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Can mildew assist in the entry of Fusarium fungi into wheat leaves?

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In 1981, large oval water-soaked flecks (approximately 2 × 4 cm) which were obviously due to *Fusarium* fungi were often observed on the upper stem leaves of wheat. The lesions appeared after flowering and were most conspicuous shortly before ripening.

Fig. 1. Typical *Fusarium* lesions on stem leaves of wheat, with an old mildew *(Erysiphe graminis)* pustule at the centre.

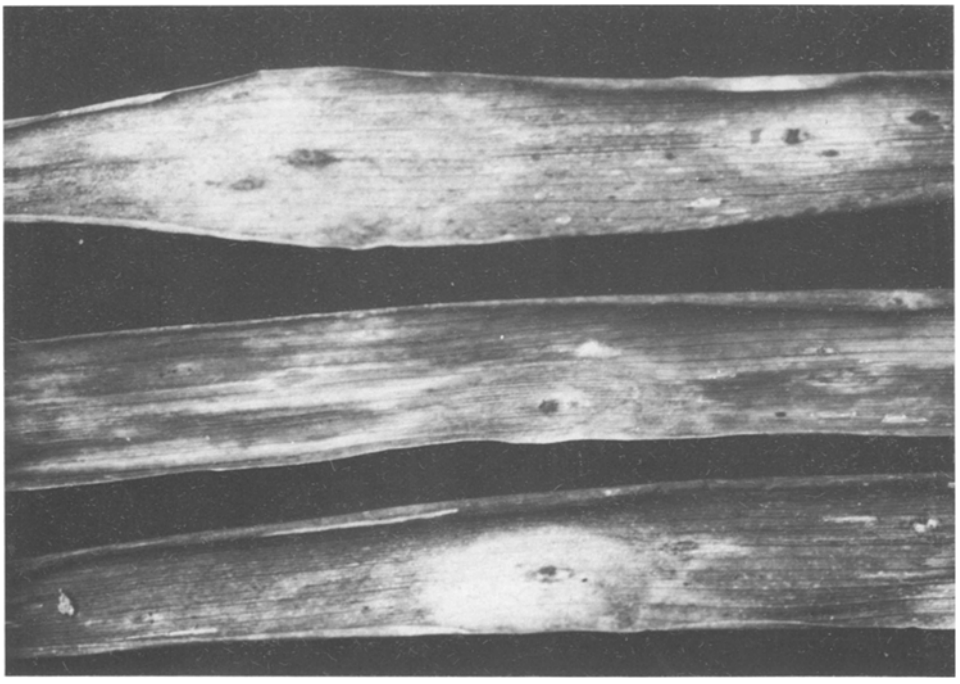

Fig. 1. Typische Fusarium-vlekken op stengelbladeren van tarwe met een oude meeldauwsorus (Erysiphe graminis) in het centrum.

Under dry conditions the lesions became necrotic, under humid conditions *Fusarium* sporulated intensely mainly on the upper leaf side, giving the lesions a pinkish colour. Often, a dark spot was seen at the centre of the fleck. Similar observations have been made by Walther and Focke (1981). The severity of the infection varied according to location, but both in Switzerland and in the Netherlands lesions could easily be found. In severe cases up to 10 percent of the foliage was affected.

Inspection of lesions from several fields in northern Switzerland showed that in many instances (sometimes over 80 percent) an old brownish mildew *(Erysiphe graminis)* pustule up to 4 mm in length could be found at the centre of the *Fusarium* fleck (Figures 1 and 2). The mildew lesion occurred at one side of the leaf only, either upper or lower side. The oval water-soaked fleck, with its long axis parallel to the long axis of the leaf, was visible at both sides of the leaf. In many cases, *Fusarium nivale,* syn. *Gerlachia nivalis,* has been isolated from these lesions.

In the Netherlands, mildew at the centre of the *Fusarium* flecks has not yet been observed. Occasionally, the centre of the *Fusarium fleck showed mechanical damage (abrasion of epidermis and parenchyma), insect damage (undefined flecks and small*

Fig. 2. *Fusarium nivale* in a water soaked lesion with an old mildew pustule at the centre. The mildew pustule itself is not shown. The micrograph shows macroconidia and sporodochia emerging from the stomata of the upper leaf side.

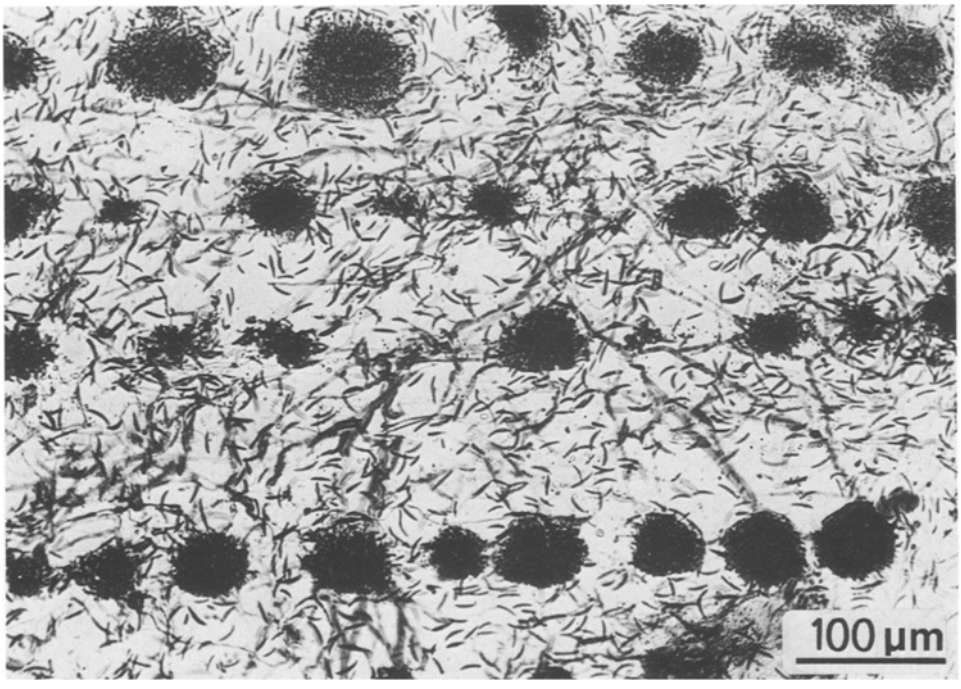

Fig. 2. Fusarium nivale in een waterige vlek met een meeldauwsorus in het centrum. De meeldauwsorus zelf is niet zichtbaar. De foto toont macroconidia en sporodochia, naar buiten komend uit de huidmondjes aan de bovenzijde van het blad.

lesions caused by the cereal leaf beetle, *Lema melanopa),* or small lesions (ca 2 mm) due to *Septoria tritici.*

The authors feel that *Fusarium* fungi could well have used mildew lesions and other lesions, bruises, or damages as a *porte d'entrée,* a point of easy entry into the leaves. This hypothesis merits further research because, if foliar *Fusarium* does interact with mildew, damage thresholds of mildew and spray warning criteria have to be adjusted accordingly. There is reason to believe that the suggested interaction varies according to cultivar, ecological site and weather. The subject is under further investigation.

Samenvatting

Kan meeldauw het binnendringen van Fusarium-schimmels in tarwebladeren mogelijk maken?

In het centrum van bladvlekken, veroorzaakt door *Fusarium* spp. op hogere tarwebladeren, werd vaak een meeldauwsorus aangetroffen. De hypothese, dat beschadiging door meeldauwinfectie het binnendringen door *Fusarium* mogelijk maakt, wordt nader onderzocht.

Reference

Walther, H. & Focke, I., 1981. *Fusarium nivale* Ces. ex Sacc. als Erreger von Blattflecken und Blattdürre an Winterweizen 1980. NachrBl. Pflanzenschutz DDR 35 (1981), 127-128.

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