que cette grande et belle espèce - 13 à 18 mm, noire à élytres, tibias et tarses rouge orange - était déjà présente chez nous depuis quelque temps.

Originaire d'Extrême-Orient, elle s'était en effet répandue, au début des années 1980, le long d'une large diagonale qui s'étendait de l'Est du Caucase à la côte ouest-allemande de la Baltique (Holstein). Partant de cette bande, elle est actuellement en train de se répandre vers l'Ouest et le Sud-Ouest. On l'a déjà signalée de Bavière et plus récemment (1987) de Rhénanie. Aux dernières nouvelles, elle vient d'être découverte en Suisse. L'animal se rencontre de préférence dans les vieilles bouses et les vieux crottins secs. C'est dans ce dernier biotope qu'il a été découvert chez nous.

En dehors de sa taille et de sa coloration, *Philonthus spinipes* se reconnaît au fait que le tiers médian du disque du pronotum ne porte que 2 points de chaque côté (compte non-tenu des points situés tout près du bord antérieur). Le pronotum des autres *Philonthus* indigènes, lorsqu'il présente des points dorsaux, en porte au moins 3 de chaque côté.

ERRATUM

Dans les Actes de la Troisième Conférence internationale des Entomologistes d'expression française, parus dans les *Mém. Soc. r. belge Ent.*, 35 (1992) 2ème partie: 671, il faut modifier comme suit l'en-tête de l'article:

Nouvelles données morphologiques sur les stades larvaires d'*Oestrus ovis* L. (Diptera, Oestridae)

par A.Z. LEHRER[1]

(texte français rédigé par
Ch. VERSTRAETEN[2], G. WAUTHY[3] & D. DRUGMAND[3]
d'après une "communication affichée" de l'auteur)

Bull. Annls Soc. r. belge Ent. 129 (1993): *31-40*

Three, not two species in the genus *Sympecma* (Odonata: Lestidae)

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Abstract

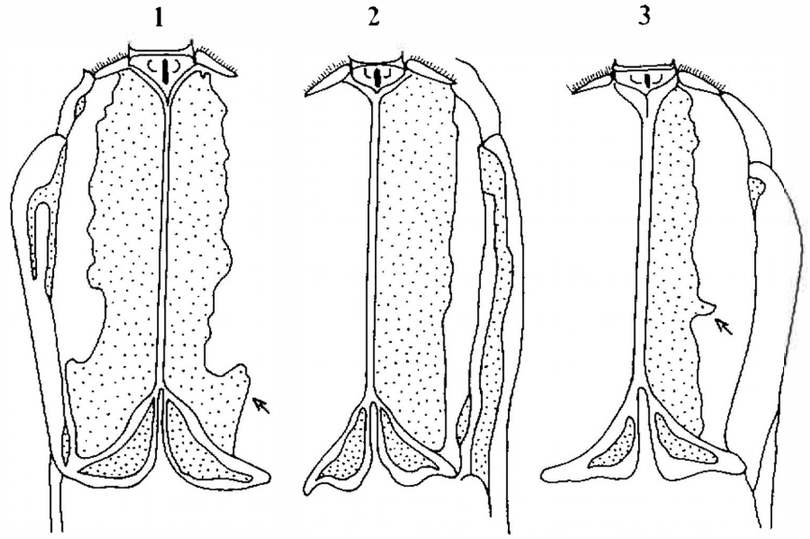
We demonstrate that both sexes of Sympecma gobica, S. paedisca *and* S. fusca, *which occur sympatrically and syntopically in central Asia, differ not only in colour and body markings, but also structurally. The best discriminating characters are linked to tandem formation mechanics: presence or absence of a triangular terminal crest on abdominal segment 10 in males (to a lesser degree in females), and the shape of the carinal fork of the synthorax in females. The situation of the basalmost inner spine on the appendices superiores of the males, the length of the styli (cerci) in the females, and the size of the spines along the margin of the ovipositor in the females are also useful.*

S. gobica *(both sexes) also stands out by the central lobe of the pronotum, which is free of tubercules, while it is tuberculated in both the other species.* S. fusca *and* S. paedisca *appear more closely related to each other than to* S. gobica, *which occupies a rather isolated position within the genus.*

Introduction

The small lestid genus *Sympecma*, well known for its overwintering habits, is strictly palaearctic, and extends from North Africa, across Europe, Siberia, and central Asia, to the Japanese islands. It is now widely considered (see e.g. ASKEW, 1988) that the genus is composed of only two species, *S. fusca* (VANDER LINDEN, 1820), and *S. paedisca* BRAUER, 1882. Considerable confusion surrounds the validity of the latter name, which we will here use *sensu* BRAUER, 1883; Erich SCHMIDT, 1929; and Eberhardt SCHMIDT, 1967, not because we wish to take a position in this nomenclatorial tangle, but with an aim at adding to our knowledge of its morphology and intrinsic taxonomic status. We will refrain from speculating on taxa of possible infraspecific status, such as the Anatolian *S. paedisca annulata*

SELYS, 1887, but will advance arguments to the effect that *S. gobica* (FÖRSTER, 1900), originally described as a subspecies to *S. annulata* SELYS = *S. paedisca* Auct., deserves full specific rank. We stress, however, that there is considerable individual variation, as well as inter-population variation, in the extent of dark brown markings (dots, stripes) on the flanks of the synthorax, which have erroneously led authors like BARTENEF (1913) and SHORYGIN (1926) to distinguish a number of transitional "forms" between spp. *paedisca* and *gobica*. In fact, the only reasonably reliable diagnostic characters of colour marking are the shape of the brown stripe on the mesepisternum and the upturned, apical "horns" of the dorsal abdominal stripes.



Figs 1-3. Synthoracical markings in *Sympecma*. 1: *S. gobica* (Tiger valley, SW Tajikistan, 5.IV.1988); 2: *S. fusca* (Fayzabad, Tajikistan, 18.V.1989); 3: *S. paedisca* (Gela,; 80 km E. Kitab, Uzbekistan, 24.VII.1988).

Characters used

1. Coulour

The conviction that *Sympecma* is composed of three, not two species, arose from many years of field experience in the Central Asiatic Republics of Tajikistan and Uzbekistan of one of us (S.N.B.). These three taxa frequently occur syntopically and synchronically here, without visible interbreeding or hybridisation. Of these, *S. gobica* has a relatively dark ground colour, and a deep brown mesepisternal band (Fig. 1) which widens broadly in its posterior fourth against the alar sinuses. The second, usually also dark species (*S. fusca*), does not show this posterior broadening (Fig. 2). The third species, in addition to being much paler (ground colour fawn), does not show a posterior widening of the mesepisternal band either. Instead, in distinctly more than half of the cases, a prominence (bulge) on either side of its posterior third occurs (Fig. 3).

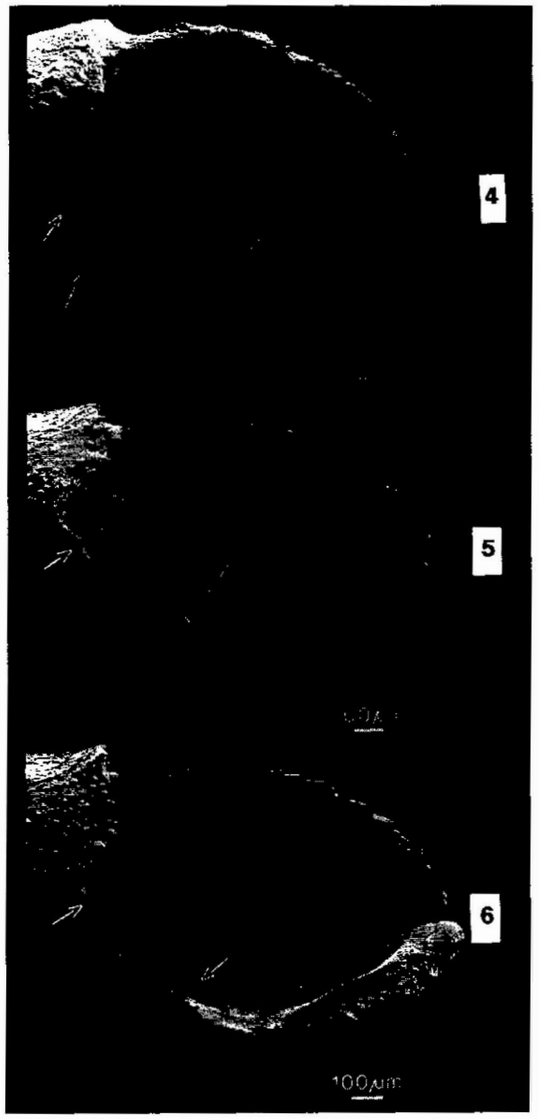
Additionally, the abdominal markings differ: from segment 2 through 8, the apical part of the dorsal, bilaterally symmetrical marking shows strong upturned "horns" in *gobica*, but not in *paedisca* and *fusca*. This character is well figured in the original description by FOERSTER (1900).

These characters are quite usable to the experienced field worker. Such features may also contribute substantially to species recognition, and lead to some degree of reproductive isolation. However, it is unlikely that by themselves they would form hermetic barriers in such closely allied species. Therefore additional, structural characters were sought after.

2. Structural characters: the dorsum of the tenth abdominal segment and its appendages in the male; the carinal fork in the female

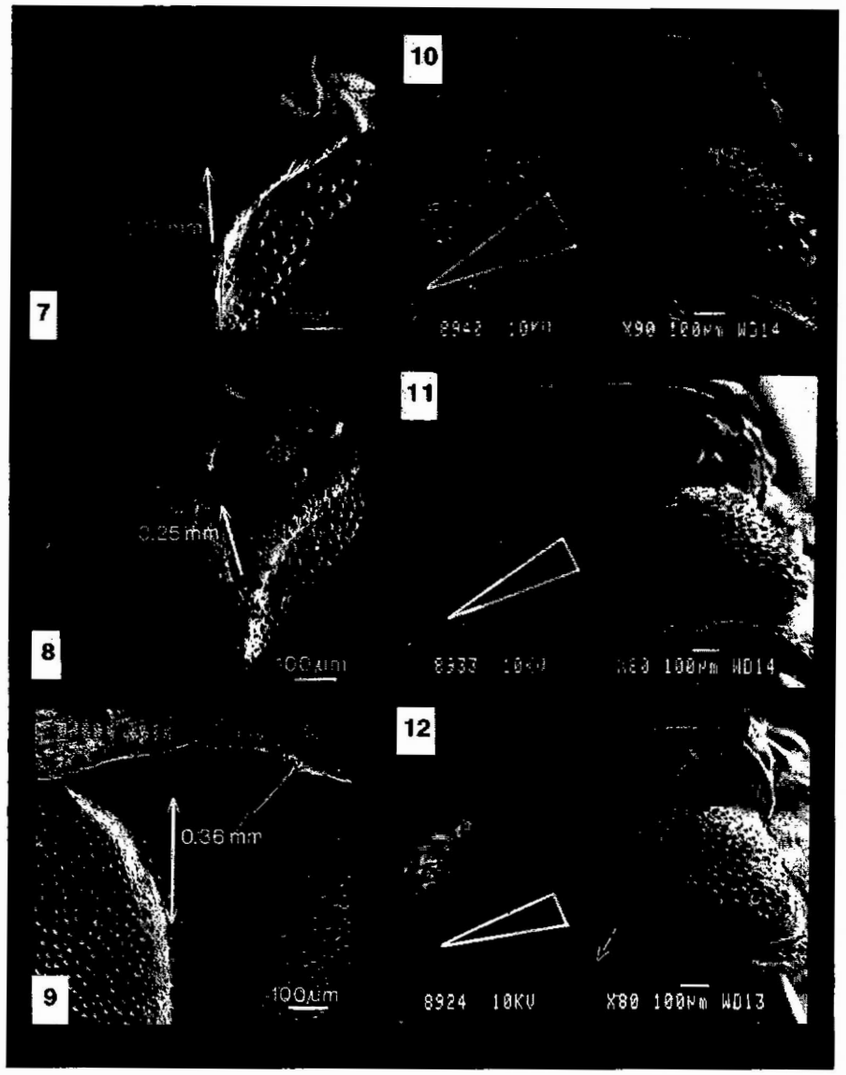
An investigation under the scanning electron microscope revealed that reliable though subtle lock-antilock "docking" differences between the three *Sympecma* species exist. The mid-dorsal terminal rim of the tenth segment in males, which together with the appendix dorsalis, is adpressed to the carinal fork of the female in tandem formation, is raised into a denticulated triangular crest in *S. fusca* (strongest) and in *S. paedisca* (somewhat less strong), but is depressed and free of spines in *S. gobica* (Figs 4-6). The correlative, thoracical difference in females is a sharply raised triangular carinal fork in *S. fusca* (Fig. 7), a more elongated fork with thickened flanks in *S. paedisca* (Fig. 8), and a strongly elongate fork, with distal, narrowed section in *S. gobica* (Fig. 9).

The male superior appendages are forcipate in all three species, and are composed of three sections: a basal part terminating in an internal tooth, a medial, flattened, marginally denticulated "knife-blade", and a terminal, curved, club-shaped apex. It was found that the position of the basal tooth differs in the three species (Figs 13-15). It is situated basalmost in *S. fusca*, and distalmost in *S. gobica*, with *S. paedisca* taking an intermediate position. Although almost certainly significant in achieving reproductive isolation, these differences in situation are of the order of 0.1 mm and therefore difficult to judge by the human eye. They illustrate that what may be significant to species isolation, may seem irrelevant to a human observer. The correlative structure in the female is not prominent. during tandem linkage, the male's appendix dorsalis is pressed against the central spiraculum (perhaps resulting in adherence by a moderate suction-effect). Topographically, it seems impossible for the teeth of the male app. sup. to anchor in the lateral holes of the carinal fork. Rather, they become situated under the central lobe of the female pronotum where they often leave lateral scars. The central part of the male appendix (the "knife") is sandwiched between the flattened and smooth underside of the lateral lobes of the pronotum's hind rim and the laminae mesostigmales. The apical "club", finally, extends over the side of the pronotum (Fig. 16).



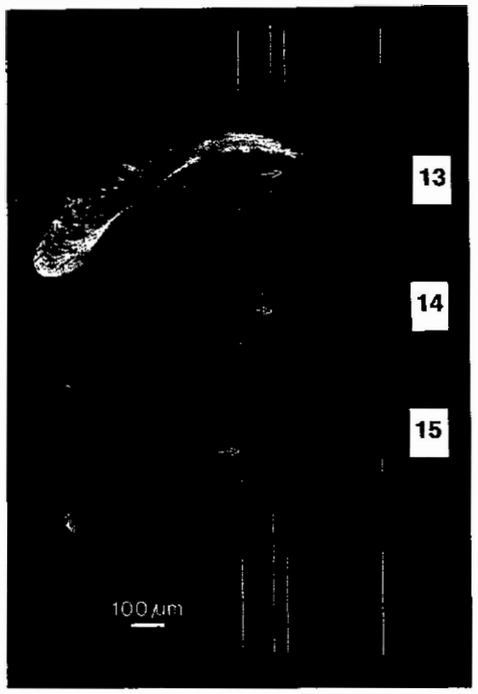
Figs 4-6. Terminalia of *Sympecma* males. 4: *S. gobica*; 5: *S. paedisca*; 6: *S. fusca*. Arrows indicate a) position of basal tooth on appendix superior and b) mid-dorsal crest (or its absence) on S10.

The central lobe of the hind rim of the pronotum has a similar shape in all three species, but is transversely ridged *and* tuberculated on top in *S. fusca* and *S. paedisca*, not-tuberculated and with transverse chitinous crests, in *S. gobica* (Figs 10-12) (both sexes).



Figs 7-9. Carinal fork in female *Sympecma*. 7: *S. fusca*; 8: *S. paedisca*; 9: *S. gobica* (absolute length of the distance from base of spiracle tot tip of fork also given).

Figs 10-12. Pronotum of female *Sympecma*. 10: *S. fusca*; 11: *S. paedisca*; 12: *S. gobica* (arrow: smooth central hindlobe of pronotum); left docking zone of inferior appendix of male on central lobe of pronotum also indicated.



Figs 13-15. Relative position of basal spine on appendix superior in male *Sympecma*. 13: *S. fusca*; 14: *S. paedisca*; 15: *S. gobica*.

The inferior appendages of the males are distinctive from these of other lestids in not being juxtaposed, but turned towards each other, forming a half-dome each. Probably, in tandem linkage, they open up, and extend over the median lobe of the pronotum. SEM-pictures show (Figs 10-12) that differences in smooth and rugged zones can be identified on the median lobes, corresponding to areas where contact is made, and others, where no contact occurs. It is possible to identify females of *S. fusca*, where the inferior appendage is much more massive than in both others, by the larger extent of the smooth zones closest to the hind rim. The cranial parts of the smooth zones are similar in all three species, and seem to be atavistic traits, no longer functional in achieving reproductive isolation (see concluding remarks).

3. Other characters

It has been claimed, in all major dragonfly monographs since Erich SCHMIDTS' book (1929), that females of *S. fusca* and *S. paedisca* can be separated by the length of the cerci: as long or longer than S10 in *fusca*; shorter or as long as S10 in *paesdisca*. In checking long series of all three species, we have found this to be a practical character for separating *fusca*

females from females of *gobica* and *paedisca*. However, in evaluating the morphology of the terminal part of the female abdomen, we found that the distal rim of the dorsum of the tenth segment is differentiated as in the male, albeit in a less pronounced way. Thus, *S. gobica* has a small central depression, laterally lined by sclerotized spines, while *S. paedisca* and *fusca* have raised, incomplete triangles. The ovispositor also shows limited specific differenciation and provides another useful discriminating character. The distal third of the third pair of valves of the ovipositor, V3, is lined with black teeth, which number 14-16 in *fusca*, 11-13 in *paedisca*, and 12-14 in *gobica*. Importantly, these teeth are usually more strongly developed in *S. paedisca* than in both others (Figs 17-19). An analysis under the SEM revealed that these teeth are not simple modified setae, but are really the strongly developed sockets in which these setae insert. We illustrate this with figures 20-21 which show (1) a typical lateral seta, with its slightly elevated socket; (2) an intermediate type, in which the setule is shortened, and the socket raised into a hump, and (3) a typical case, in which the socket has been modified into a sclerotized tooth, and the original seta is reduced to a slender spine preceding it. This modification was found not to be typical of *Sympecma*, but occurs in *Lestes* spp. as well.

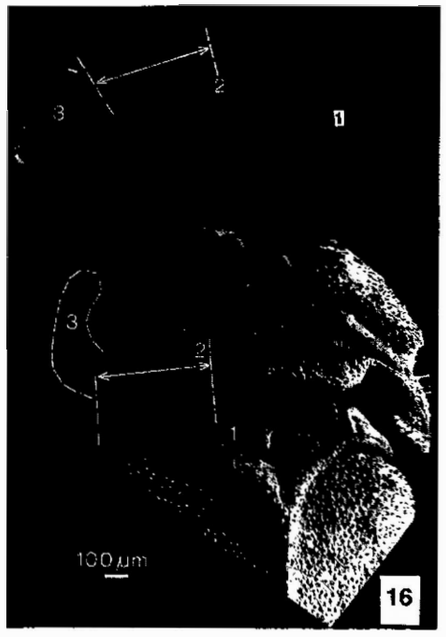
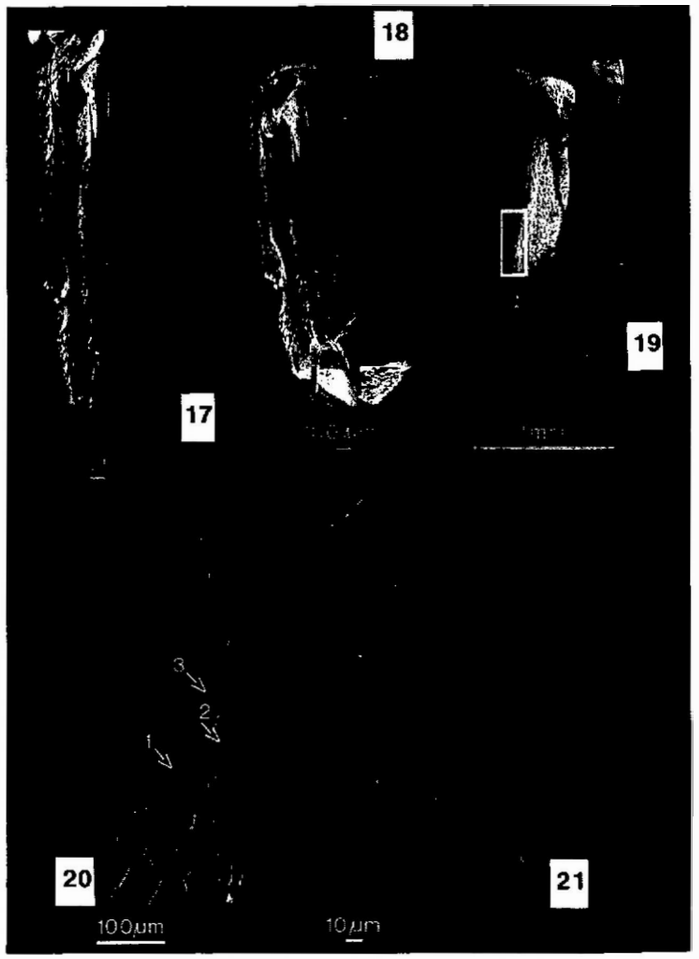


Fig. 16. Probable "docking" configuration of appendix superior against carinal fork, lamina mesostigmalis and hind rim of pronotum. Figures (1, 2) refer to the position of the base of the appendix and its basal spine during tandem formation.



Figs 17-19. Ovipositor in *Sympecma* females. 17: *S. fusca*; 18: *S. gobica*; 19: *S. paedisca*.

Figs 20-21. Enlarged section of spines on V3 in *S. paedisca* in fig. 19 [1,2,3: three stages of the transformation of a seta to a marginal spine].

4. Concluding remarks

Two surprising conclusions were reached:

1) Not only is *S. gobica* a morphologically well defined taxon, but it also seems less closely related to each of its two congeners than they are between themselves.

Characters unique to *gobica* are 1) the hind rim of the tenth abdominal segment (both sexes), 2) the elongated carinal fork (female), 3) the non-tuberculated central hindlobe of the pronotum (both sexes) and 4) the distalmost position of the internal spine on the appendix superior (male).

The other two species share 1) the raised, spinulated crest on the dorsum of S10, 2) the non-elongated carinal fork 3) the tuberculated upper face of the central lobe of the pronotum. Their specificity rests on few positive characters only: the more massive inferior appendages in males, the slightly longer cerci in females of *fusca*, and the more strongly denticulated ovipositor in *paedisca*. We conclude that, evolutionary speaking, *S. gobica* takes an isolated position within the (small) genus.

2) The characters most useful for species demarcation in *Sympecma* (rim of S10 in males, carinal fork in females) happen to be, *in general appearance*, quite generalized for lestids, and are certainly shared with the large genus *Lestes*. This might indicate that, in spite of the enormous age of dragonflies as a group, at least some extant genera and families are the result of comparatively recent evolution. We therefore suggest that the docking mechanisms in *Sympecma* (and, in palaearctic *Lestes*), involving the pronotum hind ridge, and carinal fork in females, the rim of S10, appendix dorsalis, and appendices superiores in males, are only moderately developed and still evolving. The appendix inferior of the male, which docks to the dorsum of the pronotum, seems to play a remarkably unimportant role, and the smooth docking zones of the dorsal lobe of the pronotum in the female seem to be partly unused in modern species. We presume that this reflects a recent loss of function, a process which might still be ongoing. In conclusion, we hypothesize that within *Sympecma* and *Lestes*, an evolutionary shift is underway, which transfers the weight of mechanical reproductive isolation from the central zone of the pronotum to the zone of the hind rim of pronotum - carinal fork.

5. A practical key to the identifical of Sympecma

1. Males 2
- Females 4

2. Terminal rim of S10 medially raised into a triangular, spined crest. Mesepisternal brown band not strongly windened against the alar sinuses 3
- Terminal rim of S10 medially depressed, devoid of spines. Mesepisternal band strongly widened against the alar sinues . . . . . *S. gobica* (FÖRSTER)

3. Inferior appendages short, their tip not reaching the level of the internal tooth on the superior appendages . . . . . *S. paedisca* (BRAUER)
- Inferior appendages longer, their tip reaching the level of the internal tooth of the superior appendages . . . . . *S. fusca* (VANDER LINDEN)

4. Carinal fork an equilateral triangle. Rami of carinal fork running straight from lamina mesostigmalis to thoracic carina. Central lobe of pronotum tuberculated. Mesepisternal brown band not strongly widened against the alar sinuses 5

- Carinal fork an elongate triangle. Rami of carinal fork narrowed posteriorly. Central lobe of pronotum smooth. Mesepisternal band widened against the alar sinuses . . . . . *S. gobica* (FÖRSTER)

5. Internal edge of carinal fork thickened in its distal part. Ovipositor with about 11-13 strong marginal teeth along its distal third. Cerci shorter than, or as long as, S10 . . . . . .*S. paedisca* (BRAUER)

- Internal edge of carinal fork not thickened. Ovipositor with about 14-16 small teeth on its distal third. Cerci as long as, or longer than, S10 . . . . . .*S. fusca* (VANDER LINDEN)

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Bull. Annls Soc. r. belge Ent. 129 (1993): *41-52*

A five year survey of the invertebrate fauna of crop fields and their edges. Part 1. Study area, crop history and methodology

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Summary

Between 1986 and 1990 an intensive sampling campaign has been conducted in Belgian fields with maize or Italian ryegrass and their edge zones by means of many different sampling methods. This first contribution gives a detailed description of the study area including meteorological aspects, the crop history of the fields, the results of a botanical survey of the area, the methods used and information on the sampling periods. It acts as a basis for further publications on the results of the study.

Samenvatting

Tussen 1986 en 1990 werden intensieve bemonsteringen uitgevoerd op Belgische akkers ingezaaid met maïs of Italiaans raaigras en hun randen door middel van diverse bemonsteringsmethodes. Deze bijdrage geeft een gedetailleerde beschrijving van het studiegebied, de teeltgeschiedenis van de onderzochte akkers, de resultaten van een botanische inventaris van het studiegebied, de gebruikte bemonsteringsmethoden en informatie omtrent de bemonsteringsperiodes. Ze vormt een basis voor verdere publicatie van de resultaten van deze studie.

Résumé

Entre 1986 et 1990 une campagne intensive d'échantillonnage a été réalisée en Belgique dans des champs de maïs, d'ivraie italien et dans leurs zones de bordures en utilisant diverses méthodes. Cette contribution donne une description detaillée des sites étudiés, les résultats d'un inventaire botanique, la méthodologie appliquée et des informations sur les périodes d'échantillonage. Elle forme une base pour d'autres publications traitant les résultats de l'étude.