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## Notes on the Bacterial Flora of the Snake

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NOTES ON THE BACTERIAL FLORA OF THE SNAKE

ROGER PATRICK AND C. H. WERKMAN

A study was made of the bacterial flora of diseased and normal snakes. The material was furnished by the Museum of the Minnesota Academy of Science, Minneapolis Public Library. Two types of disease were reported as being the cause of the death of their snakes. One, a typhoid-like disease; the other, a pneumonia. Scrapings from the intestines of the typhoid-like cases and the lungs from the snakes which had died of pneumonia were sent to this laboratory for bacteriological examination. The species from which isolations were made are as follows: Western Diamond Rattlesnake (*Crotalus atrox*), Timber Rattlesnake (*Crotalus horridus*), California Red Rattlesnake (*Crotalus exsul*), and Coach-whip Racer (*Coluber flagellum*).

The species of bacteria isolated and identified from the typhoid-like cases were: *Achromobacter solitarium*, *A. nebulosum*, *Aerobacter chinense*, *Escherichia vesiculiformans*, *E. alba*, *Pseudomonas viscosa*, *Ps. smaragdina*, *Ps. jaegeri*, *Proteus hydrophilus*, *Bacillus lacticolus*, *B. subtilis*, and *Shigella bienstockii*. One new species was named as a result of this study. The species is as follows:

*Pseudomonas puris* n.s. conforms to the specific diagnosis of *Pseudomonas ureae*, given by Bergey, with these exceptions: Gram positive. Agar slant: thin, white growth. The medium is bluish-green. Litmus milk: peptonized, yellow and later turning blue. Nitrates not reduced between one and seven days.

*Pseudomonas smaragdina* proved fatal to a guinea pig within 24 hours. The organism was recovered from the lungs, liver, and kidneys. The liver showed petechiae scattered over the entire surface. The lungs were much congested and the suprarenal capsules were so congested and swollen as to give them the appearance of blood blisters. *Proteus hydrophilus* from an agar slant was injected into mice intraperitoneally. The mice died within twenty-four hours.

Identification was made of the following species from the lungs of the snakes which had died of the pneumonia: *Alcaligenes bookeri*, *A. albus*, *Achromobacter geminum*, *Escherichia leporis*,

*Es. plebeia*, *Es. acidilactici*, *Proteus hydrophilus*, *P. vulgaris*, *Klebsiella pneumoniae*. The pathogenicity of these has not been tested, except *Proteus hydrophilus* which killed mice within twenty-four hours.

A study of the bacterial flora of a normal Garter snake, *Thamnophis sirtalis sirtalis* was made. Specimens were taken from the lung, stomach, intestine and cloaca. *Micrococcus saccatus* was the only species isolated and identified from the lung. From the isolations of the stomach, two species were found: *Achromobacter sinosum* and a new species, *Bacillus indologenes* n.s.

*Bacillus indologenes* n.s. conforms to the specific diagnosis of *Bacillus pseudoteticus*, as given by Bergy, with these exceptions: non-motile. Gelatin rapidly liquefied. Agar slant: white, thick and crusted. Litmus milk: Reduced after seven days. Peptonized after ten days. Indol formed. Acid in dextrose, salicin, levulose, maltose, trehalose, dextrin, and glycerin.

*Micrococcus saccatus* was found to be non-pathogenic to mice. A single species was isolated from the intestine and cloaca. After its cultural characteristics were carefully studied, it was described as a new species, *Escherichia draconis* n.s.

*Escherichia draconis* n.s. conforms to the specific diagnosis of *Escherichia schaefferi*, as given by Bergey, with these exceptions: Gelatin: slow liquefaction or doubtful. Litmus milk: Slow reduction at the bottom of the tube. Nitrates not reduced to nitrites. Potato slant: Brown, shining growth. No acid or gas in salicin.

*Escherichia coli* was not found in the intestinal tract of the snake.

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