

Short communication

Myxobacteria from Antarctic soils

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Myxobacteria are widespread microorganisms in substrates such as soils, dung of herbivores, decaying plant material, and bark. They have been isolated from soils in nearly all climatic zones (Reichenbach and Dworkin 1981), but no data are yet available from Antarctic substrates.

Five crude topsoil samples were collected aseptically from the surface to 5 cm depth at Fildes Peninsula, King George Island (South Shetland Islands), during the Antarctic summer of 1984. The investigations were carried out during November. The soils were slightly acid to neutral [$\text{pH}(\text{H}_2\text{O}) = 5.7 - 6.9$]. The isolation techniques consisted of the dung pellet and the water agar methods (Rückert 1979). Incubation took place both at 30°C and at room temperature, but not under psychrophilic conditions because there was insufficient material. Identification was carried out after characteristic fruiting bodies (McCurdy 1969, Rückert 1979) had appeared.

Two out of five samples were positive. Fruiting bodies of *Myxococcus virescens* were isolated from a water agar plate (30°C), and of *M. stipitatus* from a dung pellet plate (room temperature), respectively. In total, six strains were isolated and identified as *M. virescens* (five strains) and *M. stipitatus* (one strain). All developed best at 30°C. There was no cell reproduction under psychrophilic conditions.

There are several, in a qualified sense comparable, investigations on myxobacteria in soils from cold regions of the northern hemisphere. In 17 soil samples from the Alaskan and Canadian Arctic, *Myxococcus fulvus* was found twice and *Sorangium* (= *Polyangium*) *sorediatum* three times. Thirteen samples yielded no fruiting bodies (Brockman and Boyd 1963). In all cases strains developed on plates incubated at 24°–26°C, and none under psychrophilic conditions (6°–8°C). *M. fulvus* appeared by far the most common species in soils from northern Europe, being observed in 15 of 50 alpine soil samples taken from northern Sweden, while *M. virescens* and *Chondroccoccus* (= *Myxococcus*) *coralloides* were both obtained from two samples, and *Archangium sp.* from one sample. Thirty-three samples were negative (Norén 1952). In 34 soil samples from the European Subarctic (Iceland, northern Norway) *M. fulvus* occurred abundantly (28 times) and five samples yielded fruiting bodies of *M. coralloides*. *A. gephyra* was observed twice, whereas *M. virescens* and *Podangium gracilipes* (= *Melittangium lichenicola*) were recorded only once. Only five samples were negative (Rückert 1976).

Myxobacteria are mesophilic. In pure cultures they prefer temperatures between 18° and 40°C, with a usual temperature optimum of 30°C (McCurdy 1974). Psychrophilic strains are still unknown. Fortunately, soil temperatures were measured at the sampling locations. A maximum soil temperature of 18°C was recorded, while the air temperatures (1 m) stayed below 7°C during January and February (Blümel 1984). Apparently the soil climate seems to be suffi-

cient for temporary myxobacterial development. Nutritional conditions do not seem to be a limiting factor for the occurrence of myxobacteria in cold climates.

Obviously, in extreme habitats members of the genus *Myxococcus* predominate, possibly because of a higher resistance of their resting cells against drought, heat, cold, salinity, and long storage (Rückert 1983). The results presented are adequate confirmation of this.

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