THE DESIGNATION OF CORYNEBACTERIUM
UREAFACIENS KREBS AND EGGLESTON
AS ARTHROBACTER UREAFACIENS
(KREBS AND EGGLESTON) COMB. NOV.

Francis E. Clark¹

In 1937 Dubos and Miller (1) isolated a small Gram-positive bacterium which grew readily on all common laboratory media and which was of particular interest to them in that when grown on creatine or creatinine as a sole source of carbon and nitrogen, urea accumulated in the substrate. At that time they designated their culture simply as Culture NC. In 1939, Krebs and Eggleston (2) confirmed the biochemical observations of Dubos and Miller; they also extended the description of the bacterium and named it Corynebacterium ureafaciens. Later, Dubos and Miller sent their initial isolate to the American Type Culture Collection, under the name Corynebacterium creatinovorans. This name appeared in the following ATCC catalogue of cultures (3) and it has also appeared in some more recent literature (4, 5).

Inasmuch as Krebs and Eggleston employed the culture of Dubos and Miller, the two differently named cultures obviously are identical. C. ureafaciens has been of interest primarily to workers engaged in biochemical studies. Its relationship to other species of Corynebacterium, and the question of whether it should be placed in the genus Corynebacterium or in one of the closely related genera now recognized for the soil corynebacteria (6), have not heretofore been considered. It is my purpose here to call attention to the close similarity of the soil isolate Corynebacterium ureafaciens to certain soil corynebacteria now recognized in the genus Arthrobacter, and to propose that the species be transferred to Arthrobacter.

Observations have been made on C. ureafaciens no. 7562 received from the American Type Culture Collection. This culture meets the description given by Krebs and Eggleston, particularly in its irregular cell morphology, uneven staining, nonmotility, yellow pigmentation, ability to grow on inorganic media, gelatin liquefaction, failure to reduce nitrates, catalase production, and failure to produce urease.

¹Soil and Water Conservation Research Branch, Agricultural Research Service, U.S. Dept. of Agric., Beltsville, Md.

In the course of comparative screening of a number of corynebacteria of soil, plant, or animal origin, it was quickly found that the great majority of them were culturally dissimilar from Corynebacterium ureafaciens. These cultures are accordingly dismissed from any individual consideration in order that attention can be focused on a few cultures that have shown less marked cultural dissimilarity. These cultures are three strains of Arthrobacter aurescens isolated by Conn and Dimmick (7), and an unnamed soil corynebacterium designated T178, isolated by Topping (8) in Scotland. Conn and Dimmick, although they did not publish a description of A. aurescens, did refer (p. 350) to a yellow chromogenic bacterium which occurred in soil and which they stated undoubtedly belonged in the same genus as A. globiforme. Cultures sent by Conn to the writer in 1950 were labeled A. aurescens. These cultures were studied by Clark (9) and later by Phillips (10).

These cultures, as well as Corynebacterium ureafaciens, are capable of growing on creatine, creatinine, and uric acid as a sole source of carbon and nitrogen, and they are urease negative. Their growth responses on common laboratory test media are in agreement with those of C. ureafaciens. All produce a yellow pigmentation, which varies somewhat in intensity.

The similarity of these cultures to C. ureafaciens points to the desirability of placing them all in the same genus, and in a single species. The writer has discussed previously (6) the desirability of recognizing the genus Arthrobacter Conn to accommodate the numerous corynebacteria of soil origin that as a rule grow readily on inorganic media and whose inclusion in Corynebacterium does not seem desirable, particularly since they differ quite markedly from the type species of that genus. Accordingly, the designation of Corynebacterium ureafaciens Krebs and Eggleston as Arthrobacter ureafaciens comb. nov. is herewith proposed.

Arthrobacter ureafaciens (Krebs and Eggleston) comb. nov.

Corynebacterium ureafaciens Krebs and Eggleston 1939.

Corynebacterium creatinovorans Dubos and Miller 1949?
(not validly published).

Arthrobacter aurescens Conn and Dimmick (?) 1948.

BACTERIOLOGICAL NOMENCLATURE
AND TAXONOMY

SUMMARY

Arthrobacter ureafaciens comb. nov. is proposed for certain yellow-pigmented soil corynebacteria that grow readily on creatine and uric acid media but fail to produce urease. These bacteria have previously been recognized under the name Corynebacterium ureafaciens, C. creatinovorans, Arthrobacter globiforme var. aureescens, and A. aureescens.

REFERENCES

1. Dubos, René J. and Benjamin F. Miller. The production of bacterial enzymes capable of decomposing creatinine. Jour. Biol. Chem. 121:429-445. 1937.
2. Krebs, Hans A., and Leonard V. Eggleston. Bacterial urea production (Metabolism of Corynebacterium ureafaciens). Enzymologia 7:310-320. 1939.
3. Catalog of Cultures, American Type Culture Collection. Ed. 5. 1949.
4. Kalnitzky, George, and E.S. Guzman Barron. The effect of fluoroacetate on the metabolism of yeast and bacteria. Jour. Biol. Chem. 170:83-95. 1947.
5. _____. Some factors influencing enzymic activities of Corynebacterium creatinovorans. Proc. Soc. Exp. Biol. and Med. 74:767-768. 1950.
6. Clark, Francis E. The generic classification of the soil corynebacteria. Int. Bull. Bact. Nom. Tax. 2:45-56. 1952.
7. Conn, H.J., and I. Dimmick. Soil bacteria of the genus Arthrobacter. Soil Sci. 65:349-351. 1948.
8. Topping, Lucy E. The predominant microorganisms in soils. I. Description and classification of the organisms. Zentralbl. Bakt., Abt. II, 97:289-304. 1937.
9. Clark, F.E. The generic classification of certain cellulolytic bacteria. Soil Sci. Soc. Amer. Proc. 15:180-182. 1951.
10. Phillips, H.C. Characterization of the soil globiforme bacteria. Iowa State Coll. Jour. Sci. 27:240-241. 1953.