

CHANGES IN LOCAL MOSQUITO FAUNA FOLLOWING BEAVER (*CASTOR CANADENSIS*) ACTIVITY—AN UPDATE

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ABSTRACT. Drastic reduction of populations of univoltine temporary pool mosquitoes followed impoundment of breeding areas by beavers. Mosquito populations persist at very low levels over a 10-year period with no evidence of mosquito development in the impoundment.

Marked reductions in mosquito populations related to beaver (*Castor canadensis*) activity in the upland site of the Biological Field Station of the State University of New York, College at Oneonta has been documented (Butts 1986). The research site is just north of Cooperstown, NY, consists of about 360 acres (146 ha) and is largely wooded. A small area of open grassland around a 16 ha man-made pond, an old field between 2 abandoned, unpaved airport runways and a small bog occupied the original non-forested sites. The area surrounding the bog and an adjacent poorly drained forest (ca. 12 ha) are now impounded. Impoundment by beavers of an area which previously supported large larval populations of univoltine *Aedes* spp. has inundated large areas of temporary waters, making them unsuitable for the breeding of these species.

Populations have been sampled each summer in anticipation of utilization of the now permanent standing water by other mosquito species. Throughout subsequent summers mosquitoes alighting upon, biting or within reach of a seated adult human have been collected. Exposure has been at approximately weekly intervals from late April or early May through mid-September or later. Times of exposure have been consistently longer than those of the standard sampling periods of the original survey (Butts 1974). Exposure characteristically began at first light and continued for 1–3 h thereafter, or began at just before sundown and continued until the onset of darkness. Specimens collected in this manner are listed in Table 1.

Beginning in 1985 two CDC miniature light traps (without dry ice) have been operated at weekly intervals at various sites around the edge of the impoundment. Alive specimens thus collected are also listed in Table 1. Occasional larval surveys of all surface area accessible by canoe have been consistently negative for mosquito larvae.

From 1981 through 1991 mosquito populations have remained at quite low levels with no evidence of use of the impounded waters by

mosquitoes. Only 4 mosquitoes were collected during the summer of 1988. This stands in marked contrast to the situation prior to impoundment. In the sampling series conducted in the summer of 1969 a total of 696 specimens of 5 univoltine temporary pool *Aedes* spp. were collected. On July 20, 1977 in a 20-min exposure, 309 landings and departures were recorded from a 0.09m² area on the author's back (Butts 1986). Two new site records have been established by light trap sampling. A female *Culex pipiens* Linn. was taken on September 1, 1988 and a female *Culiseta melanura* (Coquillett) was collected on August 15, 1990.

Changes in the impoundment which may influence larval development have been noted. By the end of the summer of 1985 much of the permanent woody vegetation, consisting primarily of beech (*Fagus grandifolia*), northern hemlock (*Tsuga canadensis*), *Populus* spp. and alder (*Alnus* spp.), had died, leaving the water surface largely devoid of shaded areas. Much of the surface was covered (with temporal variations due to wind patterns) by a mat of duckweed (*Wolffia* sp. and lesser amounts of *Lemna* sp.). This vegetation had developed shortly after initiation of the impoundment and had persisted. At dawn on August 13, 1985 no duckweed was visible on the water surface. By 1000 h, small clumps of *Wolffia* began to rise to the surface, but the mat was not re-established and has not developed since. By the summer of 1987 the large populations of *Chaoborus* sp. and numerous entomostracan crustaceans that had prevailed previously were no longer in evidence. A larval survey on August 5, 1987 yielded only a single aeshnid nymph. The impoundment had acquired a dirty greenish cast with a surface scum characteristic of cyanobacterial growth. These characteristics have persisted in subsequent summers.

Use of the impoundment by beavers has continued to date without enlargement of the impounded area. Continued surveillance of the site is anticipated.

Table 1. Mosquitoes collected from 1984 to 1991 in CDC light traps (marked with asterisks*) and when alighting upon, biting or within reach of a seated adult human. Numbers in parentheses indicate multiple specimens.

Species	1984	1985	1986	1987	1988	1989	1990	1991
<i>Aedes vexans</i> (Meigen)		Jul. 30*		Aug. 4			Aug. 27*	
<i>Aedes canadensis</i> (Theobald)	Jun. 6 (2) Jun. 7		Aug. 13	Aug. 4			Jul. 9 (2) Jul. 16 Jul. 30 (2) Aug. 27	Jul. 29 (2)
<i>Aedes excrucians</i> (Walker)		Aug. 16						
<i>Aedes punctor</i> (Kirby)	May 7			Jun. 30		Jun. 19 (2)		
<i>Aedes stimulans</i> (Walker)	Aug. 8	Aug. 21			Jul. 19	Aug. 16	Jul. 23 Jul. 30	
<i>Aedes hendersoni</i> Cockerell			Jul. 25			Aug. 16		Aug. 13
<i>Aedes triseriatus</i> (Say)	Aug. 8			Jul. 7			Aug. 27 (2)	Aug. 13
<i>Anopheles earlei</i> Vargas		Jun. 17 Aug. 22	Aug. 1 (8) Aug. 7 (3) Aug. 13 Aug. 26				Aug. 28*	Aug. 14* Sep. 19*
<i>Anopheles punctipennis</i> (Say)	Aug. 25	Aug. 21						
<i>Coquillettidia perturbans</i> (Walker)		Jul. 30*	Aug. 1	Jul. 8*	Jul. 21*		Aug. 15*	Jul. 29
<i>Culex pipiens</i> Linnaeus		Aug. 16*			Sep. 1*			Jun. 24*
<i>Culex restuans</i> Theobald					Sep. 1*			
<i>Culex territans</i> Walker							Sep. 5*	
<i>Culesita melanura</i> (Coquillett)							Aug. 15* Aug. 28*	

REFERENCES CITED

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