presented for each sp.

(500) FISCHER, Z., 1972. The energy budget of Lestes sponsa (Hans.) during its larval development. Pol. Arch. Hydrobiol. 19 (2): 215-222. – (*Dept. Bioenerget. & Bioproductiv., Nencki Inst. Expl. Biol., Pasteura 3, Warsaw, PO*).
In order to obtain an energy balance estimation, daily food intake, respiration, and body caloric values of larvae of various ages (originating from a periodic pond nr. Warsaw, Poland) were measured. It was found that their cumulative energy balance during development is gradual and reveals no sudden shifts. Food assimilation is fairly low (about 40%), the gross index of ecological efficiency (K_1) can be considered as constant at about 20-30%. The net index of ecological efficiency (K_2) is high, particularly so during the inititial 6 days of life (90-80%); later on it falls down to about 70%. High values of the K_2 index can be probably accounted for by the low assimilation of food and small metabolic losses as the larvae move but little under excess of the available food. (Author).

(501) FURTADO, J.I., 1972. Reproductive behaviour and the phylogeny of the Odonata. Proc. XIII Int. Congr. Ent. (Moscow 1968) 3: 335-336. – (*School Biol. Sci., Univ. Malaya, Kuala Lumpur, Malaysia*).
So far the reproductive behaviour of 58 spp., referable to 9 families is known. An attempt is made to give a general classification of different patterns of odon. reproductive behaviour.

(502) GUHL, W., 1972. Neue symphorionte Peritriche von Libellenlarven. Zool. Anz. 189 (3-4): 273-277. – (*I. Zool. Inst., Univ. Erlangen, Universitätsstrasse 19, D-852 Erlangen, GFR*).
3 new spp. of Peritricha (Protozoa) are described and illustrated from collections in the Erlangen area, German Federal Republic, viz. Scyphidia glandti (from Lestes sponsa), Epistylis dreyeri (from L. sponsa and Coenagrionidae), and Opercularia jumpi (from Lestidae and Coenagrionidae). Each appears to be specialized to its particular

host(s) and does not occur on other substrates in the same biotope.

(503) JAHN, W., 1972. Ökologische Untersuchungen an Tümpeln unter besonderer Berücksichtigung der Folgen von Wasserverschmutzung durch Öl. Arch. Hydrobiol. 70 (4): 442-483. – *(Eckenhofstrasse 52, D-7230 Schramberg 11, GFR).*
The macroinvertebrate fauna of 13 ponds in the surroundings of Kiel, German Federal Republic, was analyzed in the course of 150 excursions during August-November, 1969 and March-December, 1970. The distribution of most spp. did not depend on the type or on the site of the pond. Ponds that dried up and refilled were immediately recolonized by indigenous spp. which had survived the drought in the bottom. This applies also to some Odon. When the water was polluted by fresh motor oil (BP-Energol HD SAE 30, produced by BP Benzin and Petroleum AG), many of the aquatic insects that have to come to the water surface in order to replenish their supply of air, to search for prey, or to moult were killed. The emerging zygopteran larvae were killed in great numbers. Though in some cases the ecdysis set in, the adults were unable to leave the exuviae.

(504) LAHIRI, A.R. & T.R. MITRA, 1972. A note on Acanthagyna dravida (Lieftinck) (Insecta: Odonata: Aeshnidae). J. Bombay Nat. Hist. Soc. 69 (2): 438-439. – *(Dept. Zool., Univ. Calcutta, 35 Ballygunge Circular Rd., Calcutta-19, India).*
The anal appendage of a ♂ from Calcutta, India, is described and illustrated. The specimen differs from other descriptions of this sp. by a differently coloured labium and a different nodal index.

(505) LIEFTINCK, M.A., 1972. Some features of amphipterygid larvae, primitive and adaptive (Odonata). Proc. XIII Int. Congr. Ent. (Moscow 1968) 3: 339-340. – *(Nwe Veenendaalseweg 224, Rhenen, NL).*
The archaic Amphipterygidae contain few genera and spp. with a scattered distribution in tropical South America, Africa and Asia. Morphological and anatomical characters of imago and larva of Amphipteryx and Rimanella (Neotropical), Pentaphlebia (Ethiopian) and Devadatta (Oriental), are compared, with special reference to the proventriculus of the larva and the development of a postero-median respiratory organ (gill tuft) in addition to three normal caudal abdominal lamellae. The gizzard in all of the 4 genera has 32 dentigerous fields. According to previous authors, in the extinct Odon. the number of such structures should have been more than 16. This archaic feature is retained in Amphipterygidae.

(506) OHNO, M., 1972. (Tramea virginia [Rambur, 1842] in the surroundings of Tokyo). Nature and Insects 7 (7): 28-29. (Japanese). – *(124 Ashiori, Tsurugashima, Iruma-gun, Saitama Pref., 350-02, JA).*
A note on T. virginea, which is a southern sp. and only occasionally found in the vicinity of Tokyo.

(507) SEVASTOPULO, D.G., 1972. Moth migration in East Africa (the long rains, 1970). Entomologist 105 (1315): 305-307. – *(c/o Dept. Zool., Univ. Manchester, Manchester-13, UK).*
2 specimens of Diplacodes lefebvrei coming to the lamp on April 29, 1970 in Mombasa, Kenya, are brought on record.

(508) TAKETO, A., 1972. Further notes on dragonflies and butterflies of the Ishikawa Prefecture. Life Study, Fukui 16 (1-2): 15-16. (Japanese, with Engl. translation of the title). – *(Dept. Biochem., School Medicine, Kanazawa, Ishikawa, 920, JA).*
Notes on Lanthus fujiacus Fraser, Somatochlora viridiaenea atrovirens Selys, Aeshna nigroflava Martin and Sympetrum frequens Selys.

(509) TAKETO, A., 1972. (Dragonflies taken in Fukuoka City). Life Study, Fukui 16 (1-2): 16. (Japanese). – *(Dept. Biochem., School Medicine, Kanazawa Univ., Kanazawa, Ishikawa, 920, JA).*

A note on odon. collected and/or observed at Fukuoka City, Fukuoka Prefecture, Kynchu, Japan, including Libellula quadrimaculata asahinai, Aeschnophlebia longistigma, Ictinogomphus pertinax (all taken), I. clavatus, Ceriagrion nipponicum and Tramea virginea (all seen only).

(510) WOODALL, W.R., Jr. & J.B. WALLACE, 1972. The benthic fauna of four small southern Appalachian streams. Am. Midl. Nat. 88 (2): 393-407. – (*Georgia Power Company, P.O.B. 4545, Atlanta, GA 30302, USA*).
Monthly quantitative samples of benthic organisms were collected from streams in 4 different watersheds in the Appalachi Mts, USA, from Aug. 1968 to July 1969. Each of the watersheds supports one of the following types of vegetation: old-field succession, hardwood forest, white pine forest, coppice forest. The kinds of organisms in the 4 streams are generally similar, but their relative importance varied significantly. Only 2 odon. spp. were recorded (Cordulegaster erroneus, Lanthus albistylus); they were found in all 4 streams. The importance value of L. albistylus was much greater in the white pine stream than in the other 3 streams. A Duncan's multiple-range test showed significant differences in the numbers of most taxa among watersheds. The old-field stream had the greatest abundance, while the coppice stream had the greatest standing crop biomass. Most of the differences are attributed to different inputs of allochthonous detritus.

(511) WARREN, G., 1972. All colour book of Art Nouveau. Octopus Books, London. 72 pp., 101 pls. (col.). – (Publisher's address: *59 Grosvenor Street, London W1, UK*).
This is a brief illustrated account of the Art Nouveau style. Reproductions of 2 famous Art Nouveau dragonfly ornaments by R. Lalique appear on pp. 15 and 16. One is a corsage ornament, consisting of a dragonfly with griffon's paws and a green female torso, made of gold, enamel, moonstones and chrysoprase stones. The other is a car mascot in the form of a resting dragonfly, designed to be fastened to the bonnet by a bronze base, beneath which was attached a multicoloured lighted disc. Dragonfly wings are also used in a bronze electric lamp, designed by H. Beau in the 1890s (p. 36), and styled zygopterans in a walnut and oak cabinet by L. Majorelle of about 1900 (p. 34).

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(512) ABSTRACTS OF PAPERS read at the Second International Symposium of Odonatology, Karlsruhe, 1973. Issued by the Societas Internationalis Odonatologica (S.I.O.). Karlsruhe, 40 pp. – (*c/o Dr. B. Kiauta, Inst. Genet., Univ. Utrecht, Opaalweg 20, Utrecht, NL*).
Abenante, Y.P. de: External morphology of Aeshna (Neureclipa) bonariensis Rambur; – *Adetunji, J.F. & M.J. Parr*: Colour changes and maturation in the common African libellulid Brachythemis leucosticta (Burmeister); – *Anderson, M. & R. Ness:* The status of Anax junius (Drury) in Minnesota (Title only); – *Andriès, J.C. & M. Mouze*: Action in vivo de l'α ecdysone sur la morphogenèse imaginale d'Aeshna cyanea (Müller); – *Asahina, S.*: Interspecific hybrids among the Odonata; – *Dumont, H.J.*: A discussion of the west palearctic species of Platycnemis; – *Hamrum, C.I. & J. Peterson*: Reproductive behaviour of Minnesota Aeshna species; – *Heymer, A.*: Evolutionsbiologische und ethologische Untersuchungen an Epallage fatime (Charpentier) (Title only); – *Heymer, A.*: Freilandbeobachtungen an Calopterygiden und Chlorocyphiden im äquatorialafrikanischen Regenwald (Title only); – *Hinnekint, B.O.N.*: Preliminary research results about the colour forms of Ischnura elegans elegans (Vander Linden); – *Kaiser, H.*: Intraspezifische Agression, Territorialverhalten und Temporialverhalten bei Grosslibellen; – *Kapetanović, M.*: Soziologie und Zusammensetzung der Odonatenfauna in dem Fischteich Seničani, Bosnien, Jugoslawien; – *Kiauta, B.*:

Intraspecific karyotypic variability in some oriental dragonflies; – *Macan, T.T.*: Twenty generations of Pyrrhosoma nymphula (Sulzer); – *Mill, P.J. & R.S. Pickard*: The role of abdominal muscles in ventilation and swimming in aeshnid larvae; – *Mouze, M. & J.C. Andriès*: Action in vivo de la β ecdysone sur la morphogenèse imaginale d'Aeshna cyanea (Müller); – *Mouze, M.*: Croissance et régénération de l'oeil de la larve d'Aeshna cyanea (Müller); – *Norling, U.*: Studies on the life histories of some Aeshna species; – *Olesen, J.*: Some problems in the prey capture of anisopteran larvae; – *Pandian, T.J. & S. Mathavan*: Energy balance in the tropical dragonfly Diplacodes trivialis (Rambur); – *Parr, M.J. & M. Parr*: Studies on the behaviour and ecology of Nesciothemis nigeriensis Gambles; – *Paulson, D.*: The adult Odonata community at a tropical pond; – *Paulson, D.*: The annual cycle of Odonata at a seasonal tropical pond; – *Paulson, D.*: The seasonal cycle of Anax junius (Drury); – *Paulson, D.*: Species and sex recognition in damselflies; – *Pellerin, P. & J.-G. Pilon*: Etude du cycle de Lestes eurinus Say en milieu artificiel; – *Schaller, F.*: Nouveaux aspects du contrôle hormonal du cycle biologique des Odonates: recherches sur la larve d'Aeshna cyanea (Müller); – *Testard, P.*: Observations sur l'écologie des larves de Mesogomphus genei Selys en Espagne et au Tchad; – *Westfall, M.J., Jr.*: Taxonomic relationships of some North American species of Gomphus; – *Jurzitza, G.*: Behaviour of adult Chalcolestes viridis (Vander Linden). A photographic documentation; – *Paulson, D.*: Slide program on nearctic and neotropic dragonflies (Title only); – *Pfau, H.K.*: Slide program on dragonflies of tropical Africa (Title only); – *Sandhall, A.*: Some dragonflies from Northern Europe. [Slide program]. (Cf. also *OA* Nos. 530 and 531).

(513) AKRAMOWSKI, N.N., 1973. Novyi obshchebiologicheskyi i entomologicheskyi zhurnal "Odonatologica". Journal of the Societas Internationalis Odonatologica. (A new general biological and entomological journal "Odonatologica". Journal of the Societas Internationalis Odonatologica. Zh. obsh. biol. 34 (2): 319. (Russian). – (*Inst. Zool., Armenian Acad. Sci., Paruyr Sevak Str. 7, 375044 Yerevan, Armenian SSR, USSR*).
A brief indication is given of the publication program of the new periodical, and the first issue of the first volume is reviewed.

(514) ALI KHAN, B., 1973. The copulatory complex of Hemianax ephippiger (Burmeister) (Aeshnidae: Anisoptera). Zool. J. Linn. Soc. Lond. 52 (1): 1-7. – (*Zool. Dept., Agra Coll., Agra-2, U.P., India*).
Like other Anisoptera, H. ephippiger bears 2 sets of copulatory apparatuses. The first, which is primary, is located on the ventral surface of abdominal segment IX and consists of vestigial penis, gonocoxites, supra-anal appendages and infra-anal appendage. The supra-anal appendages are well-developed and lanceolate with serrate margin and spinous apices. They are flattened dorso-ventrally and are furnished with long hairs and black teeth-like tubercles. The secondary copulatory complex is lodged inside the membranous fossa on the ventral surface of abdominal segments II and III. It consists of anterior lamina, posterior lamina, supporting framework, hamules, penis sheath, penis vesicle and penis. The anterior lamina is deeply cleft at the posterior margin to accommodate the ovipositor of the ♀ during copulation. Both portions of the supporting framework are well-developed; the anterior portion is somewhat rectangular, the posterior nearly U-shaped. The anterior hamules are well-developed, with truncated and hooked portions, while the posterior are very much reduced. The penis sheath is forcipate, with a well-developed rectangular flap which hangs over the penis. The penis is stout, is clearly demarcated into 3 segments and bears a prominent groove in the mid-ventral line.

(515) BELYSHEV, B.F., 1973. Zoogeographical correlations in equatorial part of Atlantic countries on the grounds of distribution of dragonflies (Odonata, Insecta). Izv. sib. Otdel. Akad. Nauk SSSR, ser. biol., (1973)

10 (2): 109-114. (Russian, with Engl. s.). – *(Biol. Inst., Siberian Branch USSR Acad. Sci., Ul. Frunse 11, Novosibirsk-91, USSR).*
A brief comparison is made between the Ethiopian and Neotropical odon. faunas, based on Pinhey's catalogue for Africa, and on papers by Fraser, Needham and Racenis for S. America. Manuscript notes on the faunas of Venezuela and Colombia were furnished by J. Racenis and D.R. Paulson respectively.

(516) BELYSHEV, B.F., 1973. Extinct and dying out dragonflies and possible causes of the dying out of taxons. Problems of Evolution, Novosibirsk 3: 119-131. (Russian, with Engl. s.). – *(Biol. Inst., Siberian Branch USSR Acad. Sci., Ul. Frunse 11, Novosibirsk-91, USSR).*
Theoretical considerations on the process of extinction, based on the evidence available for dragonflies.

(517) BELYSHEV, B.[F.], 1973. Pochemu leteli strekozy? (Why dragonflies were migrating?) Vecherniy Novosibirsk 1973, 164 (4719): 1 p. (issue of June 16, 1973). (Russian). – *(Biol. Inst. Siberian Branch USSR Acad. Sci., Ul. Frunse 11, Novosibirsk-91, USSR).*
A popular article in a daily newspaper (editors' answer to a question by a reader) on the Libellula quadrimaculata migration, observed in Novosibirsk, USSR, on June 10, 1973. This was one of the scarce, large migrations: 57-220 specimens were crossing a line of 10 metres per minute. The direction in the town was accidental, caused by the urbane configuration. In the area of the Gusinobradskiy Zhilmassiv, however, the migration followed the South-North direction. The causes of dragonfly migrations in general are briefly discussed.

(518) BELYSHEV, B.[F.], 1973. Raketa, kotoroiy polmiliarda let. (Half a billion years old rocket). Vecherniy Novosibirsk 1973, 198: 1 p. (issue of August 24, 1973. (Russian). – *(Biol. Inst., Siberian Branch USSR Acad. Sci., Ul. Frunse 11, Novosibirsk-91, USSR).*
A brief artistic sketch on dragonflies in a daily newspaper.

(519) BUTZ, W., 1973. Odonaten als ökologische Indikatoren für saarländische Landschaften. Abh. Arbeitsgem. tier.- u. pflanzengeogr. Heimatsf. Saarland 4: 52-67. – *(Hauptstrasse 31, D-6691 Mainzweiler, GFR).*
A detailed chorogeographical and ecological analysis is given of the odon. fauna (31 spp.) of the Federal State of Saarland, German Federal Republic. It is accompanied by distributional maps for all spp. Various types of biotopes are analyzed and the conclusion is drawn that there exists a clear causal relation between the odon. fauna on one side, and the landscape quality on the other. It is suggested that the knowledge of the ecological valence of single spp. occurring at a certain locality, can be used as indicator of the local synergism.

(520) COUNCE, S.J., 1973. The causal analysis of insect embryogenesis. In: S.J. Counce & C.H. Waddington (Eds.), Developmental Systems: Insects. Vol. 2, pp. 1-156. Academic Press, London-New York. – *(Dept. Anat. and Zool., Duke Univ., Durham, N.C., USA).*
This is a comprehensive survey of the subject, divided into chapters on egg architecture, initiation of development, cleavage, dynamics of early development, establishment of the embryo, dynamics of later development, metameric organization, and biochemistry of development. Odon. are extensively referred to at appropriate places.

(521) DEFOSSEZ, A. & F. SCHALLER, 1973. Inhibition de la métamorphose de l'appareil copulateur mâle des larves d'Aeshna cyanea Müll. (Insecte, Odonate) par injection d'un mimétique de l'hormone juvénile. C.R. Acad. Sc. Paris (D), 276: 2051-2054, pls. 1-2. – *(Lab. Biol. anim., Univ. Sci. et Techn. Lille-I, B.P. 36, F-59650 Villeneuve d'Ascq).*
The metamorphosis of the copulatory apparatus of A. cyanea, which takes place in the course of the ultimate instar under in-

fluence of the moulting hormone, is controlled from the first days of this instar by the decrease in the level of juvenile hormone. This was concluded from experiments in which a mimic of juvenile hormone (farnesol methylic ester) was injected into ultimate instar larvae.

(522) DUMONT, [H.]J., 1973. Contribution à la connaissance des Odonates du Maroc. Bull. Soc. Sci. nat. phys. Maroc 52 (1972): 149-179. – *(Inst. Zool., Univ. Gent. Ledeganckstr. 35, B-9000 Gent)*.
49 spp. are recorded from Morocco, July-August, 1971. 5 are new to this country. For many, the distribution inside the country is defined in detail. The larva of Orthetrum trinacria is described. Data on the morphological variability of Platycnemis subdilatata and Ischnura saharensis are presented. The presence of several spp., recorded only once or twice from Morocco, is confirmed. A new colour-form of Ischnura pumilio is described. Coenagrion caerulescens is reported for the first time from a high-mountain environment. Ethological notes on some North-African endemics have been collected. (Author).

(523) HARWOOD, P.D., 1973. Nymph, damsel and dragon. Smithson. Mag. 4 (5): 45-51. – *(Box 346, Route 1, Ashland, Ohio 44805, USA)*.
A popular essay on dragonflies in general, with (mostly) large size colour photographs of Enallagma civile (mating), Argia moesta (mating), A. apicalis (mating), Tanypteryx hageni (♂, resting), Calopteryx maculata (♀, resting), Lestes rectangularis (♂, resting), Boyeria grafiana (exuvia), and Aeshna palmata (♀, emergence).

(524) HEYMER, A, 1973. Etude du comportement reproducteur et analyse des mécanismes déclencheurs innés (MDI) optiques chez les Calopterygidae (Odon., Zygoptera). Ann. Soc. ent. Fr. (N.S.) 9 (1): 219-254. – *(Lab. d'Ecol. Gén., Mus. Nat. d'Hist. Nat., 4 av. du Petit Château, F-91800 Brunoy)*.
The reproductive behaviour of Calopterygidae is described, covering pre-copulatory behaviour (representation of the oviposition site, display flight and alighting on the ♀, transfer of spermatozoa in the ♂), copulation, post-copulatory behaviour, oviposition, the significance of supervision of the ♀ by the ♂ during oviposition. Ritualised behaviour, in the form of swaying of the abdomen and taking up of the defence positions, is also described. Experiments in nature showed that Calopteryx spp. are capable of colour-perception and Gestalt-perception. (Cf also *OA* No. 309).

(525) HEYMER, A., 1973. Das hochspezialisierte Beutefangverhalten der Larve von Cordulegaster annulatus (Latr. 1805), eine ökologische Einnischung (Odonata, Anisoptera). Rev. Comp. Animal 7 (2): 103-112. – *(Lab. d'Ecol. Gén., Mus. Natl d'Hist. Nat., 4 av. du Petit Château, F-91800 Brunoy)*.
The larva of C. annulatus (= C. boltoni) does not actively search for food in its environment (flowing water), but passively awaits its arrival. For this purpose, it burrows into the substrate so that only the forelegs, the head with its small pedunculate eyes and the tail-spines are left protruding. Under experimental conditions, larvae with adequate food supply were relatively firmly attached to their sites, whilst those with inadequate food supply frequently altered their locations. The larvae leave their retreats briefly for moulting. Prey animals are perceived by sight, as has been demonstrated with experiments involving manipulations of objects outside the aquarium. The survival value of burrowing and of the associated, highly-specialised predatory behaviour, is discussed. In this connection, 4 rheophil/limnobenthic dragon-fly larvae (Cordulegaster, Orthetrum, Gomphus and Onychogomphus) are compared with one another. It is shown how spp. which are potentially competitive in a given environment can co-exist on the basis of ecological niche separation and differentiation in the form of feeding behaviour. (Author).

(526) KIAUTA, B., 1973. Notes on new or little known dragonfly karyotypes. IV. Spermatocyte chromosomes of Calopteryx splendens (Harris) (Zygoptera: Calopterygidae), Gomphus pulchellus Selys, and Libellula depressa Linnaeus (Anisoptera: Gomphidae, Libellulidae) from northern France. Genen Phaenen 16 (2): 55-60. – (*Inst. Genet., Univ. Utrecht, Opaalweg 20, Utrecht, NL*).
Spermatocyte chromosomes of C. splendens splendens (n= 13), G. pulchellus (n = 12), and L. depressa (n = 13) from northern France (July, 1972) are described. An m-bivalent is present in all of them. G. pulchellus has not been previously studied cytologically. The French material of C. splendens splendens resembles the cytological conditions met with in a north Italian population of the subspecies caprai Conci, and deviates from the northern European population of the nominate form, in which the metaphase I elements are nearly uniform in size and which lacks m-chromosomes. In the metaphase I of the French L. depressa, 13 elements occur without exception, whereas only 12 were reported for the British and 12 and 13 for the Austrian material. (Author).

(527) KUMAR A., 1973. Description of the last instar larvae of Odonata from the Dehra Dun valley (India), with notes on biology. I. Suborder Zygoptera. Oriental Insects 7 (1): 83-118. – (*Forest Ent. Branch, Forest Res. Inst., Dehra Dun, U.P., India*).
The ultimate instar larvae of the following spp. are described, figured and keyed: Desparoneura campioni Fraser, Copera marginipes (Ramb.), Pseudagrion rubriceps Sel., P. laidlawi Fraser, Ceriagrion coromandelianum (Fabr.), Ischnura delicata (Hag.), I. senegalensis (Ramb.), Rhodischnura nursei (Morton), Agriocnemis pygmaea (Ramb.), Rhinocypha unimaculata Sel., Bayedera indica Sel., and Neurobasis chinensis chinensis (L.). Exhaustive notes on habitats, ecology, phenology and behaviour (all of larvae and adults) as well as on life history patterns and geographic distribution are added.

(528) KUMAR, A., 1973. Description of the last instar larvae of Odonata from the Dehra Dun valley (India), with notes on biology. II. Suborder Anisoptera. Oriental Insects 7 (2): 291-331. – (*Forest Ent. Branch, Forest Res. Inst., Dehra Dun, U.P., India*).
The ultimate instar larvae of the following spp. are described, figured and keyed: Anisogomphus occipitalis Sel., Burmagomphus sivalikensis Laidlaw, Mesogomphus lineatus (Sel.), Cordulegaster sp., (probably C. brevistigma [Sel.]), Macromia moorei Sel., Orthetrum sabina (Drury), Potamarcha obscura Ramb., Brachythemis contaminata (Fabr.), Sympetrum commixtum (Sel.), Trithemis aurora (Burm.), Zyxomma petiolatum Ramb., Tholymis tillarga (Fabr.), Pantala flavescens (Fabr.), and Tramea basilaris burmeisteri Kirby. Exhaustive notes on habitats, ecology, phenology and behaviour (all of larvae and adults) as well as on life history patterns and geographic distribution are added. Morphological adaptations in larvae in relation to their habitats are discussed in a special chapter.

(529) MITRA, T.R., 1973. Sympetrum tandicola Singh, 1955, a synonym of Pantala flavescens (Fabr.) (Odonata, Libellulidae). Ent. Rec. J. Var. 85 (1): 30-31. – (*Dum Dum Park, Calcutta-55, India*). S. tandicola described from Calcutta, India, is synonymized with P. flavescens (Fabricius, 1798).

(530) PROGRAM AND GENERALITIES of the Second International Symposium of Odonatology, Karlsruhe, 1973. Issued by the Societas Internationalis Odonatologica (S.I.O.). Karlsruhe, 36 pp. – (*c/o Dr. B. Kiauta, Inst. Genet., Univ. Utrecht, Opaalweg 20, Utrecht, NL*).
Contents: Symposium Officers, Symposium location, General information, Scientific programme, Societas Internationalis Odonatologica (incl. Agenda of the Business Meeting), Symposium . Dinner, Excursion to Black Forest, Post-Symposium tour to the island of Sardinia, List of Symposium participants and authors of contributed papers. (Cf. also *OA* Nos. 512 and 531).

(531) [SCHMIDT, E.], 1973. Symposium der Libellenforscher. Badische neuste Nachrichten, Karlsruhe 28 (221): 20 (issue of September 20, 1973). – *(Biol. Seminar, Pädagogische Hochschule, Mürwikerstr. 77, D-239 Flensburg, GFR).*
Text of the report released to the local press by the Organizing Committee of the Second International Symposium of Odonatology, held in Karlsruhe, German Federal Republic, on September 20-23, 1973. (Cf. also *OA* Nos. 512 and 530).

(532) SELYSIA, A Newsletter of Odonatology. Vol. 6, No. 1 (May 1, 1973). Compiled by M.J. Westfall Jr. and C. Johnson. – *(c/o Prof. M.J. Westfall Jr., Dept. Zool., Univ. Florida, Gainesville, Fla 32601, USA).*
Montgomery, B.E.: Observations on the spelling and gender of technical names in the Odonata; – *Kiauta, B.*: First European Symposium on odonatology; – *Gloyd, L.K.*: Additions to Calvert bibliography; – *Gloyd, L.K.*: A fantastical, hypothetical but logical (?) explanation of the origin of the dragonfly name Aeshna; – *Miscellaneous news* on current work and informative communications by D.R. Paulson, G.H. Bick, T.W. Donnelly, D. Cuyler and R.L. Willey; – *Bibliography* of the Odonata for 1970.

(533) SHALAPENOK, E.S. & E.B. PAVEL'EVA, 1973. Rol'lichinok strekoz v transformacii energii v litoral'noi zone ozera Naroch'. (The role of dragonfly larvae in the energy transformation in the littoral zone of the Naroch Lake). Vestn. Belorus. Univ., (II), 1973 (1): 41-45. (Russian). – *(Dept. Invert. Zool., Fac. Biol., Byelorussian Univ., 220080 Minsk, Byelorussian SSR, USSR).*
A quantitative characterization is given of the energy transformation in odon. larvae of the Naroch Lake, Byelorussia, USSR, and their role in the energy cycle is considered. Larval Odon. constitute 30% of the litoral benthos biomass (3 g/m^2). From a series of tests the formula, $Q = 0.326W^{0.84}$ (*1*), was obtained concerning the metabolism intensity of larvae, where Q is the oxygen consumption rate of one individual (in mg/h), and W is the wet weight in g for one individual. From another series of tests the daily ration of one individual was determined (in cal), $R = 0.298W^{0.88}$ (*2*). Hence, food assimilability was calculated by two formulas: $\frac{1}{u} = \frac{R - F}{R}$ (*3*), and $\frac{1}{u} = \frac{P + T}{R}$ (*4*), where F is energy content of food not assimilated by the individual, P is energy content of daily increase of the individual, T is daily energetic expenditure of metabolism calculated by means of (*1*). The mean assimilability was 92.5% when calculated by formula (*3*), and it was 58.6% by formula (4). The latter value seems to be more probable as the increase of odon. larvae received in the tests conforms to it best. This value was used to obtain the equation of average monthly production in the whole larvae association, $P = 0.073W^{0.926}$, where P is the production of the association (cal/d/individ.), W is its weight (cal). After finding P, the average monthly P/B-coefficient was calculated, where B is average monthly biomass. This coefficient was found to be decreasing from 2.68 in July, to 2.21 in August, and 1.35 in September. However, the energy flow through the association was governed by a different law. The greatest energy flow was observed in September (9.76 cal/m^2). This is explained by the hatching of new larvae and by flying out of imagines at that time, i.e. by the increase of the small-sized categories of larvae which have a more intensive metabolism and a more dense population.

(534) SPURIS, Z., 1973. Bemerkungen zur Odonatenfauna Rumäniens. Latv. Ent. 15: 78-80. – *(Inst. Biol., Latvian Acad. Sci., 229021 Salaspils, Latvian SSR, USSR).*
Annotations are given on a small collection (15 spp.) brought together from the end of August through the beginning of September, 1971, at various localities in Rumania. No sp. is new to the fauna, though Lestes viridis has been previously known from few Rumanian localities only.

(535) TORTONESE, E., 1973. Appunti faunistici relativi all'Isola di Rodi. Atti Mus. civ. Stor. nat. Trieste 28 (1): 269-280. – *(Mus.*

Civ. Stor. Nat., Genova, Italy).
A general review of the fauna of the Island of Rhodos, Greece. Adult and larval Odon. are mentioned from 2 localities, but no list of spp. is given.

(536) [VORONTSOV, N.N., (Ed.)], 1973. Belyshev Boris Fedorovich. Problems of Evolution, Novosibirsk 3: 307. (Russian). – (*Inst. Biol. and Pedol., Far-Eastern Scientific Centre, USSR Acad. Sci., Vladivostok-22, USSR*).
A brief biographic note on Dr. B.F. Belyshev, by the Editors of the journal (born 1910, graduated at the University of Leningrad, at present Senior Scientific Officer in the Biology Institute of the USSR Academy of Sciences, Novosibirsk).

(537) WHITE III, H.B. & W.J. MORSE, 1973. Odonata (dragonflies) of New Hampshire: an annotated list. New Hampshire Agric. Exp. Stat. Res. Rep. 30: III + 46 pp. – (*Dept. Chem., Univ. Delaware, Newark, Delaware 19711, USA*).
The seasonal and geographical distribution of Odon. within New Hampshire, USA, is compiled from available published and unpublished records. Of the 134 spp. now known from the State, the following 23 are reported for the first time: Hetaerina americana (Fab.), Nehalennia gracilis Morse, Coenagrion resolutum (Hag.), Enallagma geminatum Kell., E. laterale Morse, E. vernale Gloyd, Cordulegaster obliqua Say, Progomphus obscurus (Ramb.), Ophiogomphus carolus Needh., Gomphus descriptus Banks, G. furcifer Hag., G. scudderi Sel., G. spiniceps (Walsh), G. villosipes Sel., Somatochlora franklini (Sel.), Williamsonia lintneri (Hag.), Perithemis tenera (Say), Celithemis eponina (Drury), Libellula luctuosa Burm., L. needhami Westf., Pachydiplax longipennis Burm., Tramea lacerata Hag., and Pantala hymenaea (Say). Unpublished records of Odon. from Maine and Massachusetts, USA, are included where they add perspective to the known and potential odon. fauna of New Hampshire. A procedure for preserving color in fresh Odon. specimens is presented. (Authors).