

## ON A DRAGONFLY COLLECTION FROM SYRIA\*

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*Received July 3, 1980 / Accepted August 28, 1980*

Odonatological results of 3 excursions to the Middle East are summarised and the zoogeographic importance of Odonata in this area is discussed. *Ischnura evansi* Morton, *I. fountainei* Morton, and *Brachythemis fuscopalliat*a (Sel.) are new to Syria. In the Gāb rift valley (Orontes River), *Coenagrion l. lindeni* (Sel.) was found, rather than *C. l. zernyi* (Schmidt), described from northern Palestine. *C. puella syriaca* Morton is not regarded as bona species, but as a subspecies of *C. puella* (L.).

### INTRODUCTION

In 1977, 1978 and 1979 three excursions to the Middle East were made by the Institute of Zoology of the Johannes Gutenberg University, Mainz, under the direction of Prof. Dr. R. Kinzelbach. In the last two, the author had the opportunity to collect the Odonata that are dealt with in the present paper. Despite treatments of the local dragonflies by Morton and Schmidt, we have no comprehensive knowledge of the fauna of this area. Not only is the regional list of species still incomplete, but so is our knowledge of the distribution and zoogeographic relationships of the middle-eastern fauna. In recent years DUMONT (1972, 1973, 1974, 1975 & 1977) and ASAHINA (1973, 1974) have worked on these aspects. The present report aims at filling in some remaining gaps. For species common throughout the area, the collected material is here not specified.

\* Results of the travels of R. KINZELBACH to the countries of the Middle East, No. 15.

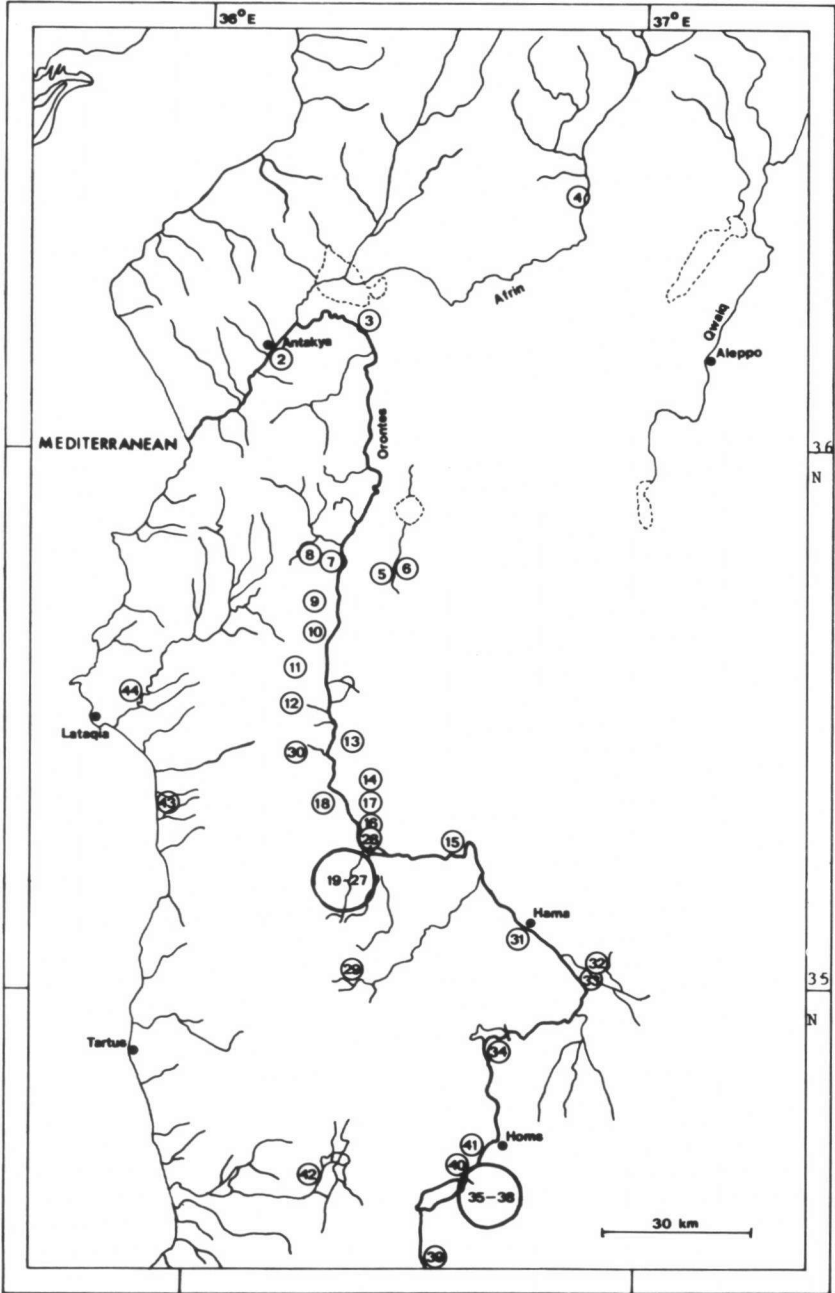


Fig. 1. Collecting stations in western Syria.

LIST OF COLLECTING POINTS  
(cf. Figures 1, 2)

Greece

- (1) Thessalonikis, 6 km S of Stawros, 29/08/78

Turkey

- (2) near Antakya, 09/04/79  
(3) Orontes near Demirköprü, 17/08/79

Syria

- (4) Nahr <sup>c</sup>Afrin, near <sup>c</sup>Afrin, 19/03/79  
(5) tributary of the Rūḡ, 20/03/79  
(6) river near the Rūḡ rift valley, 19/08/78  
(7) Orontes in Ġisr aš-Šuġūr, 21/03/79  
(8) Nahr al-Abyaḍ, left tributary of the Orontes, 21/03/79  
(9) W slope of the Ġāb, 22/03/79  
(10) W slope of the Ġāb, second of the rich karst springs, 22/03/79  
(11) W slope of the Ġāb, third karst spring, fish ponds of Šattqa, 22/03/79  
(12) Orontes river near <sup>c</sup>Ain Salimū, 22, 23, 25/03/79

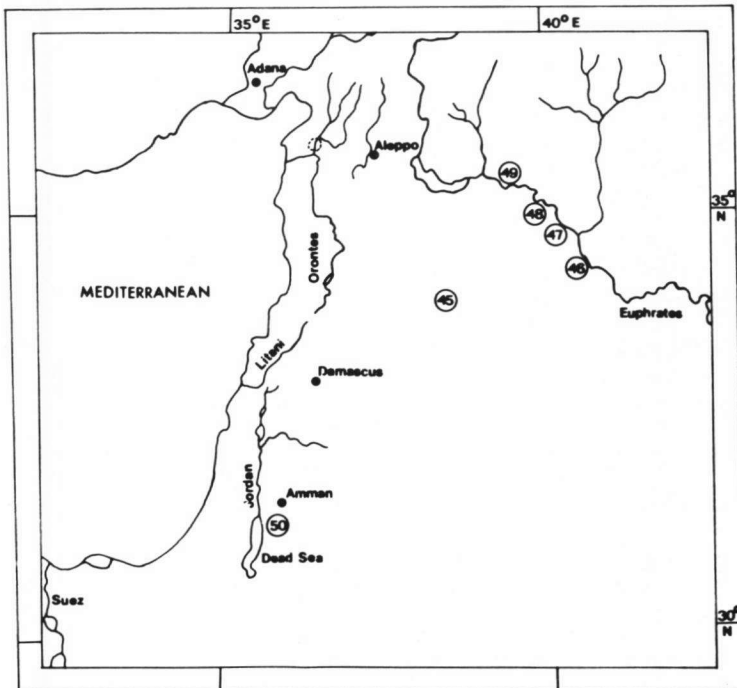


Fig. 2. Collecting stations in eastern Syria and Jordan.

- (13) E slope of the Ġāb, karst spring of ʿAin Ṭāqa, 08, 10/08/78; 25, 27/03/79
- (14) Qal ʿa al-Muḏīq, fisheries training centre, 08/08/78; 26/03/79
- (15) Orontes river near the bridge of Šaizār, 06/08/78; 27/03/79
- (16) Orontes near the bridge of al-Ḥansa, 30/03/79
- (17) irrigation and drainage ditch near Šaqalbiya, 08/08/78
- (18) Orontes backwater near ʿAin Karā'im, 08, 10/08/78
- (19) road ditches along the W slope of the Ġāb rift valley, near Masiyat Naba al-Fuār, irrigation channels and wetland, 30/03/79
- (20) Orontes backwater near Šaṣṣafiya, 11/08/78
- (21) main drainage channel NO of 20., 11/08/78
- (22) brook near Masiyat Naba al-Fuār, 30/03/79
- (23) karst spring 5 km S of 22., 30/03/79
- (24) rain water pond and drainage ditch near ʿAšarna 30/03/79
- (25) tributary to the Orontes river near ʿAšarna, 30/03/79
- (26) karst spring and small lake, tributating to the river of 25., W of Tall Salḥab, 31/03/79
- (27) Orontes backwater near ʿAšarna, 30/03/79
- (28) Orontes river 400 m downstream the barrage of ʿAšarna, 30, 31/03/79
- (29) brook in al-Baidan, S of Mašṣyaf, 11/08/78
- (30) Nahr Abū Qubais, 30/03/79
- (31) Orontes river in Ḥamā, 08, 09/08/78; 29/03/79
- (32) Wadi Salamiya near Kāfāt, E of Ḥamā, 29/03/79
- (33) Orontes river near Kāfāt, 29/03/79
- (34) Orontes river, bridge near ar-Rastan, 04/08/78
- (35) Lake of Homs, western outflow, 02, 03/08/78
- (36) Lake of Homs, near the roman dam, 02, 03/08/78
- (37) junction of the two outlets of the Lake of Homs, 03/08/78
- (38) Homs, canal near Qaṭṭina, 04/08/78
- (39) Orontes river near al-Quṣṣair, 01/04/79
- (40) Orontes river, N of the Lake of Homs, 01, 02/04/79
- (41) Orontes river, bridge over the road Homs - Ṭarṭūs, 05/08/78
- (42) Nahr al-Kabīr (South), bridge on the road al-Lādāqiyya - Ṭarṭūs, 20/08/78
- (43) karst spring near Ġabla, 06/03/79

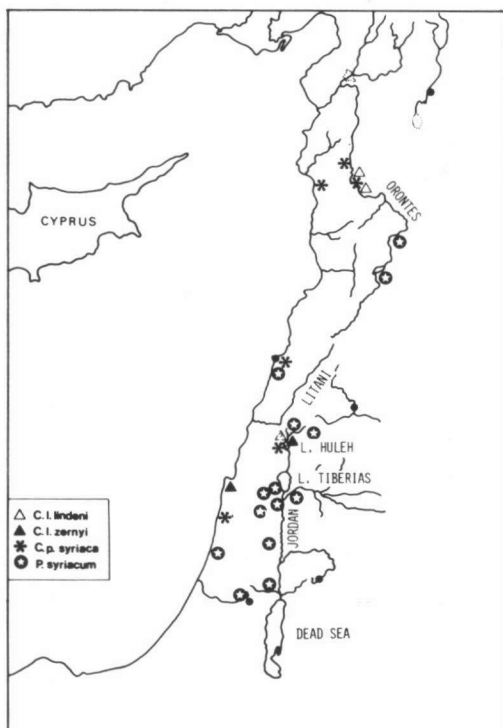


Fig. 3. Distribution of *Coenagrion l. lindeni* (Sel.), *C. l. zernyi* (Schmidt), *C. puella syriaca* (Morton), and *Pseudagrion syriacum* (Sel.) in the Middle East.

- (44) Nahr al-Kabīr (North), 10 km above al-Lāḏaqīyya, 20/08/78
- (45) Tadmur, ruins of Palmyra, 11/03/79
- (46) 50 km SE of Dair az-Zūr, mesohaline backwater of the Euphrates river, 14/03/79
- (47) 19 km SE of Dair az-Zūr, summer-dry pool, 13/03/79
- (48) backwater of the Euphrates river N of Dair az-Zūr, 15/08/78
- (49) backwater of the Euphrates river near Maḥḍān, 17/08/78

#### Jordan

- (50) hot springs (= Zarqā Maḥḍān), 15/03/77

### LIST OF SPECIES

#### *PLATYCNEMIS DEALBATA* (SELYS, 1863)

Widespread over Syria.

#### *COENAGRION LINDENI LINDENI* (SELYS, 1840)

Figure 3

1978: (21) 1 ♂ (juv.); — 1979: (13): 1 ♂.

It is remarkable that our specimens from Syria belong to the nominal form and not to the subspecies *C. l. zernyi*, which has been newly described by SCHMIDT in 1938 from northern Palestine (Khudeira, south of Haifa and from Lake Huleh). The easternmost location of the subspecies is Siwand (Iran, north-east of Lake Niris). None of the characters which have been described by Schmidt for *zernyi* apply to our specimens: in both of them the marking of the second abdominal segment reaches its anterior edge. The adult male of location (13) shows on its 10th abdominal segment the same colour pattern that has been found in central european specimens.

#### *COENAGRION PUELLA SYRIACA* (MORTON, 1924)

Figures 3-5

1979: (16): 3 ♂; (19): 2 ♂, 4 ♀; (43): 2 ♀.

The specimens are identical with Morton's syntypus (ex Coll. Ris, Senckenberg Museum, Frankfurt a. M., No. 10479) from Lake Huleh in northern Palestine. We do not agree with SCHMIDT (1954b) who regards it as a valid species, *Agrion syriacum*. The abdominal markings as well as the form of the male terminalia agree with those of the nominal form. Only the appendices inferiores are longer (Figs. 4-5). Just the latter character allows a definite identification of this subspecies.)

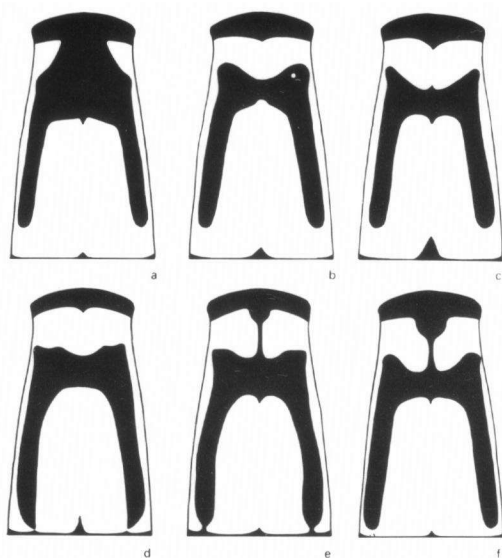


Fig. 4. *Coenagrion syriaca* (Morton), variability in the male second abdominal segment: (a-c) near al-Hansa, Syria, 30/03/1979; — (d-e) near Masiyat Naba al-Fuār, Syria, 30/03/1979; — (f) Morton's syntype, Lake Huleh, Palestine (coll. Ris, No. 10473).

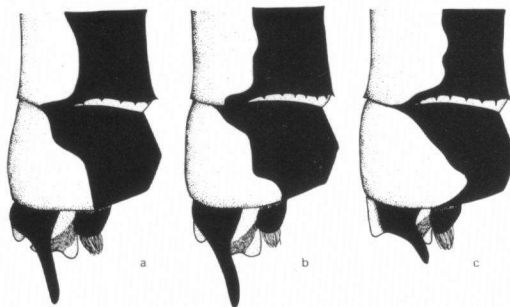


Fig. 5. *Coenagrion puella syriaca* (Morton) and *C. p. puella* (L.), lateral view of male terminalia: (a) *C. p. syriaca*, Morton's syntype, Lake Huleh, Palestine (coll. Ris, No. 10479); — (b) *C. p. syriaca*, Masiyat Naba al-Fuār, Syria, 30/03/1979; — (c) *C. p. puella*, Kaste-muni, Turkey, (coll. Ris, No. 30517).

*ISCHNURA ELEGANS EBNERI*  
SCHMIDT, 1938

All over Syria. As the inner branches of the appendices superiores in males are crossed, the specimens belong to the subsp. *ebneri*, which has been described by SCHMIDT in 1938 because of the character mentioned above. Nevertheless attention should be paid to the fact, that SCHMIDT (1968) corrected his new description and no longer regarded *I. e. ebneri* as subspecies but rather as "forma atavistica". As long as a complete zoogeographical treatment of the complex group of *I. elegans* has not been completed, *I. e. ebneri* should be listed as subspecies.

*ISCHNURA EVANSI* MORTON,  
1919

Figure 7

1979: (45) 1 ♂ (juv.).

New to Syria. As RIS (1928) already mentioned, this species, which has been described by MORTON (1919) from Basra (Iraq), is closely related to the previous one. The westernmost location of this species is the Siwa Oasis in the Libyan Desert (KIMMINS, 1950), the easternmost is Kabul (Afghanistan) (SCHMIDT, 1961). As

Table I  
Physical and chemical water conditions of collecting point 46 (M. Ziese)

t °C	O <sub>2</sub> mg/l	pH	Cl <sup>-</sup> mg/l	sal. ‰	cond. μσ
18.8	9.6	9.0	11500	18.3	25200

little is known about the ecology of *I. evansi*, some data shall be given about the collecting point in Syria. The ♂ which has been caught there was not yet fully hardened nor coloured, thus for sure hatched at the collecting point, which is a mesohaline backwater of the Euphrates, densely grown over with reed, an environment similar to those from which this species had been reported earlier. As in the following days no more specimens were found, the hatching-period of *I. evansi* might begin between the middle and the end of March. The tolerance of the larvae towards salinity must be considerable, as shown in Table I.

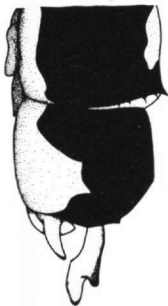


Fig. 6. *Pseudagrion syriacum* (Sel.): lateral view of male terminalia (Orontes, near ar-Rastan, Syria, 04/08/1978).

*ISCHNURA FOUNTAINEI* MORTON, 1905

1978: (48) 1 ♀; (49) 4 ♂.

New to Syria. This species has been described by BARTENEF in 1916 as *I. bukharensis* from the Kara Su (Iran, south coast of the Caspian Sea). *I. fountainei* is adapted to extreme dryness, as shown by its area of distribution: it has been reported from North Africa, Palestine, Iraq, Iran and now from eastern Syria as well, thus along the afro-asian desert belt.

*PSEUDAGRION SYRIACUM* SELYS, 1887

Figures 3, 6

1978: (34) 1 ♂, 1 ♀.

This locality, so far the northernmost where this species was found, seems to confirm the presumption of DUMONT (1973) that *P. syriacum* occurs along the Orontes as well. The fact, that both specimens were caught on *Mentha* sp. agrees with an observation by DUMONT (l.c.), that *P. syriacum* is associated with this plant.

*EPALLAGE FATIME AMASINA* SELYS, 1869

1979: (8) 1 ♀ (reared from larva); (33) 2 ♀.

The nominate form occurs as far North as northern Greece, though the family is otherwise purely oriental. The subspecies *amasina*, on the other hand, has been reported from Mesopotamia (Iraq) and Palestine (MORTON, 1924). The brown spot on the tip of the wing in the latter subspecies is very small and reaches the pterostigma only in one specimen. For this reason, our collections belong to *amasina*.

*CALOPTERYX HYALINA* MARTIN, 1909

1978: (37) 4 ♂; — 1979: (7) 26 ♂; (9) 3 ♂; (10) 1 ♂; (11) 5 ♂; (16) 9 ♂; (25) 2 ♂; (33) 1 ♂; (39) 6 ♂.

ST. QUENTIN (1965) and DUMONT (1975) discuss the possibility that *C. hyalina* is identical with the homoeochromic phase of *C. syriaca* Ramb., 1842. Some of the oo from collecting point (7) show a slightly developed black spot in the wing-tip, as found in *C. syriaca*.

*CALOPTERYX INTERMEDIA INTERMEDIA* SELYS, 1887

1978: (44) 1 ♂; — 1979: (4) 1 ♂; (7) 9 ♂; (8) 3 ♂; (9) 1 ♂; (11) 1 ♂; (43) 1 ♂.

Many efforts were made to describe the variety of the oriental species of this genus (BARTENEFF, 1912, 1930b; SCHMIDT, 1954b; ST. QUENTIN, 1965). An extensive analysis of this group, worked out by BARTENEFF (l.c.), assumes the presence of 24 sub- and subspecies in the area. ST. QUENTIN (1965) doubts the correctness of a so far-reaching splitting. I agree with the opinions of St. Quentin and SCHMIDT (1954b), and think that an extensive comparison of all forms in this area will be necessary to clear up the system of the west-asiatic *Calopteryx*. The identification of the females is specially difficult: in *C. i. intermedia* homoeochromic and heterochromic females occur, while in *C. hyalina* Martin, 1909 all females are homoeochromic. As both species are sympatric, the females of *C. hyalina* and the heterochromic females of *C. i. intermedia* cannot be distinguished definitely from each other. For this reason the present list does not contain any data on females.

*GOMPHUS DAVIDI* SELYS, 1887

1979: (3) 1 ♀.

The western limit of distribution of this east-mediterranean species is near the Alanya peninsula in Turkey (SCHMIDT, 1954b), in the south it reaches



Palestine (MORTON, 1929), in the east Iraq (ST. QUENTIN, 1964).

*ANAX IMPERATOR* LEACH, 1815

1978: (21) 1 ♀; (36) 1 ♀; — 1979: (13) 1 ♂; (30) 1 ♀.

*HEMIANAX EPHIPPIGER* (BURMEISTER, 1839)

1979: (45) 2 ♂, 1 ♀.

*BRACHYTHERMIS FUSCOPALLIATA* (SELYS, 1840)

Figure 7

1978: (21) 2 ♂; (49) 3 ♂, 4 ♀.

New to Syria. So far it has been estimated that *B. fuscopalliata* occurs only in the humid areas of the lower course of Euphrates and Tigris (MORTON, 1919, 1920; FRASER, 1917; RIS, 1928). In 1960 SAGE reported findings from Khanaqin (Iraq) on the Alwand river. Lately DUMONT (1972) found this species near Adana (Turkey) and reported three males from the vicinity of Lake Huleh in Palestine. Dumont estimates, that this dragonfly must have been more common along the eastern mediterranean coast during more humid periods, and that the present populations may be regarded as relicts. This is supported by the new collections from Syria (Fig. 7).

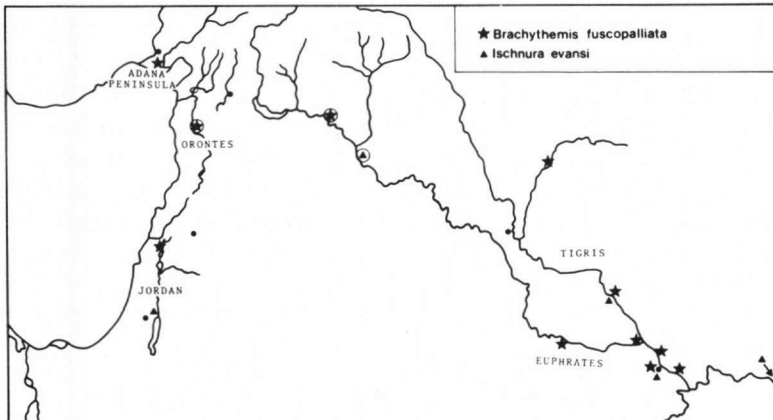


Fig. 7. Distribution of *Ischnura evansi* Morton (except for Egypt and Afghanistan), and *Brachythemis fuscopalliata* (Sel.). ⊙ and ⊔: new records.

*CROCOTHEMIS ERYTHRAEA* (BRULLÉ, 1842)

1978: (14) 5 ♂, 5 ♀; (17) 3 ♂, 2 ♀; (18) 8 ♂, 5 ♀; (21) 1 ♂; (37) 1 ♂; — 1979: (9) 1 ♂; (16) 1 ♂, 1 ♀.

*DIPLACODES LEFEBVREI* (RAMBUR, 1832)

1978: (14) 1 ♂.

*LIBELLULA FULVA PONTICA* SELYS, 1887

1979: (9) 3 ♂, 2 ♀; (28) 1 ♂, 2 ♀.

*ORTHETRUM BRUNNEUM* (FONSCOLOMBE, 1837)

1978: (6) 3 ♂; (38) 1 ♂.

*ORTHETRUM CHRYSOSTIGMA* (BURMEISTER, 1839)

1977: (50) 4 ♂, 1 ♀.

This Ethiopian species also reaches Syria.

*ORTHETRUM RAMBURI* (SELYS, 1848)

*Orthetrum anceps* auct., non *O. anceps* Schneider

1978: (1) 1 ♂; (14) 2 ♂; (36) 6 ♂, 2 ♀; (37) 3 ♂, 1 ♀; (41) 1 ♂ (juv.); — 1979: (28) 1 ♂.

Some authors regard this east mediterranean form as *O. coerulescens* (Fabricius, 1798) (SCHMIDT, 1954; ST. QUENTIN, 1964b, 1965; BILEK, 1966); others regard it as a valid species (CONCI & NIELSEN, 1956; VALETTA, 1957; DUMONT, 1975). My collection includes an adult male from Thessalonikis (Greece), the accessory genitalia of which are identical with those of the Syrian specimens. BARTENEV (1930), who regarded *O. anceps* (= *O. ramburi*) as a valid species, showed that the structure of the penis in *anceps* is different from *coerulescens* and that the anterior lobe of *coerulescens* differs in direction from that found in *ramburi*. For this reason, the identification by BILEK (1966) has to be doubted and the forms under discussion here should not be placed among *O. coerulescens*.

*ORTHETRUM SABINA* (DRURY, 1770)

1978: (14) 1 ♂; (18) 3 ♂, 2 ♀; (21) 1 ♂.

*SELYSIOTHEMIS NIGRA* (VANDER LINDEN, 1825)

1978: (18) 1 ♂.

*SYMPETRUM FONSCOLOMBEI* (SELYS, 1840)

1978: (38) 1 ♂, 1 ♀; (41) 1 ♀.

*TRITHEMIS ANNULATA* (P. DE BEAUVOIS, 1840)

1978: (13) 1 ♂; (14) 8 ♂, 2 ♀; (20) 1 ♂, 7 ♀; (21) 3 ♂; (49) 3 ♂; — 1979: (13) 3 ♂, 1 ♀; (14) 2 ♂; (28) 1 ♂.

## DISCUSSION

The water systems of the Levant have presumably been linked to each other for a certain period of time, though they never formed a unique water body. This thesis has been supported by investigations into the faunal composition of these water systems (KOSSWIG, 1973; POR, 1975; KINZELBACH, 1980). In the north of this area the Orontes river is of central importance. The Nahr al-Quwayq probably linked it to the Euphrates, while Kara Su and Aksu formed its connection with the Ceyhan. In the south, temporary connections existed with the Litani and through the latter with the Jordan. During humid periods, when the Sinai peninsula did not yet form a desert barrier, the Jordan might have been linked to the Nile system, so that the Levant was open to immigrants from Africa.

Odonatological works in this area were almost exclusively limited to the task of bringing the list of species up to date. Only lately did ST. QUENTIN (1960, 1965) and DUMONT (1972, 1973, 1974, 1975a, 1977) point out that studies on Odonata not only contribute to the evolutionary history of the Middle Eastern fauna, but that the inclusion of zoogeographical points of view allows an exact taxonomic interpretation of the dragonfly fauna in this region.

Still far away from being able to prove definitely the thesis of temporarily connected water systems in the Levant, our knowledge on the distribution of some species of Odonata supports these considerations. In the following some examples are given. We have to distinguish between species which in identical or apomorph form, belong either to the Nile-Levant system or the Nile-Levant-Euphrates system. The distribution pattern of *Brachythemis fuscopalliata*, which has formerly been regarded as an endemic form of the Şaṭṭ al-ʿArab, supports the thesis of a temporary connection between the Euphrates, the Orontes, the Litani and the Jordan. DUMONT (1972) estimated, based on material from Adana (Turkey) and from Lake Huleh (Palestine), that the present populations of *B. fuscopalliata* must be regarded

as relicts of a formerly larger area of distribution. We now established this species on the Orontes as well.

The assumption described above is given further support by the distribution of *Ischnura evansi*. This species was originally described from the lower Euphrates and Tigris, but was later reported from the Jordan rift valley (MORTON, 1924), Afghanistan (SCHMIDT, 1961), northern Iraq (ASAHINA, 1973) and Siwa Oasis in Egypt (KIMMINS, 1950). *I. evansi* is of special importance in this context, as Zygoptera usually need a connected water network for their distribution. The fact that *I. evansi* lives in the three areas under discussion here, namely in North-West Egypt, the Levant and Mesopotamia, might be of interest for the answer to the question of how far the history of colonization depends on geological events.

DUMONT (1972, 1973, 1975a, 1977) comprehensively reported on the influence of the African dragonfly fauna on that of the Jordan system and pointed out that here endemism developed within extremely small areas. Forms of the African genus *Pseudagrion* give specially good examples. *Pseudagrion syriacum* (SELYS, 1887), closely related to *P. kersteni* (Gerst.) occurs on the Jordan, Litani and, as recently established by us, also on the Orontes. In contrast to this, *P. sublacteum mortonii* (SCHMIDT, 1938) is only to be found south of the Hermon-Mountain and *P. torridum hulae* DUMONT, 1973 exclusively at Lake Huleh. The situation is probably similar with species of the genus *Calopteryx*. *C. hyalina* (MARTIN, 1909) occurs on the Litani and Orontes but is missing on the Jordan.

In the genus *Coenagrion*, *puella* and *lindeni* form interesting subspecies. *C. p. syriaca* is to be found all over the area. Towards the north-west it finds its limit of distribution in the Amanus- and Taurus-Mountains. In the Taurus *C. p. puella* (L.) with the shorter inferior appendices already occurs. A study on the populations of *C. lindeni* (Sel.) will be very informative. SCHMIDT (1938) described a new subspecies, *C. l. zernyi*, from Lake Huleh. The characters of our specimens from the central course of the Orontes (Ğāb) do not agree with those of this subspecies but rather look similar to the nominal form. As the Ğāb and the upper Jordan rift valley (Lake Huleh) formerly probably showed similar hydrographic conditions the formation of a special Ğāb- and Jordan-form cannot be excluded. Anyhow, to answer this question more material, and the specimen, which SCHMIDT (1954) described as *C. l. zernyi* from Siwand (Iran), have to be reexamined.

These few examples outline the importance of odonatological-faunistical studies for the zoogeography of the Middle East.

## ACKNOWLEDGEMENTS

I wish to thank Dr. and Mrs H. SCHRÖDER (Senckenberg Museum, Frankfurt, West Germany) for enabling me to study the dragonfly collection of Dr. F. Ris, and Prof. H.J. DUMONT (Ghent, Belgium) for reviewing the manuscript. I am, in particular, indebted to Prof. Dr. R. KINZELBACH (Mainz, West Germany) who gave me the opportunity to accompany him on his travels to the Middle East.

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