

Polymyxa betae in Nebraska

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ABSTRACT

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Field surveys in September 1981 in western Nebraska sugar beet growing areas showed the presence of *Polymyxa betae* cystosori and zoospore-releasing sporangia in roots of sugar beets and of the common redroot pigweed, *Amaranthus retroflexus*. No virus could be recovered from the cultures of *P. betae*.

Polymyxa betae Keskin is an important root-inhabiting fungus occurring in sugar beet growing areas in Europe (3), Japan (7), and Canada (2); it has also been found in California (5). *P. betae* is thought to be the vector of beet necrotic yellow vein virus (BNYVV) (7). Sugar beet production in Italy is poor in areas where viruliferous *P. betae* occurs (4). Recently, the virus has been isolated in the state of Washington (1). This is of concern because no sugar beet varieties resistant to BNYVV or *P. betae* are known. *P. betae* not only infects sugar beet and spinach but also occurs in large numbers in the roots of a weed common to sugar beet fields, *Amaranthus retroflexus* or redroot pigweed.

In 1976, we assayed fields in western Nebraska cropped to sugar beets for *P.*

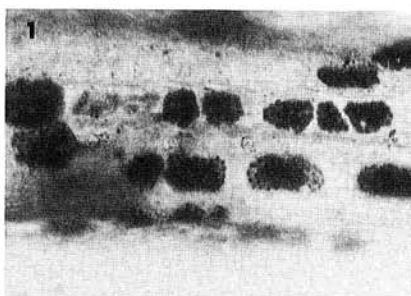


Fig. 1. Light micrograph of sugar beet root cortex cells with *Polymyxa betae* cystosori ($\times 250$).

betae, but found none. The report of BNYVV in North America (1) prompted another search. Roots of sugar beets and redroot pigweed from low-lying areas in fields in Scottsbluff County were again examined for *P. betae*. Washed roots were boiled for 5 min in lactophenol containing 1% acid fuchsin, destained in lactophenol, and inspected with a Zeiss light microscope. In five of six fields, *P. betae* was present in all roots examined (Fig. 1).

Because *P. betae* and *P. graminis* are morphologically indistinguishable (2), we planted sugar beet and wheat seed in a

soil sample from an infested field. To avoid the ubiquitous *Oplidium brassicae* and tobacco necrosis virus, we grew plants at 28 C in growth chambers. This temperature prohibits *O. brassicae* and favors *P. betae* (6). Only sugar beets became infected with *Polymyxa* sp. Roots of wheat were free of *Polymyxa* sp., establishing the species encountered as *P. betae*. Root samples containing *P. betae* were finely ground with mortar and pestle, and the sap was used to inoculate leaves of sugar beet seedlings. No local lesions developed, indicating the absence of BNYVV. Field samples of the western Nebraska sugar beet growing area will periodically be monitored for *P. betae* and BNYVV.

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