Sakaguchi, B. and S. Kobayashi. National Institute of Genetics, Japan. Morphological observations of "sex-ratio" agents of D. willistoni and D. nebulosa.

It has been demonstrated by Poulson and Sakaguchi (1961) that the infectious agents responsible for the maternally transmitted "sex-ratio" condition (SR) in D. willistoni and D. nebulosa are minute spirochetes, presumably Treponema. In order to investigate the form, fine structure and life cycles of the SR agents, the SR spirochetes, electron microscopical observations are now underway. The results so far obtained may be briefly described.

Females of SR strains of D. willistoni and D. nebulosa were used as a source of the SR spirochetes. The hemolymphs taken from the females were either diluted with Drosophila Ringer or treated with 2% phosphotungstic acid (for negative stain). The diluted hemolymphs were placed on grids and then fixed by osmium tetroxide vapor.

The forms of the SR spirochetes are very variable; the two species of the spirochetes cannot be clearly distinguished (Figure 1). The size of the spirochetes can be estimated to be of

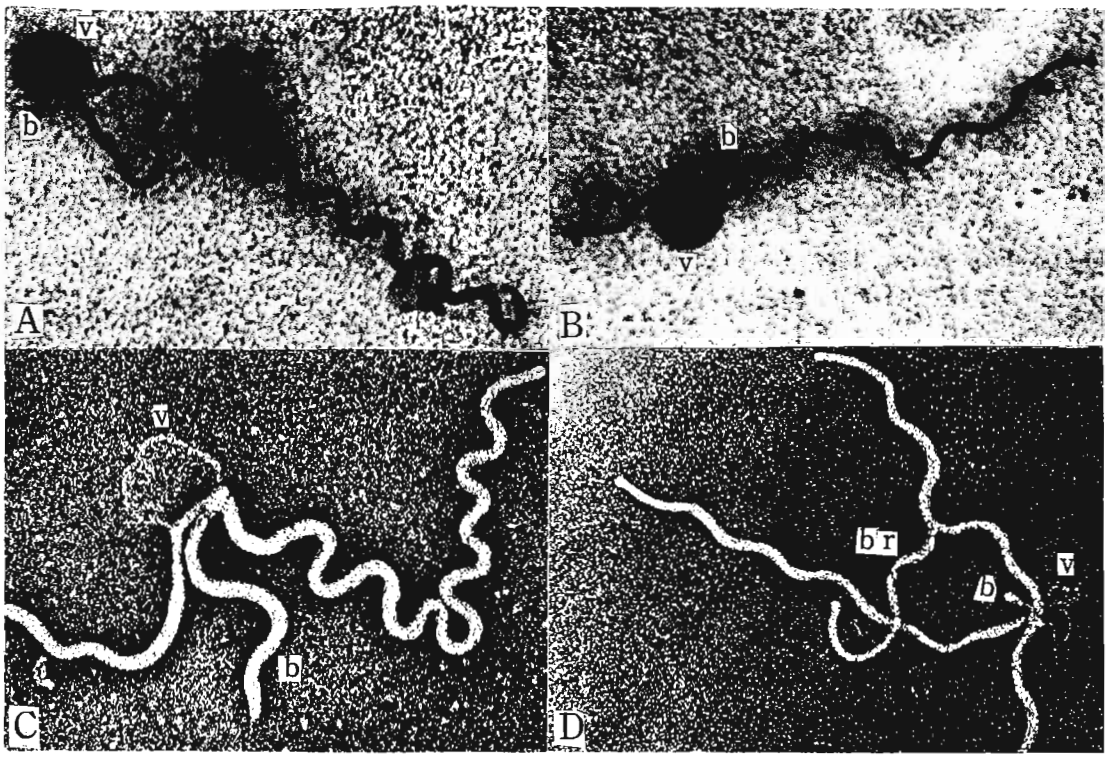

Figure 1. Electron micrographs of SR agents of D. willistoni and D. nebulosa. A and C: SR agent of D. willistoni (A: fixed by osmium vapour, X 12,000; C: negative stain, X 16,000). B and D: SR agent of D. nebulosa (B: Fixed by osmium vapour, X 12,000; D: negative stain, X 13,000). b: bud, br: branch, v: vesicle.

the order of about 8 to 16 microns in length and 0.15 to 0.08 microns in diameter. In most instances the spirochetes show irregular undulations running along the filaments, as represented in the photographs. A striking morphological feature is a vesicle ranging from 0.8 to 1.2 microns in diameter. These vesicles may occur at any point along the filament. Furthermore, they form one to four minute granules (buds) which may develop into young spirochetes. It is suggested that the vesicles play an important role in the cycle of duplication.

It is interesting that the filaments are occasionally branched. This feature has so far been found in no other spirochete species. In some spirochetes treated with 2% ammonium sulfate the filament appeared to be double coiled, each coil approximately 5 millimicrons thick.

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