PUBLIC PERCEPTION OF A TRAP TO LOCALLY REDUCE YELLOW FLY (DIPTERA: TABANIDAE) NUISANCE IN RESIDENTIAL AREAS OF NORTHEASTERN FLORIDA

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ABSTRACT

A mail survey was conducted to measure perception of seasonal yellow fly (Diptera: Tabanidae) nuisance by residents of the East Flagler Mosquito Control District (Flagler County, FL) before and after using adhesive-coated black beach balls as traps to capture these outdoor biting fly pests. A total of 72 (36%) completed questionnaires were received from 200 initially mailed. The majority of survey respondents (70%) reported that annoyance (nuisance) from yellow flies had decreased after using this trap. Relative reduction of nuisance did not appear to have been significantly ($P > 0.05$) influenced by number of trapped flies observed on traps. Fly nuisance was not related to length of residence in the county or number of years a person had used the beach ball traps. Most respondents (66.0%) reported that they used one trap per residence with the majority of traps (48.0%) placed in the backyard. No significant relationship existed between initial nuisance ranking and number of traps used. Sixty-six percent of survey respondents reported that the trap was very easy to use, while 98.6% stated this method of control was worth the effort expended.

Key Words: Biting flies, *Diachlorus ferrugatus*, *Chrysops*

RESUMEN

Se realizó una encuesta por correo para medir el grado de molestia causado por la mosca amarilla (Diptera: Tabanidae) a los residentes de East Flagler Mosquito Control District, en el Condado de Flagler, Florida. Se midió la eficacia de utilizar pelotas de playa pintadas de color negro y cubiertas de un adhesivo para atrapar a los mosquitos. De un total de 200 cuestionarios enviados, 72 (36%) fueron contestados y usados para clasificar las respuestas. La mayoría de los encuestados que respondieron (70%) reportó que la molestia causada por las moscas amarillas disminuyó después de instalarse las trampas. Sin embargo, la reducción en el grado de molestia no fue influída de manera significativa ($P > 0.05$) por el número de moscas atrapadas. Tampoco se observaron diferencias significativas cuando se comparó el grado de molestia con el tiempo de residencia de los encuestados en el Condado o con el número de años que la persona hubiera utilizado las trampas. La mayoría de las personas (66%) reportó que utilizaron una trampa por residencia. La mayoría de las trampas (48%) fue colocada en el patio trasero de la casa. No se encontró una relación significativa entre el nivel de molestia inicial y el número de trampas empleadas. Según el 66% de los encuestados, la trampas fueron muy fáciles de usar, y el 98.6% de encuestados consideró justificado el esfuerzo empleado en este método de control.

As a group, "yellow flies" consist of about a dozen species of yellow-bodied biting flies in the family Tabanidae. From early spring through mid-fall these blood-sucking flies (primarily *Diachlorus* and *Chrysops* spp.) frequently become pests in northern

Florida. These insects persistently attack the head region, shoulders and extremities of people. This host-seeking behavior is not only discomforting, but the bite can be painful and allergic reactions have been reported (Banks 1904, Mease 1943).

From 1993-1995 personnel of the East Flagler Mosquito Control District (EFMCD) provided to residents a "yellow fly trap" that consisted of a glossy black beach ball (51 cm diam) coated with an adhesive as a method to control these flies (Cilek 1993). A set of written directions on how to set up the trap was provided. The ball was suspended about head-height (1.5 m) to allow free movement with wind currents. The District provided a 120-ml packet of adhesive per trap for residents to apply to each beach ball. *Diachlorus ferrugatus* (F.), and some species of *Chrysops,* have been observed to land on this trap, presumably influenced by movement of the ball's silhouette and/or reflected sunlight along its curved surfaces. Attraction to such objects has been reported for Tabanidae (e.g., Bracken et al. 1962).

The beach ball trap program has appeared to be a popular one during the yellow fly season (April-June) (J. Cash, Director, EFMCD pers. comm.). However, no quantitative information has been available on client satisfaction relative to trap use and reduction of fly nuisance. As a result, a mail survey was conducted during the summer of 1995 to gauge the public's perception of yellow fly annoyance before and after using the beach ball trap.

Materials and Methods

A total of 200 questionnaires was sent to residents of EFMCD in Palm Coast who had participated in the beach ball yellow fly trap program at any time from 1993 through 1995. The questionnaire contained 19 fill-in-the-blank questions plus a diagram of a house surrounded by a rectangular "lawn" to indicate placement of beach ball traps on their property (Fig. 1). Each questionnaire included a self-addressed stamped envelope for return and a cover letter explaining the survey.

Participants provided their address, and a statement at the top of the page assured them that answers to all questions remained confidential and anonymous. Data were collected on length of residence in the state and county, length of time in program, time of day yellow flies were most bothersome, perceived sources from which yellow fly nuisance/infestation originated, placement and number of traps used, and allergic reactions to bites. Respondents ranked nuisance (annoyance) from yellow flies prior to and after using the beach ball trap on a scale of 1 = extreme nuisance to 10 = no problem. Because yellow flies accumulated on traps and could produce a bias in nuisance ranking, respondents were asked to quantify total number of flies captured per ball as 0-25, 25-50, 100+. We also asked if "non-target" organisms (i.e. other insects, birds, etc.) were captured on these traps and if so, what kind. If beneficial organisms are caught, in addition to the pest, this may have an adverse impact on public relations—especially for publicly funded agencies. The survey period covered approximately one month (June 20 through July 15, 1995).

Results are presented as frequency of response or means where appropriate. Data on length of residence in county (i.e., <5 yr or >5 yr) and number of years (i.e., 1, 2, or 3 yr) respondents participated in the trap program were separately subjected to analysis of variance (PROC GLM, SAS Institute 1990) to determine if either variable significantly ($P < 0.05$) influenced relative perception of yellow fly nuisance before or after the beach ball trap was used. A linear regression (PROC REG, SAS Institute 1990) was performed on initial nuisance ranking versus number of beach ball traps placed at each residence with trap as the dependent variable (Sokal & Rohlf 1981). A similar but separate regression analysis was conducted on level of nuisance after trap use versus number of flies captured per trap with fly as the dependent variable.

Yellow Fly Trap Survey

ALL RESPONSES WILL BE KEPT CONFIDENTIAL AND ANONYMOUS

PLEASE RESPOND BY JULY 15, 1995

1. Your street address:_____
2. How long have you lived at this address?_____
3. How long have you lived in Flagler County?_____
4. Are you a native Floridian? Yes____ No____
5. Where do you think the yellow fly source is in your area?_____
6. Did any member of your family visit a physician as a result of yellow fly bites? Yes____ No____
7. Did any member of your family experience an extreme reaction (severe swelling, breathing problems) as a result of a yellow fly bite? Yes____ No____
8. Rate the yellow fly problem in your area **before** you began trapping (1= very bad, 10=no problem) _____
9. Rate the yellow fly problem in your area **after** you began using the yellow fly trap (1= very bad, 10=no problem) _____
10. At what time of day do yellow flies cause you the most problems? _____
11. During daylight, when are yellow flies least bothersome? _____
12. How many years have you participated in the yellow fly program? _____
13. How many traps did you set out? _____
14. Do you feel that the yellow fly trap reduced or eliminated the yellow fly problem in your immediate area? Yes____ No____
15. Estimate the number of flies per trap? 0-25_____ 25-100_____ 100+ _____
16. How convenient is it to construct the trap? Very easy____, some effort____, very difficult____
17. Suggestions to improve the trap design or construction?_____
18. Is this program worth your time and effort? Yes____ No____
19. Did you capture any other animal on the trap? Yes_____ No____ What? _____
20. Please show the approximate location of yellow fly trap(s) on your property. If you located one in the garage or in a door entry, please note.

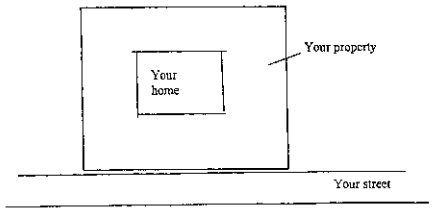

Fig. 1. Questionnaire used as survey instrument.

Results and Discussion

A total of 72 respondents (36%) returned completed questionnaires, of which 93.2% were not native Floridians. Although the trap program was available for 3 years (i.e., 1993 through 1995), the majority of survey respondents (52.8%) had participated for one year, followed by 26.4% for two years and 20.8% for three years.

Approximately 66% of respondents identified perceived sources of yellow fly nuisance. The majority (31.0%) reported wood lots adjacent to, or in the vicinity of, their property as a source of fly production. Subsequent field investigations by District personnel revealed that most persons were located near forests that bordered freshwater wetlands several hundred meters away. We presumed that these wetland habitats were the probable source of yellow fly infestation. Only 27% associated their yellow fly annoyance with lakes, ditches or canals, while approximately 23% reported the problem coming from freshwater swamps and/or brackish/salt marshes. Jones and Anthony (1964) reported that developmental areas for most yellow flies in Florida, such as *D. ferrugatus* and *Chrysops* sp., were primarily aquatic or semi-aquatic.

Most survey respondents reported that yellow flies were *most* bothersome in late afternoon (46%) and *least* bothersome in the morning (47%). This suggested that their primary nuisance species was probably *D. ferrugatus* as these data corresponded with findings of Cilek (1993) and Cilek & Schreiber (1999) relative to peak diel host seeking activity of *D. ferrugatus*. Approximately 84% of survey respondents bitten by yellow flies did not visit a physician although 52% reported that they had experienced an extreme allergic reaction from a bite. An extreme allergic reaction was defined in the questionnaire as severe swelling and/or breathing problems. Of the 16% that visited a physician, 92% experienced extreme allergic reactions.

The majority of respondents most frequently rated their level of nuisance (annoyance) from yellow flies as "1" which was categorized as extreme nuisance (Fig. 2). After using the beach ball trap, nuisance was most frequently rated as 8 (no problem had a rating of 10). Number of years living in the county and number of years participating in the trap program did not significantly ($P > 0.05$) influence rating.

Seventy percent of respondents believed that the beach ball trap decreased their yellow fly nuisance. Interestingly, 15% reported no improvement or that fly annoyance was worse. However, later in the questionnaire when respondents were asked if traps helped to reduce annoyance, 92.8% (64 out of 69) said yes. Number of flies captured on traps did not significantly influence nuisance ranking ($F = 0.86$, df = 60, $P = 0.36$). In addition to yellow flies, no organisms (e.g., birds or other vertebrates) other than flying insects were reported trapped on the adhesive-coated beach balls.

Most people (47.9%) used one beach ball trap on their property, followed by 36.6% with two and 8.5% with three. Seven percent of survey respondents used more than 3 traps. No significant relationship existed between initial annoyance ranking and number of traps placed in yards ($F = 1.64$, df = 71, $P = 0.20$). However, number of traps per yard was probably limited by lot size, (avg. 36 m length by 25 m width). Most persons (43%) placed traps in the backyard. Location probably reflected where they spent most of their time when outdoors.

The majority (66%) of respondents reported that the trap was very easy to use, 32% reported some effort had to be expended to use this technique, while 2% said the trap was difficult to use. Overall, 98.6% believed that the trap was worth using.

From the data obtained in this survey, most persons perceived their level of yellow fly nuisance (i.e. annoyance) had been substantially reduced after using the traps. Whether or not actual population levels of the pestiferous yellow fly species (in this case, *D. ferrugatus*) were reduced remains to be determined and warrants further investigation.

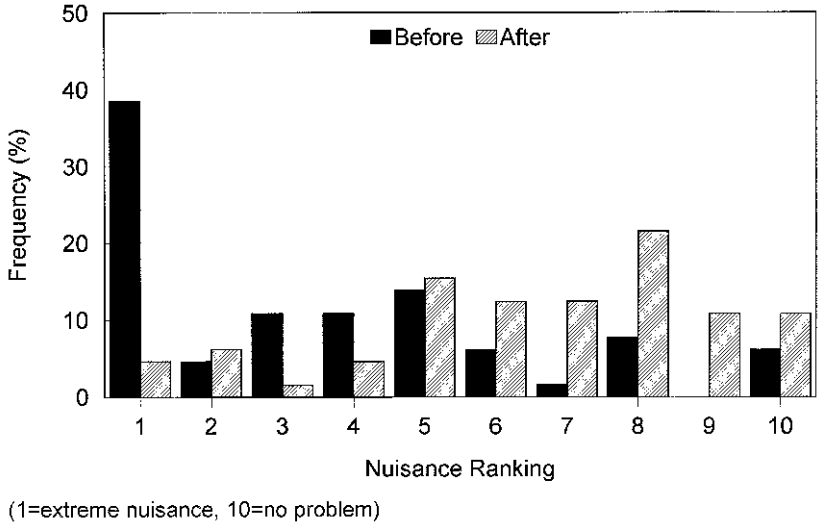

Fig. 2. Frequency distribution of relative yellow fly nuisance rating as reported by survey respondents of East Flagler Mosquito Control District (65 records) before using beach ball adhesive trap and after (1 = extreme nuisance, 10 = no problem).

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