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TABANIDAE (DIPTERA) OF KEGONSA STATE PARK, MADISON, WISCONSIN: DISTRIBUTION AND SEASONAL OCCURRENCE AS DETERMINED BY TRAPPING AND NETTING

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INTRODUCTION. The increased demand for camping and other outdoor recreational facilities has led to the development of a number of new parks. In selecting park sites, often insufficient consideration is given to the severity of the nuisance insect problem in spite of the fact that many of the nuisance insects are highly localized in distribution. There may be severe annoyance in a limited area and negligible annoyance in a similar adjacent area.

Such proved to be the case in Kegonsa State Park where deer fly populations were a serious problem in constructing the camp sites. Deer fly populations were of such magnitude as to seriously hinder workmen. Kegonsa State Park is located about 20 miles south of Madison, Wisconsin. It includes open meadow—once farmland and a hardwood-covered hill. Numerous swamps are within a mile radius of the wooded area. Some have been drained and used for agriculture, others are retained in their native marsh condition.

Roberts and Dicke (1958) reported 5 genera, 64 species of Tabanidae as having been collected in Wisconsin. Various trapping devices have been described as useful in capturing large numbers of Tabanidae. Thorsteinson *et al.* (1965) described a trap that attracts Tabanidae. Wilson *et al.* (1966) and DeFoliart and Morris (1967) described traps which employed dry ice as the attractant. Wilson (1968) was able to reduce high populations of Tabanidae by the use of such traps.

This study was designed to determine the distribution of nuisance species of Tabanidae and the feasibility of trapping as a means of reducing the high populations. By our definition, nuisance Tabanidae were those which were captured with an insect net swung over the head while slowly walking through a specific area. Collecting was done on warm sunny days over a specific area in a given time period, so that the numbers collected on specific days and in specific areas were comparable. Collections were made over a 2-year period along a forest path, along a forest road, at the edge of the forest, in the forest, in the meadow and in a marsh. Traps used were similar to those described by Thorsteinson *et al.* (1965), Wilson *et al.* (1966) and DeFoliart and Morris (1967). They were operated for periods varying

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from 8 to 24 hours on warm days when high tabanid activity would be anticipated. Traps were installed in 1970 at the edge of the forest and in the marsh.

RESULTS. Net and trap collections are summarized in Table 1. Twenty-seven species belonging to 4 genera were captured in Kegonsa State Forest during the summers of 1969 and 1970. The data indicate that *Chrysops* species were the most serious pests, being especially abundant along the forest path and at the edge of the forest. *Chrysops striatus* is by far the dominant species, followed by *vittatus* and *aberrans,* (56 percent, 24 percent and 11 percent, respectively). The data also indicate that trapping captured primarily *Hybomitra* and *Tabanus.*

Seasonal appearances of the tabanids are summarized in Table 2. In 1969, highest populations occurred during mid to late July, while in 1970 heaviest populations developed about 2 weeks earlier. Weather summaries (March through July) indicate that 1969 was cooler than 1970 by 171 day-degrees. A day-degree is the sum of negative departure of the average daily temperature of 65° F. It is of interest to note that *C. striatus, C. vittatus* and *C. aberrans* were present over a longer period of time than the other three dominant species (Table 3). Also, *C. sackeni* appeared

TABLE 1.—Summary of Tabanidae captured by net and by traps.

		No. captured with a net 1969–70	All traps 1970	% of genus captured
Chrysops	*striatus* O.S.	8215	408	56.07
	vittatus Wd.	3710	25	24.29
	aberrans Philip	1697	112	11.76
	univittatus Macq.	491	35	3.41
	sackeni Hine	260	210	3.06
	Miscellaneous			
	aestuans Van der Wulp	218		1.42
	callidus O.S.			
	cincticornis Walk.			
	frigidus O.S.			
	indus O.S.			
	mitis O.S.			
	niger Macq.			
Atylotus	*bicolor* (Wd.)			
	Species "C" unnamed			
Hybomitra	*epistates* (O.S.)	33	2273	58.14
	illota (O.S.)	39	594	15.92
	lasiophthalma (Macq.)	6	241	21.48
	Miscellaneous			
	frontalis (Walker)	177		4.45
	sodalis (Will.)			
Tabanus	*similis* (Macq.)	3	515	59.13
	lineola Fabr.	0	129	14.73
	quinquevittatus Wd.	2	126	14.61
	trimaculatus Beau.	1	34	4.00
	Miscellaneous			
	marginalis Fabr.	66		7.53
	reinwardtii Wd.			
	stygius Say			
	vivax O.S.			

TABLE 2.—Seasonal occurrence of nuisance *Chrysops* in Kegonsa State Park as determined by net collections.

	C. aberrans		*C. sackeni*		*C. striatus*		*C. univittatus*		*C. vittatus*		Totals	
	1969	1970	1969	1970	1969	1970	1969	1970	1969	1970	1969	1970
June 3	..	..	..	1	..	..	..	..	..	..	..	1
9	..	..	..	3	..	..	..	..	..	..	..	3
13	..	..	..	13	..	5	..	..	..	..	..	18
16	..	1	..	48	..	77	..	..	..	40	..	166
24	..	16	..	1	..	93	..	..	..	18	..	129
25	..	..	1	5	1	4	..	..	2	..	4	9
30	..	98	..	10	..	987	..	13	..	26	..	1334
July 1	1	..	7	..	42	..	..	..	22	..	72	..
3	1	..	2	..	80	..	..	..	46	..	129	..
7	2	104	3	1	85	78	..	14	47	89	137	486
10	20	..	6	..	57	..	5	..	225	..	513	..
13	..	2	..	1	..	18	..	..	..	6	..	27
14	42	..	114	..	282	..	39	..	296	..	973	..
15	..	85	..	..	..	51	..	24	..	24	..	584
16	..	8	..	..	..	46	..	1	..	24	..	55
17	27	..	29	..	985	..	6	..	506	..	1653	..
18	61	..	5	..	452	..	30	..	123	..	671	..
21	11	..	3	..	777	..	66	..	337	..	1394	..
22	..	83	..	..	..	47	..	12	..	154	..	297
24	60	47	6	..	1061	6	38	3	323	86	1588	142
29	46	16	..	..	787	16	11	4	219	142	1163	178
31	34	..	..	..	1366	..	19	..	457	..	2076	..
Aug. 6	29	..	..	..	104	..	1	..	32	..	166	..
8	44	..	..	..	117	..	..	..	27	..	188	..
11	..	..	..	..	..	..	..	..	..	1	..	1
12	49	..	..	..	80	..	3	..	45	..	177	..
16	8	..	..	..	..	..	..	..	8	..	24	..
21	1	..	..	..	8	..	..	..	..	..	..	..
22	..	..	..	..	3	..	..	..	3	..	7	..
25	1	..	..	..	..	..	..	..	1	..	1	..

TABLE 3.—Distribution of *Chrysops* within Kegonsa State Park as determined by netting.

Name	Forest	Forest path	Forest edge	Forest road	Marsh	Meadow
Chrysops						
striatus	145	6039	1238	625	132	36
vittatus	112	3022	421	139	6	10
aberrans	4	1393	217	45	32	6
univittatus	1	289	186	11	1	3
sackeni	6	57	129	9	45	14

slightly ahead of the other species. This is in agreement with observations reported by Pechuman and Burton (1969).

DISCUSSION. To avoid annoying *Chrysops* populations more intensive use of meadows and marshes (e.g., hiking trails) should be encouraged during late June and July, and the forested areas used during early spring and autumn.

Chrysops species are more abundant in the spring and early summer. Should park management consider establishing riding stables in this park, *Tabanus* and *Hybomitra* could become a serious nuisance pest, in addition to the already present *Chrysops*.

SUMMARY AND CONCLUSIONS. *Chrysops striatus, vittatus* and *aberrans* are the dominant nuisance species in Kegonsa State Park. The park also contains substantial numbers of *Hybomitra epistates* and *Tabanus similis* which are not a serious nuisance to park visitors. More *Hybomitra* and tabanids were collected in carbon dioxide traps with nets. Emergence of Tabanidae appears somewhat correlated with weather, occurring earlier with warmer spring and early summer temperatures.

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