Crown rot of rhubarb in Alberta

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A bacterium isolated from rhubarb *(Rheum rhaponticum)* plants showing symptoms of crown rot was identified as *Erwinia rhapontici.* These diseased plants were found at two locations in the city of Edmonton.

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Une bacterie isolée de plants de rhubarbe manifestant des symptômes de pourriture de la couronne a été identifiée comme *Erwinia rhapontici.* Les plants atteints ont ete observes a deux endroits dans la ville d'Edmonton.

Crown rot of rhubarb *(Rheum rhaponticum)* has been described by Millard (8) and Metcalfe (7) provides a comprehensive description of the disease and the causal organism, *Bacterium rhaponticum,* classified in the eighth edition of Bergey's manual (2) as *Erwinia rhapontici* (Millard) Burkholder 1948. Dye (4) compared four isolates of *E. rhapontici* as to their cultural, biochemical, and physiological characteristics. Graham (5) reported on the characteristics of three ***E. rhapontici*** isolates.

In June 1975 rhubarb plants showing extensive soft-rotting of the crown area and lower petioles were obtained from two gardens located in the city of Edmonton. A study was undertaken in an attempt to isolate and identify the cause of this disorder.

Materials and methods

Rotting tissue taken from the crown area of the rhubarb roots was plated on nutrient-yeast agar (beef extract, **0.1%;** yeast extract, 0.2%; peptone, **0.5%;** NaCl, 0.5%; agar, **1.5%;** pH 7.2-7.4). Individual colonies were checked for cultural, biochemical, and physiological characteristics using methods described by Bradbury (1), Dye (3), and Graham (5). Oxidation and fermentation of glucose was tested using the method of Hugh and Liefson (6) as modified by Riggle and Klos (9). In addition detached surface-sterilized rhubarb petioles were inoculated with the bacteria isolated and incubated in a moist chamber of 27°C. Controls were inoculated with sterile distilled water.

Results and discussion

The biochemical, physiological, and cultural characteristics of the bacterial isolate from the crown-rot disorder of rhubarb are listed in Table 1, in conjunction with those of ***E. rhapontici*** as reported by Dye (4) and Graham **(5).** The Edmonton isolate shows close correlation with those properties listed for *E. rhapontici.* It differs only in failing to produce a pink diffusible pigment, as did some of the isolates tested by Dye (4).

Table **1.** Biochemical, physiological, and cultural characteristics of an Edmonton, Alberta, isolate of *E. rhapontici,* compared with those for ***E. rhapontici*** as listed by Dye (4) and Graham (5)

Characteristic	Edmonton isolate	Dye (4)*	Graham (5)
Pectate liquefaction	–	–	–
Potato–slice rot	S1+**	–	S1+
Pink diffusible pigment	–	d	+
Gas from glucose	–	–	
Reducing substances (sucrose)	+	+	+
Gelatin liquefaction	–	–	
Production of indole	–	–	–
Levan	+	d	
Acid from glucose aerobically	+		
Acid from glucose anaerobically	+		+
Acid from maltose	+	+	+
Acid from lactose	+	+	+
Nitrate reduction	+	+	+
Soft–rot of rhubarb	+		

* Dye (4): + = 80 – 100% of isolates positive
d = 21 – 79% of isolates positive
– = 0 – 21% of isolates positive
** S1+ = slow positive

In addition, the detached petioles that were inoculated with this organism rotted within 2 days, whereas controls showed no signs of rotting. This test and the pectate liquefaction test indicate that this organism is a soft-rot bacterium.

Based on the characteristics listed in Table 1, it is reasonable to conclude that the bacterial species isolated from the crown-rot disorder in Edmonton is an isolate of ***E. rhapontici,*** a bacterial disorder of rhubarb not previously reported in Canada.

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