

Mosquitoes and Stormwater Ponds ... Testing the Perception

Abstract

MOSQUITOES are important pests and disease vectors, whose management is often a top priority in areas affected by some of the diseases they carry. The life cycle of important pest species relies on standing water. In response to concerns about mosquito breeding in stormwater ponds, we studied the distribution of mosquito populations, especially those associated with stormwater ponds, during the summer of 2003 in Prince George's County, Maryland. We designed and implemented a survey of different areas, including those with stormwater management ponds, to determine the distribution of mosquito populations. Twenty-nine randomly selected stormwater ponds were selected for sampling, as well as standing water in a variety of different land use areas: 14 forested, 2 high-density residential, 6 low-density residential, 8 agricultural, and 3 urban. At each pond, 20 dips were made along the periphery using a telescoping dip pole with a 750 ml sample container. Mosquito larvae and pupae were collected at all of the other land uses using a baster and sieve. Standing water habitats included, but were not limited to, water-filled tree holes, puddles, wheel ruts or other surface impressions, birdbaths, containers (e.g., garbage can lids, flower pots), and abandoned tires. The number of samples and volume sampled were recorded, along with semi-quantitative data on the nature of the sampling site. Mosquito larvae and pupae were rarely found in pond samples, (an average of 1 individual in 5 of 29 ponds, or 17%). By contrast, they were much more commonly found in all other habitat types, with the highest numbers (by far) found in standing water from agricultural, forested, and residential areas. Many of the individual samples from these areas yielded, on average, several hundreds (sometimes thousands) of individuals per sample, regardless of the type of site. Analysis of these data and ancillary factors suggest that well designed and maintained stormwater retention ponds are an insignificant source of mosquitoes in the County.

Field sampling



Urban site



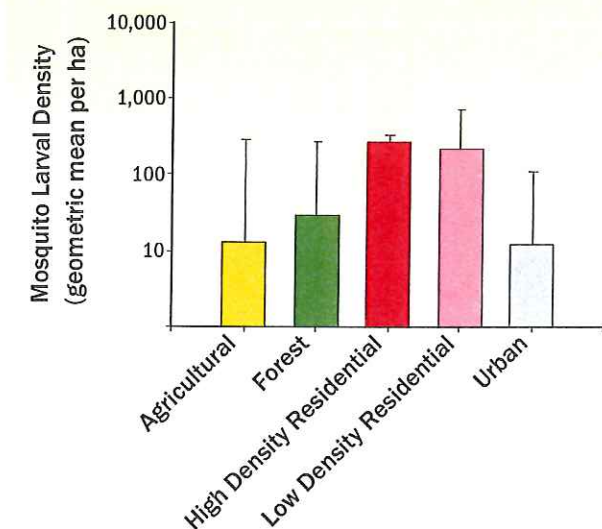
Pond site



Final Sample Sites
 ▲ Agriculture
 ▲ Forest
 ■ High Density Residential
 ● Low Density Residential
 * Pond
 ⊙ Urban
 ~ PG County Streams
 □ PG County Boundary

Total percent contribution of different land use (non-pond) types and ponds in the County to the standing stock number of mosquitoes based on field sampling observations during the study period.

	Total Mosquitoes	Total Larvae	Total Pupae	Aedes	Anopheles	Culex	Orthopodomyia	Psorophora	Toxorhynchites	Unknown
Agriculture	36	39	10	58	0	19	0	0	0	7
Urban	3	2	3	0	0	5	0	100	0	0
High Density Residential	21	20	40	8	0	32	0	0	0	70
Low Density Residential	31	31	36	22	56	44	0	0	0	13
Forest	9	8	12	13	44	1	0	0	0	10
Ponds	0	0	0	0	0	0	0	0	0	0



Average mosquito density across different non-pond sites.



Sample mosquito densities

Conclusions

- Mosquitoes were rare in stormwater retention ponds, which is attributed to high predator density and sufficient flow.
- Only 5/29 (17.2%) ponds contained mosquitoes – 2 of those were dry ponds with standing puddles.
- In contrast, mosquito densities in standing water from other land uses were much higher.
- We estimated the percent contribution of mosquitoes from different sources and it was highest for agricultural land (36%), followed by low-density residential (31%), high density residential (21%), and forested land (9%).



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