MOSQUITO PRODUCTION IN SEWAGE LAGOONS

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A fairly recent development in community sanitation is the rapidly expanding use of sewage lagoons, or stabilization ponds. Compared with the traditional mechanized sewage disposal plant they have the advantages of low first cost, depreciation, and maintenance. Unfortunately for those interested in mosquito control, some communities have responded to the low maintenance concept by providing none, with the result that the lagoons have provided ideal conditions for producing mosquitoes, principally *Culex tarsalis,* a potential disease vector.

A heavy population of *C. tarsalis* at Kamloops led to an investigation of four lagoons in the district which gave clear demonstrations of mosquito breeding at its worst, and the possibility of its suppression. These four pools are discussed in descending order of nuisance value.

Lagoon A, a pool about three acres in extent, was attached to a large private institution. Roughly rectangular, it had a peninsula extending a short distance from one end on which were the inlet works. The water had the appearance of pea soup due to algae, and the pool apparently performed its primary function excellently. It contained a number of large carp which no doubt played an important role in keeping the main body of water free of mosquito and other insect larvae. Unfortunately the banks were heavily overgrown with vegetation down to and beyond the waterline, giving place to a massive growth of cattails extending in places six feet from the shore. In this zone, sheltered from wave action and predation, *Culex* larvae proliferated excessively.

Lagoon B, a large pool of about twelve acres, served a suburban community. The banks were heavily covered with weeds and some willows, and there was a margin of a few inches of vegetation emerging from the water. This margin supported a moderate population of *Culex* larvae. At one end an overflow carried the effluent to a depressed area of several acres where it formed a swamp, heavily overgrown, which supported an exceedingly dense population of mosquitoes.

Lagoon C consisted of two sections of fifteen acres each, which at the time of inspection had been in use only for a few weeks. The banks were thickly overgrown with annual weeds, some of which had been inundated by the rising water. This had formed a narrow margin of protected water in which were a few mosquito larvae. It was obvious that this was a temporary condition, and the future state of the banks would depend upon the quality of maintenance. However, in this case there had been a long interval between the original excavation of the pools and the inauguration of the system, during which the beds had given rise to numerous tall terrestrial plants, even including willows, which protruded above the water. The annual plants would soon be gone, but the willows could thrive and form a mosquito harbour.

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Lagoon D was two small basins, totalling about three acres, attached to a large public institution. The pools had been in use for a number of years but produced no mosquitoes. The reason for this lay in their construction. The outline was rectangular, and the banks were lined with shale which gave footing to a scattered population of annual weeds, none of which extended below the water line. Accordingly wave action and native predators eliminated all larvae.

Chemical methods of larval control are uneconomic in sewage lagoons, as the normally residual larvicides degenerate rapidly in the highly polluted water, making repeated, heavy applications necessary. Fortunately, the environment may be so manipulated that the existing natural control factors become highly efficient.

The most effective deterrents to mosquito production in these pools are wave action and natural predators. Both are inhibited by the presence of emergent or floating vegetation. If the following points are observed in the construction and maintenance of sewage lagoons there is little likelihood that they will become sources of mosquitoes.

1. The area of the pools should be as large as possible, and the establishment of nearby windbreaks should be avoided, so that wave action may be encouraged.

2. The dykes should be wide enough on top to permit the passage of mowers and other maintenance machinery.

3. The banks should have a moderate slope, and if formed of soil, they should be planted to grass and kept mowed.

4. The water should be kept at sufficient depth to prevent the establishment of bottom-rooted vegetation.

5. There should be provision for a rapid draw-down of a foot or so, when this is compatible with the primary function of the pool, to destroy larvae by stranding.

6. Seepage or overflow should be carried away in deep, clear channels.

7. Emergent vegetation should be killed by herbicides or removed mechanically. Floating drift should be cleared away.

8. Coarse fish, such as carp, may be introduced as predators.

Abstract

Four sewage lagoons are described that illustrate in varying degree conditions that encourage mosquito production. Steps are outlined by which mosquito breeding in ponds can be prevented.

CONTROL OF PESTS IN INSECT AND HERBARIUM CABINETS

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For some years I have worked on control of museum pests, chiefly *Anthrenus verbasci* (L.), the varied carpet beetle, which is also the most widespread household pest in Vancouver; *Attagenus piceus* Oliv., the black carpet beetle; *Perimegatoma (Megatoma) vespulae* Milliron, a parthenogenetic species which feeds indiscriminately upon herbarium specimens and dried insects; *Stegobium paniceum* (L.), the drug store beetle; and *Ptinus ocellus* Brown (=*tectus*). We do not yet contend

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