A Preliminary Study on the Effectiveness of 1-Octen-3-ol as a Mosquito Attractant

Bios 569- Practicum in Aquatic Biology

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Abstract

A preliminary study to test the effects of 1-Octen-3-ol, or octenol, as a mosquito attractant took place for three days in late July, 1994, on the UNDERC property. The first day of trapping carbon dioxide was used to bait the mosquito traps along with octenol. The traps with only CO2 captured more mosquitoes, than the traps with CO2 and octenol. This contradicts the literature, which states that the octenol should have a synergistic effect when combined with CO2. On the last two days CO2 was not used and the amount of mosquitoes captured was significantly reduced. The traps with octenol captured more mosquitoes than the traps that did not use any attractant other than light. The data from this study shows that more study needs to be done on octenol before it can be advertised as a mosquito attractant.

Introduction

Mosquitoes have been shown to be attracted to certain chemicals. Carbon dioxide and 1-octen-3-ol (octenol) have been shown to be mosquito attractants. Carbon dioxide was first reported as a mosquito attractant by Rudolfs (1922) and is widely used in mosquito collecting. Octenol was reported to be a mosquito attractant by Takken and Kline (1989), but is still being tested.

Octenol does not appear to have a significant effect when used alone. Instead, it appears to have a synergistic effect when used with CO2. The combination of CO2 and octenol cause a significant increase in the collections of mosquitoes (Takken and Kline 1989, Kline et. al. 1990, 1991). Octenol and CO2 seem to have a strong effect on some species, while having a mixed response from others. Kline (1991) showed that octenol and CO2 increased the number of *Coquillettida perturbans*, *Culex salinarius*, and *Psorshophera columbia* collected. The combined treatments only produced mixed results for *Anopheles crucians*, *An. quadrimaculatus*, and *Cx. erraticus*.

The purpose of this experiment was to examine the effect octenol has on collecting mosquitoes at UNDERC.

Materials and Methods

This experiment was carried out over three days in late July, 1994 at the University of Notre Dame Environmental Research Center. Six CO2, light, and octenol baited mosquito traps from American Biophysics Corp. were used. Three sites were chosen that consistently have high mosquito concentrations, these sites were near Morris Lake, Cranberry Lake, and Tender Bog. Two traps were placed at each site at least 25

meters from the other. One trap contained a vial of octenol, while the other was empty. The octenol was switched on the second day. The traps were set at early evening and checked at dawn before the light sensitive fan turned off. CO2 was used in the traps on the first night, but there was not enough to bait the traps on the last two nights.

Results

The results from this study appear to be very ambiguous. The July 19 data indicates that octenol is not as effective as CO2 in attracting mosquitoes. This data appears to be contradicted on July 20 and July 22 when a greater number of mosquitoes were caught using octenol (Fig. 1). It is important to remember that CO2 was not used in the traps on those dates, thus there were far fewer total mosquitoes collected on those days than were collected on July 19.

There were no obvious differences in the species captured using octenol except in one case. On July 19 at Site 1, Morris Lake, a large number of *Anopheles* mosquitoes were caught using octenol (Fig. 2). There were no *Anopheles* caught using just CO2 despite the fact that the CO2 trap caught double the total number of mosquitoes. This was not repeated in the next two nights.

Discussion

The only certain statement that can be made of this data is that CO2 is a effective mosquito attractant. More mosquitoes were trapped on July 19, the day CO2 was used, than on the last two days combined. Whether octenol is a mosquito attractant needs to be tested further. This data suggests that octenol and CO2 is not as effective as just CO2.

On the other hand, octenol alone appears to be more effective than not using a attractant, yet it is far less effective than CO2.

The fact that CO2 and octenol attracted a large number of Anopheles is interesting. Kline (1991) suggested that the combined CO2 and octenol treatment only produced mixed results for *An. crucians* and *An. quadrimaculatus*. The larger number of *Anopheles* at the A position might have been due to the location of the traps. The A position was near the boat launch on Morris Lake, whereas the B position was further down the road away from the lake. The difference did not show up on July 20 and July 22 indicating that it was probably not due to the location of the traps.

Overall, this experiment showed that further research needs to be done on octenol to determine if it is an effective mosquito attractant. A longer study using CO2 needs to be performed and UNDERC would be an ideal location because of the high numbers of mosquitoes on the property.

Acknowledgments

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Literature Cited

Kline, D. L., D.A. Dame, and M. V. Meisch. 1991. Evaluation of 1-Octen-3-ol and Carbon Dioxide as Attractants for Mosquitoes Associated with Irrigated Rice Fields in Arkansas. *Journal of the American Mosquito Control Association.* Volume 7. Number 2. 165-170.

Kline, D. L., J. R. Wood and C.D. Morris. 1990. Evaluation of 1-Octen-3-ol as an Attractant for *Coquillettida perturbans, Mansonia* spp. and *Culex* spp. Associated with Phosphate Mining Operations. *Journal of the American Mosquito Control Association.* Volume 6. Number 4. 605-611.

Takken, W. and D.L. Kline. 1989. Carbon Dioxide and 1-Octen-3-ol as Mosquito Attractants. *Journal of the American Mosquito Control Association.* Volume 5. Number 3. 311-316.

Fig. 1

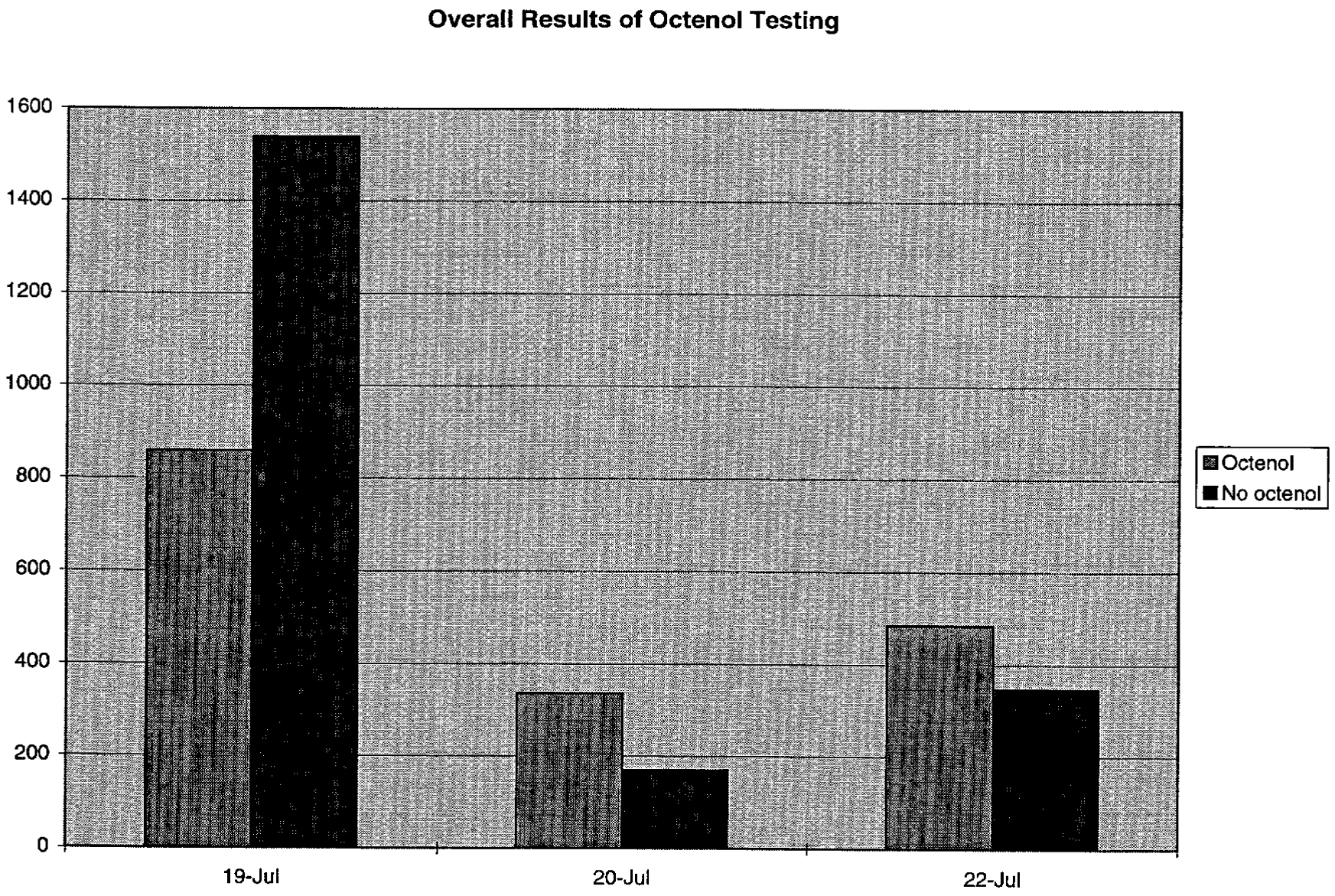
Overall Results of Octenol Testing
1600
1400
1200
1000
800
600
400
200
0
19-Jul
20-Jul
22-Jul
Octenol
No octenol

Figure 2: Mosquito collection data

			July 19			
	1A	**2A**	**3A**	**1B**	**2B**	**3B**
	Octenol	Octenol	Octenol	No	No	No
Mansonia	74	90	93	97	93	97
Anopheles	24		1			
Aedes p.	1					
A. comm.	1					
A. caus.		2	1		1	1
A. punctor		8	4	3	6	2
Culiseta			1			
100 ident.	100	100	100	100	100	100
Totals	**137**	**382**	**340**	**321**	**566**	**653**

			July 20			
	No	No	No	Octenol	Octenol	Octenol
Mansonia	74	40	29	63	229	27
Anopheles	2		1	2	1	
A. cinereus			1	1		
A. caus.			1			
A. punctor		8			7	
A. vexans					2	
Culiseta	6				1	1
Culex	8					
Totals	**90**	**48**	**32**	**66**	**240**	**28**

			July 22			
	Octenol	Octenol	Octenol	No	No	No
Mansonia	255	60	140	162	44	123
Anopheles	1		1			
Culiseta	24	1		15		
Culex	1	1		2		
Totals	**281**	**62**	**141**	**179**	**44**	**123**

	July 19	**July 20**	**July 22**
Octenol	**859**	**336**	**484**
No Octenol	**1540**	**170**	**346**

Locations

1= Morris Lake
2= Tenderfoot Bog
3= Cranberry Lake