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In the name of Allah

بنام خدا

NOTE

STUDY OF LETTUCE ANTHRACNOSE OCCURRING IN THE FARS PROVINCE OF IRAN[1]

پیدایش بیماری آنتراکنوز کاهـــودر استان فـــارس

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ABSTRACT

Lettuce anthracnose caused by *Marssonina panattoniana* (Berl.) Magn. was observed for the first time in commercial lettuce fields in Bardeh, 18 km northeast of Shiraz. Infected plants developed water soaked spots which enlarged, became tan and finally shot hole symptoms appeared. Narrow, elongated, and creamy streaks also appeared on midribs and petioles. Pure culture of the pathogen caused similar symptoms on lettuce cv. Great Lakes under greenhouse conditions at 15-23°C. Optimum temperature for growth was 15°C. The disease was prevalent during cool and wet periods in winter and early spring but not in summer.

خلاصـــه

بیماری آنتراکنوزکاهوکه توسط قارچی بنـــام *Marssonina panattoniana* تولیدمیشودبرای اولین بـــــاردر اردیبهشت ۱۳۵۵درقریه بـــــرده ، ۱۸ کیلومتری شمال شرقی شیـــــراز روی کاهوهای محلی مشاهده شد . علائـــم بیماری روی برگ ابتدا بصورت لکه های آب سوخته بقطر ۳-۲ میلیمتربوده کـــه بتدریج بزرگ شده وبه ۱ تا ۲ سانتیمتـــر میرسدوبرنگ ارغوانی درمیآید . برگ دراثرحمله بیماری سوراخ سوراخ میشود . قارچ به دمبرگ ورگبرگ اصلی نیـــز حمله کرده ونوارهای کرمی رنگ کـــه حاوی اسپرقارچ است تولیدمیکنـــد . تلقیح مصنوعی قارچ خالص شده بـــه کاهورقم Great Lakes درگلخانه در حرارت ۱۵ تا ۲۵ درجه سانتیگراد علائـــم بالارا بوجودآورد . قـــــارچ دارای اسپرهای دوسلولی بیرنگ با بعـــاد متوسط ۱۴/۸۸×۴/۰۲ میکرن میباشـــدو درحرارتهای ۵ تا ۳۵ درجه سانتیگراد رشد کرده وحرارت اپتیمم آن ۱۵ درجـــه سانتیگراداست . اهمیت بیمـــاری در مزرعه درمواقع خنک ومرطوب سال بوده ودرکاهوهائیکه درمهرماه یا اواســـط زمستان کشت میشونددراواخرزمستـــان ودربهارخسارت قابل توجهـــی وارد میآورد . این بیماری درکـــاهوهـــای تابستانه دیده نشده است .

INTRODUCTION

Lettuce anthracnose incited by *Marssonina panattoniana* (Berl.) Magn. is an important disease of young and mature lettuce plants under field conditions (4) and in transit (6). During cool and wet periods, the disease

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results in a great loss (2, 5, 7). The pathogen survives in infected plant residues and on wild lettuce but is not carried on seeds (2).

In Iran, the lettuce anthracnose has only been reported from Golpayegan (3), but no isolation, cultural, and morphological studies or pathogenicity tests have been conducted.

Lettuce is an important winter crop in the Fars province. The major fungal leaf disease in some lettuce growing areas is downy mildew caused by *Bremia lactucae* Regel. Anthracnose was observed for the first time in commercial lettuce fields in Bardeh, a village 18 km northeast of Shiraz. The purpose of this study was to investigate some cultural and pathological characteristics of *M. panattoniana*. An abstract of this work has been published (1).

MATERIALS AND METHODS

Isolation

During early spring of 1976, diseased leaves were collected from various fields in Bardeh and brought to the laboratory. Leaves were thoroughly washed under running water and surface sterilized in 0.5% sodium hypochlorite for 1 min. Infected areas were smeared on V-8 agar (V-8 juice 200 ml, agar 17 g, distilled water 800 ml) containing 50 ppm streptomycin sulfite. Plates were incubated at 24°C for 2-4 days. Pure culture of the pathogen was obtained by serial subcultures and finally by single spore isolates.

Growth Rate Studies

Five millimeter blocks of 7-day-old culture on V-8 agar were transferred into 250-ml flasks containing 50 ml of potato dextrose broth (20 g dextrose and juice of 400 g of peeled potatoes in 1000 ml distilled water). Flasks were incubated in the dark at 5, 10, 15, 20, 24, 28, 32 and 35°C. Three replicates were used for each temperature.

Ten days later, the content of each flask was filtered on pre-weighed Whatman No.1 filter paper and dried at 70°C for 24 hr. Dry weights of the pathogen from different temperatures were compared.

Pathogenicity Test

Lettuce cv. Great Lakes grown for 4-6 weeks in the greenhouse were inoculated with a heavy spore suspension of *M. panattoniana* (grown on V-8 agar for 5 days) by means of an atomizer. Controls were sprayed with distilled water flooded on V-8 agar plates. Plants were incubated at 15-25°C in a humid chamber for 72 hr after which they were transferred to a greenhouse bench and kept at 15-25°C for symptom development.

RESULTS

Morphological Studies

Microscopic observations of diseased tissues and pure culture of the pathogen on V-8 agar, revealed the presence of *M. panattoniana*. Conidia were two-celled and hyaline. The average dimension of 50 conidia was 14.88 by 4.02 µm (10-18 by 3-5 µm). They were formed on short grouped conidiophores. In culture, the pathogen increased mostly by budding of conidia.

Growth Rate Studies

The pathogen grew on all temperatures used in this study; however, maximum growth occurred at 15°C (Fig. 1). There was a sharp increase and decrease in growth from 10 to 15 and 15 to 20°C, respectively. Very little growth occurred at 5 and 28°C or higher temperatures.

Pathogenicity Test

Under greenhouse conditions the pathogen caused water-soaked minute spots on leaves which later enlarged to 2-3 mm in diameter with tan edges and white centers. Numerous

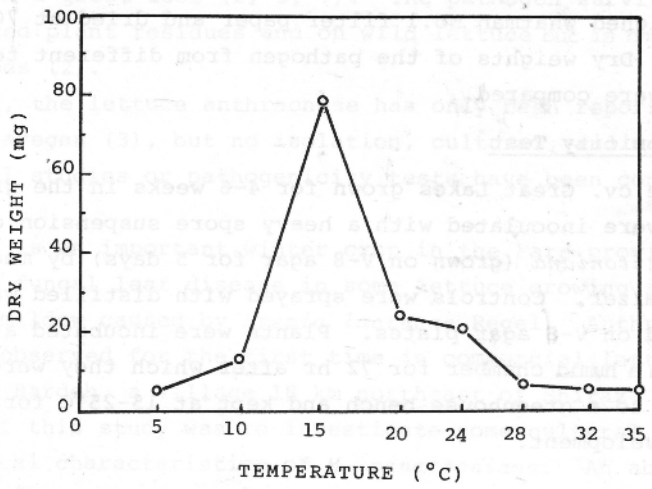

Fig. 1. Growth of *Marssonina panattoniana* on potato dextrose broth after 10 days of incubation at 5 to 35°C.

spots appeared on a single leaf. The center of old spots fell out and resulted in a shot hole symptom. Petioles and midribs showed creamy streaks full of conidia (Fig. 2). Under field conditions the disease symptoms were observed on seedlings as well as on mature lettuce plants. Seeds sown in the fall exhibited disease symptoms from midwinter and resulted in total loss of young seedlings.

DISCUSSION

The activity of the pathogen is dependent on favorable environmental conditions. There are several reports that the disease is important during cool and wet periods (3, 5, 7). It was shown in this study that optimum temperature for growth in culture is 15°C. In Bardeh, the disease is important during cool and wet conditions prevailing during winter

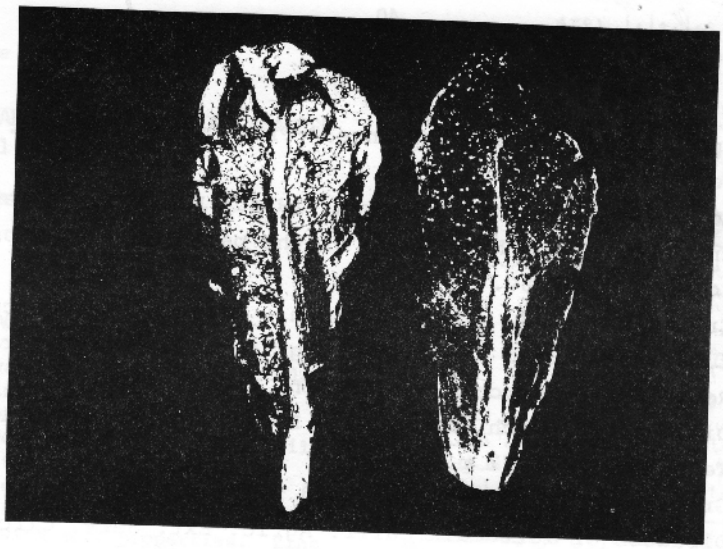

Fig. 2. Field symptoms of *Marssonina panattoniana* on the midribs and blade of a local lettuce cultivar.

and early spring and not in summer. This indicates that low temperature and high humidity are the major factors for the disease development.

Couch and Grogan (2) concluded that the pathogen mostly survived in lettuce debries for at least seven months. Wild lettuce was also important for the survival of the pathogen. The pathogen was not considered to be seed-borne (2). In Bardeh, lettuce is grown throughout the year and most of the farmers plant lettuce in the same land successively. The infected lettuce residues are, therefore, considered to be an important source of inoculum. Infected lettuce plants may also harbor the pathogen during unfavorable conditions.

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