Menophra annegreteae sp. n., a new ennomine well established in southern Spain, with notes on the status of *Sardocyrnia fortunaria* (Vázquez, 1905) (Geometridae: Ennominae)

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Abstract. *Menophra annegreteae* sp. n. is described on material from south-eastern Spain. The new species is superficially similar to *Sardocyrnia bastelicaria* (Bellier, 1862) and *Sardocyrnia fortunaria* (Vázquez, 1905). All three species are illustrated.

Zusammenfassung. *Menophra annegreteae* sp. n. wird aus Südostspanien beschrieben. Äußerlich ähnelt die neue Art *Sardocyrnia bastelicaria* (Bellier, 1862) und *S. fortunaria* (Vázquez, 1905). Alle drei Arten werden zusammen mit ihren männlichen und weiblichen Genitalien abgebildet.

Key words. Lepidoptera, Geometridae, Ennominae, *Menophra*, *annegreteae*, Spain, new species, morphology, distribution, *Sardocyrnia*, *bastelicaria, fortunaria*.

Introduction

So far the ennomine genus *Menophra* Moore, 1887 comprises 65 described species distributed in the Old World from Japan and Taiwan in the east to western Europe (incl. Madeira) in the west; southwards it ranges to the Cape province. A single New World taxon, *M. angustipennis* (Dognin, 1907), described from Peru, is also currently assigned to the genus (Scoble 1999). So far a mere six species have been recorded from Europe (Müller 1996). Little is known about the biology of these moths and host-plant records seem available only for eight species, including one European.

During a trip to Spain in April–May 2000 I collected Geometridae close to the village of Cabo de Gata in the province of Almeria. Among these were three specimens that looked superficially most similar to what I then considered as *Sardocyrnia bastelicaria* (Bellier, 1862). Despite the rather worn state of the three specimens, they did look different from *S. bastelicaria* and I decided to spread them. At home I compared them with *S. bastelicaria* specimens in my collection and I noticed that the antennae were different, and the newly collected specimens had palps that were hardly visible. Shortly after I found two fresh specimens with the same type of antennae and very short palps among unidentified material from Tabernas (labelled 'Mini Hollywood'), province of Almeria; they had been collected by the Danish lepidopterist Fritz Schepler in June 1994. Though their wing markings were difficult to compare with those of the three worn specimens from Cabo de Gata, they looked considerably darker. The antennal structure and the reduced palps made me suppose that these five specimens could belong to an overlooked *Menophra* species. This was later confirmed by Dr. Dieter Stüning, ZFMK, who compared the male genitalia from one of the Spanish specimens with those of the comprehensive genitalia slide collection of western Palaearctic *Menophra* species in 'Museum Koenig'. In late April 2001, in order to obtain more detailed knowledge of the new species I arranged another collecting trip to south-eastern Spain with my

friends Bjarne Skule and Carsten Hviid. The trip was a great success with 8 specimens obtained from Cabo de Gata and 14 from Tabernas. Later the new species was found also by other lepidopterists (see below).

Abbreviations

ZFMK	Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, Germany
ZMUC	Zoological Museum, University of Copenhagen, Denmark
MNMS	Museo Nacional de Ciencias Naturales, Madrid, Spain

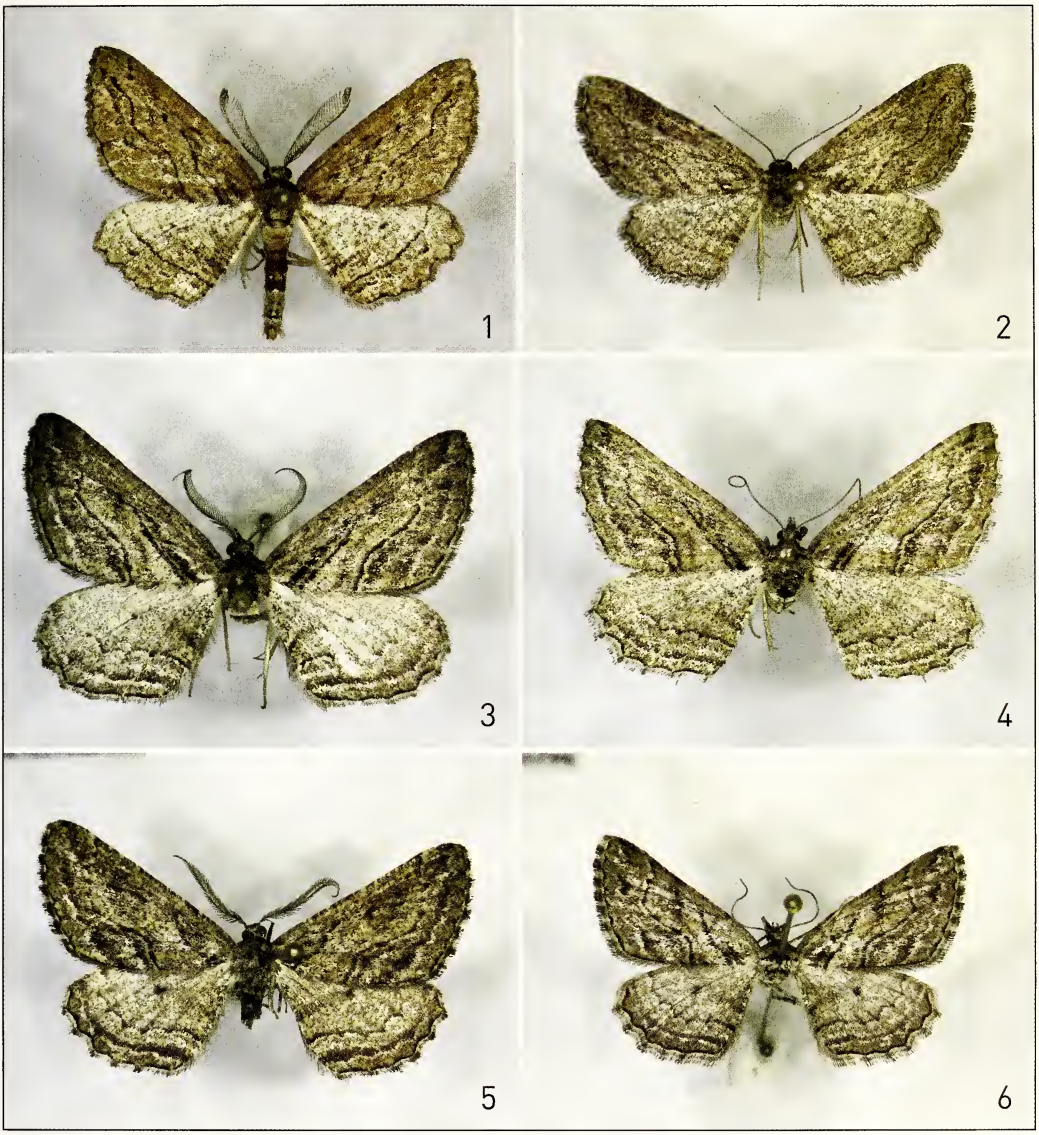
Menophra annegreteae sp. n.

Material. Holotype, ♂, **Spain**, Almeria, Cabo de Gata, 10 m, 16.–17.v.2001, leg. Skou & Skule, coll. ZMUC. – Paratypes: 6♂, 1♀, same data as holotype, leg. et coll. Skou and Skule; 8♂, 1♀ same data as holotype, but 5 m, 2., 4.v.2000, 30.vii.2003, leg. et coll. Skou (♂ prep. Fibiger 4143); 3♂, 1♀, same data as holotype, but, 0 m, 29.iii., 3.vi.2002, 19.iv.2003, leg. et coll. Viehmann; 1♂, same data, but 4.iii.2003, leg. et coll. Schmitz; 11♂, 2♀, Almeria, 2 km SW Tabernas, [Rambla de Tabernas], 350 m, 18., 23., 25.iv.2001, leg. Skou, Hviid & Skule, (♀ prep. Fibiger 4144), coll. Skou and Hviid; 45♂, 17♀ same data, but 400 m, 31.vii.2003, 15., 24.–25., 29.v.2006, leg. et coll. P. Skou; 4♂ same data, but 5.vi.2002. leg. Schmitz, coll. Viehmann and ZFMK. 6♂, 2♀, same data, but 10 km W Tabernas, 300 m, 19.v.2003, leg. Jeppesen, coll. Jeppesen and Fibiger. 1♂ Almeria, Mini Hollywood, 1000 m, 2.vi.1994, leg. Schepler; 1♂ same data, but 600 m, 3.vi.1994, ZMUC.

Description. Labial palps reduced as in other *Menophra* species (here shorter than largest eye diameter), porrect, with all segments equally long. Male antenna bipectinate, with long lamellae; female antenna filiform. *Habitus* (Figs 1–2). Wingspan: 22–30 mm. Forewing brownish, suffused with black scales; transverse lines blackish brown; antemedial line oblique, not reaching costa; postmedial line oblique, wavy, angular shortly before reaching costa; terminal line blackish brown; discal spot small, black. Hindwing concolorous with forewing, with darker transverse line beyond indistinct discal spot. Undersides of both wings greyish; on hindwing with weak distal spot and transverse line.

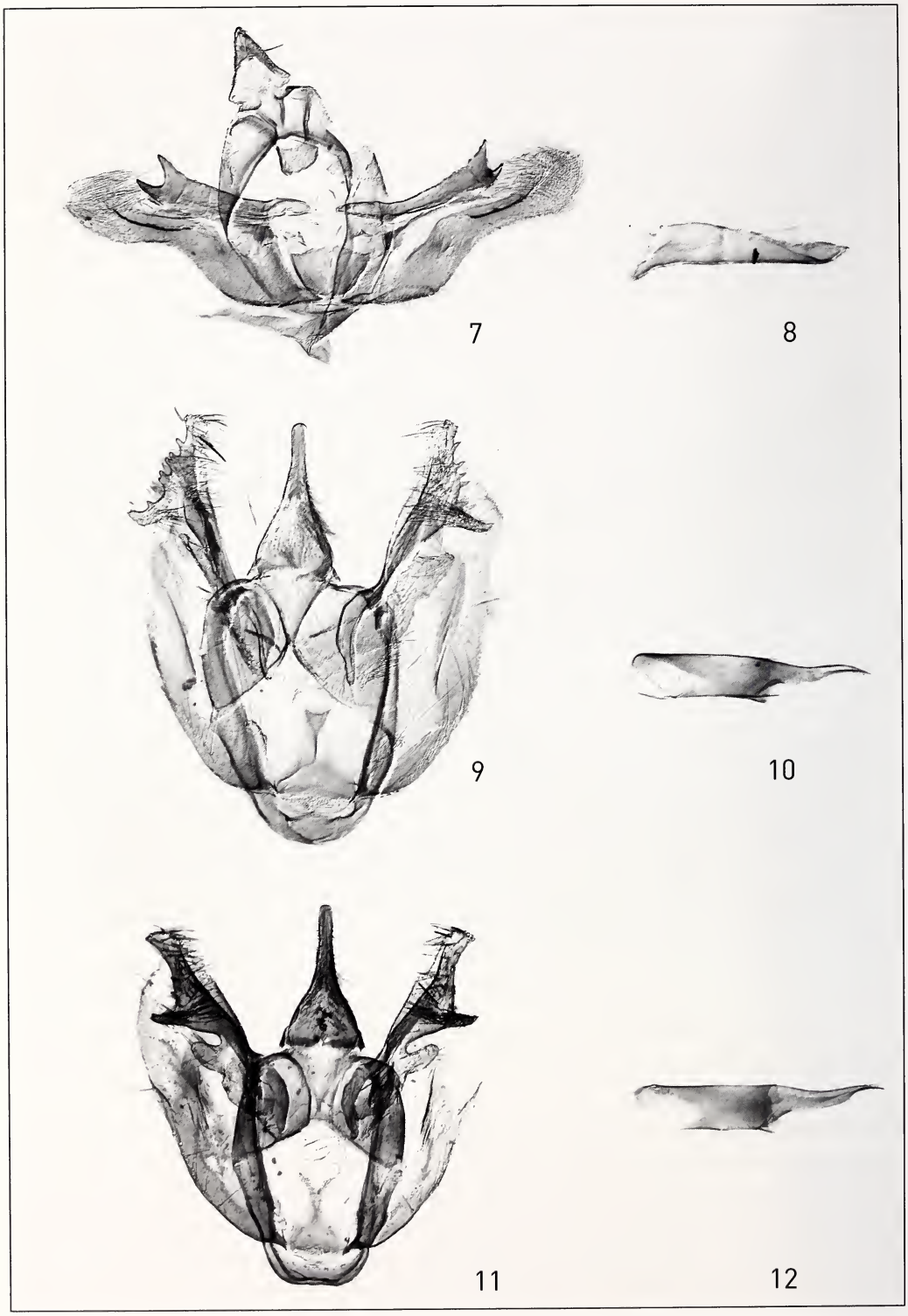
Variability. The ground colour of the wings is variable, and so is the distinctness of the blackish brown markings. It is remarkable that specimens of *M. annegreteae* from Cabo de Gata are lighter brown than the specimens from Tabernas. The distance between the two localities is only 32 km. The specimens from late July are considerably smaller than those flying earlier and later in the year: only 22–24 mm. This could indicate the occurrence of at least three generations.The males are a little smaller than the females.

Male genitalia (Figs 7–8). Uncus triangular, dorsally setose. Gnathos prominent, apically smoothly truncate. Saccus v-shaped. Valva with strongly sclerotised costal bar with bifurcate tip; proximal ends of bars bluntly tapered and weakly sclerotised, not transversely united. Area immediately below costal bar membraneous. Lower part of valva lightly sclerotised; a broad thick-walled groove extending from middle of valva into rounded cucullus; lower margin of groove appearing as prominent line in slide mounts. Juxta large, strongly sclerotised, shield-shaped. Aedeagus straight, widest at coecum, tapered towards apex and ending ventrally in spine-like process; vesica membranous without diverticulum or cornuti, only with small subapical field of spinules (n=3).

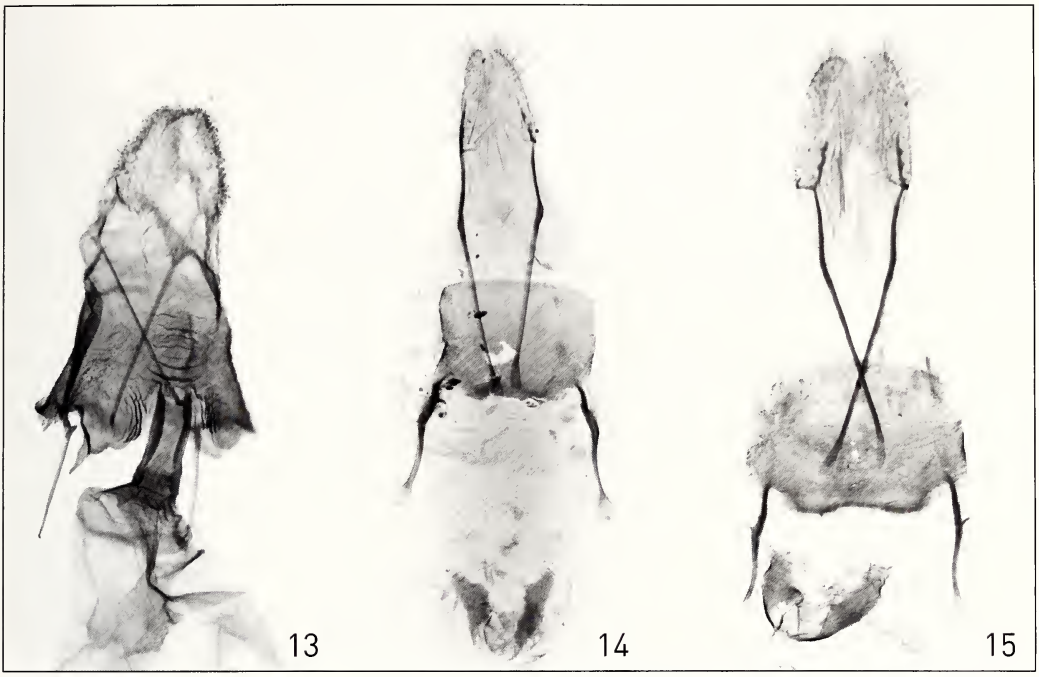


Figs 1–6. Adults of *Menophra* and *Sardocyrnia* species. **1.** *Menophra annegreteae* sp. n., holotype, ♂, Spain. **2.** *Menophra annegreteae* sp. n., paratype, ♀, Spain. **3.** *Sardocyrnia fortunaria*, ♂, Spain. **4.** *Sardocyrnia fortunaria*, ♀, Spain. **5.** *Sardocyrnia bastelicaria*, ♂, Corsica. **6.** *Sardocyrnia bastelicaria*, ♀, Corsica.

Female genitalia (Fig. 13). Ovipositor lobes rounded, slightly sclerotised, densely covered with setae; another patch of setae present on mid-ventral area in front of ovipositor lobes. Segment A8 dorsally sclerotised, ventrally largely membranous. Postvaginal area transversely wrinkled. Lamella antevaginalis slightly sclerotised, shortest in middle, with longitudinal (laterally curved: longitudinal/transverse) wrinkles. Ductus bursae moderately sclerotised, sub-cylindrical, almost as long as apophyses anteriores. Corpus bursae ovoid, membranous, with very weakly sclerotised signum. Ductus seminalis arising close to ductus bursae ventrally (n=2).



Figs. 7–12. ♂ genitalia of *Menophra* and *Sardocyrnia* species. **7–8.** *Menophra annegreteae* sp. n. **9–10.** *Sardocyrnia fortunaria*. **11–12.** *Sardocyrnia bastelicaria*.



Figs 13–15. ♀ genitalia of *Menophra* and *Sardocyrnia* species. **13.** *Menophra annegreteae* sp. n. **14.** *Sardocyrnia fortunaria*. **15.** *Sardocyrnia bastelicaria*.

Differential diagnosis. In habitus, the other European *Menophra* species clearly differ from *M. annegreteae*. Only some very dark extreme forms of *M. abruptaria* (Thunberg, 1792) and *M. japygiaria* (O. Costa, 1849) may, very superficially, be confused with the new species. These species, together with *M. berenicidaria* (Turati, 1924) (=*trypanaria* Wiltshire, 1948) may in fact be phylogenetically close to the new species, but differ structurally in male genitalia in the stout cornuti of the aedeagus, the smaller dorsal process of the costal furca of the valva, and in the digitiform, slightly bill-shaped uncus; in female genitalia the signum is well sclerotised. Also the north-western African species *M. dubiosa* (Albers & Warnecke, 1941) and *M. undulosa* (Albers & Warnecke, 1941) recorded from south-eastern Spain, bear cornuti in the aedeagus, the latter being longer and narrower than in *M. annegreteae*.

The new species is superficially most similar to *Sardocyrnia bastelicaria* (Bellier, 1862) (Figs. 5–6), occurring only on Sardinia and Corsica, and *S. fortunaria* (Vázquez, 1905) (Figs. 3–4) from Spain. The status of the latter taxon will be dealt with below.

The two *Sardocyrnia* species can be separated from *M. annegreteae* sp. n. by the course of the costal part of the post-medial line (dentate in *Sardocyrnia*, angled in *M. annegreteae*), the different antennae of the males, and the well developed palps. The differences in genitalia are distinctive: the males of both *S. bastelicaria* (Figs. 11–12) and *S. fortunaria* (Figs. 9–10) are rather similar to each other and differ from those of *M. annegreteae* in having no gnathos, a long cone-like uncus, an extremely broad tegumen, a costa with two ventral processes, and a long, medially constricted juxta. Females of these *Sardocyrnia* species differ from that of *M. annegreteae* in having a

Fig. 16. Habitat of *Menophra annegreteae* sp. n. Cabo de Gata.

heavily sclerotised ostium ring, a very short ductus bursae (as long as wide), and an elongate, pear-shaped corpus bursae.

Distribution. *Menophra annegreteae* sp. n. is only known from the Almeria province in south-eastern Spain. All specimens labelled 'Tabernas' have been found in the Rambla de Tabernas at an altitude of 400 m. The different altitudes indicated on the labels reflect different ways of altitude recording. Apparently the new species is becoming more and more abundant at Tabernas. In May 2006 a total on 101 specimens came to light in four nights, with a maximum of 37 specimens in one night.

Derivatio nominis. The new species is named after my life companion, Anne-Grete Klausen.

Life history. The early stages are unknown. The habitat at Cabo de Gata (Fig. 16) is a salt marsh and the habitat at Tabernas (Fig. 17) is a dry and extremely warm canyon both situated in the Almeria province, the driest and warmest region in Europe. The moth appears to fly in several generations as it was so far found in early and late March through April, in early, mid, and late May, in early June, in late July, and in late October. It is attracted to ultraviolet light. Sugaring was used, but no specimens of *M. annegreteae* were attracted in this manner.

Remarks. The taxon name *S. fortunaria* has apparently been unused from the date of its description until 1999, when it was listed at the species rank by Scoble (1999). Subsequently it was used by Redondo & Gastón (2004), but without a differential diagnosis with regards to *S. bastelicaria*. It has not been possible to trace the type-specimen(s) of *S. fortunaria*. There is no type material in MNMS, and Dr. Carolina Martín of that museum informed me that the fate of Vázquez's collection is unknown.

Fig. 17. Habitat of *Menophra annegreteae* sp. n. Tabernas.

The male genitalia of *S. bastelicaria* (Figs 11–12; n = 3) differ from those of *S. fortunaria* (Figs 9–10; n = 3) in the smooth surface between the outer process and apex of costa of the valva? (this surface is jagged with small broad spines in *S. fortunaria*). Moreover the juxta is less constricted medially and the pointed apex of the aedeagus is shorter. The female genitalia of *S. bastelicaria* (Fig. 15; n=2) and *S. fortunaria* (Fig. 14; n=2) are rather similar to each other and differ mainly in the sclerotisation adjacent to the ostium.

S. fortunaria appears to be an Iberian endemic occurring over a large part of the peninsula where it is found from sea level at Cabo de Gata, Almeria Province and up to at least 1200 m at Albarracin, Teruel Province. *S. bastelicaria* is endemic to Corsisa and Sardinia where it apparently occurs at lower altitudes. *S. fortunaria* and *S. bastelicaria* are superficially very similar, but in *S. bastelicaria* the postmedial line is in general more bent close to dorsum. The colour of both species is brownish, but *S. bastelicaria* has a more greyish tint.

Acknowledgements

First of all, I wish to thank my life companion and travelling partner on so many field trips, Anne-Grete Klausen, for her support and forbearance. Moreover I am especially grateful to Michael Fibiger, Sorø, Denmark, and Ole Karsholt, ZMUC for much help and encouragement to finish this paper, Michael Fibiger also did the genitalia preparations. I also wish to thank Vladimir Kononenko, Vladivostok, for photos of the imagines, Dieter Stüning, ZFMK, for confirming the validity of the new species by checking the genitalia collection of ZFMK. Thanks are also due to Niels Peder Kristensen and Axel Hausmann, Zoologische Staatssammlung, Munich, Germany, for help in different ways, to Carolina Martín, MNMS for providing information, to Bjarne Skule, Veksø, Denmark, and Carsten Hviid, Virum, Denmark, for joining me on the 2001 field trip, and to Gert Jeppesen, Elkenøre, Denmark, Willibald Schmitz and Joachim Viehmann, Bergisch Gladbach, Germany, for permission to include their material.

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