

hyaline with dark staining only toward the anterior margin of the fore wing, especially in the radial cell and along the costal and basal veins (instead of black except for a large median hyaline blotch on the fore wing); and the nervulus interstitial to postfurcal and only weakly inclivous (instead of strongly antefurcal and steeply inclivous).

SPECIFIC NAME. The specific name, used here as a Latin genitive singular, was chosen for this species in reference to *Rivina humilis* L., the plant that dominates the habitat where the holotype was taken.

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A SURVEY OF NORTHWEST FLORIDA FOR POTENTIAL STABLE FLY BREEDING

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ABSTRACT

A survey was made in 15 counties of Northwest Florida and 10 bordering counties in Georgia and Alabama for potential breeding sites of stable flies, *Stomoxys calcitrans* (L.). Most of the sites found that were capable of breeding tremendous numbers of flies were located at dairies and feedlots, but some were at beef ranches, horse farms, and swine and poultry installations. All of these potential breeding sites were located within 70 miles of the Gulf coast beach resorts, which are within the flight range of the stable fly.

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Serious outbreaks of stable flies, *Stomoxys calcitrans* (L.) occur each year along the beaches of Northwest Florida. When the flies are present in great numbers there is a definite reduction in the tourist trade with a subsequent loss in revenue to the area. It is difficult to estimate the exact cost, but it has been estimated to run into the millions if the fly invasion lasts for several days or more. Most of the fly nuisance occurs in the fall, however, anytime if there is a shift of wind direction with the winds coming from a northerly direction instead of off the Gulf, there is a good possibility that flies will suddenly appear on the coastal beaches (Anon. 1973).

Simmons and Dove (1941) reported on stable fly breeding in freshwater bay grasses, weeds, and some marine grasses. They speculated that these aquatic grasses were the principle source of stable flies on the beaches. However, in the same manuscript they report on the extensive breeding of stable flies in peanut litter in the farming areas of Florida, Georgia, and Alabama. They made no references that the flies coming from the peanut litter were migrating to the beaches. Later workers did realize the possibilities of fly migration. They (Anon. 1971) released marked flies in these same farming areas, which were at least 70 miles inland and recaptured the marked flies a few days later on the Gulf beaches.

Since the Simmons and Dove report in 1941 the handling of peanut litter has changed. Vines are no longer stacked in the fields for animal use. They are now either cultivated into the fields immediately or baled for animal feed. Peanut litter is not now a major breeding source of stable flies. Still, stable flies are very prevalent in the area. Therefore, Williams et al. (1980) evaluated various potential stable fly larval media, which were prevalent in this farming area. He found very high infestations of *Stomoxys* larvae in "green chop" silage, especially when it became mixed with animal wastes in the field. Heavy populations were also found in the silage when it was left for several days in the feeding troughs or uncovered in pit silos. They reported larval counts as high as $15 \times 10^6/m^2$ at some sites where larvae were present in the "green chop" and animal waste mixture on the ground.

In May, June, and July of 1977 a joint team of scientists from the U.S. Department of Agriculture, Insects Affecting Man and Animals Research Laboratory and the Florida Division of Health made a survey in 15 counties of Northwest Florida and the 10 bordering counties of Georgia and Alabama for potential breeding sites of stable flies. In each county the county agent was contacted and all farms with livestock or poultry visited. The number of animals and farm management practices were recorded for each site. In most cases a search was not made for stable fly larvae on the farms because of limitations on time and covering this large area, ca. 27,889 km², in the 25 counties. Most of the potential fly breeding areas visited were located at dairy, beef, horse, swine, and poultry farms.

The results of this survey showed that the 15 counties of Northwest Florida had a total of 53 dairies housing 11,278 animals and 104,570 beef cattle plus numerous large and small horse farm operations housing 10,492 animals (Table 1, Fig. 1). There are also numerous swine and poultry operations which contribute to stable fly production, although mainly these types of farms produce house flies. Recent reports by R. S. Patterson¹ (1978 personal communications) show very high stable fly production in the winter and early spring from poultry and swine farms in Northeastern Florida.

TABLE 1. NUMBER OF ANIMALS ON FARMS IN 15 COUNTIES OF FLORIDA AND 5 COUNTIES EACH IN GEORGIA AND ALABAMA.

County/Seat	Dairies-cattle	Pigs	Poultry	Horses	Range cattle	Feedlot cattle
Florida						
Bay/Panama City	1 - 140	550	None	1,000	170	—
Escambia/Pensacola	13 - 2,558	5,000	30,000	3,000	5,000	—
Calhoun/Blountstown	1 - 75	8,000	None	200	7,500	—
Franklin/Apalachicola	0 - 15	800	None	112	1,200	—
Gadsden/Quincy	1 - 700	11,274	250,000	230	11,000	1,500
Gulf/Port St. Joe	0 - 50	1,500	None	100	9,200	—
Holmes/Bonifay	11 - 990	10,000	None	1,000	20,000	—
Jackson/Marianna	13 - 2,696	30,000	125,000	1,000	1,000	—
Leon/Tallahassee	1 - 900	5,300	300	150	5,000	—
Liberty/Bristol	0 - 0	450	None	200	1,000	—
Okaloosa/Crestview	0 - 0	4,000	None	1,000	5,000	—
Santa Rosa/Milton	2 - 255	1,000	30,000	600	14,000	—
Wakulla/Crawfordville	0 - 0	2,500	None	400	2,500	—
Walton/DeFuniak Springs	2 - 719	2,000	None	1,000	15,000	—
Washington/Chipley	8 - 2,180	3,000	None	500	7,000	—
Subtotal	53 - 11,278	85,374	435,300	10,492	104,570	1,500
Georgia						
Decatur/Bainbridge	1 - 725	40,000	250,000	175	28,000	300
Brooks/Quitman	3 - 1,600	600,000	4,000	—	55,000	—
Thomas/Thomasville	6 - 1,180	—	1,000	200	—	—
Grady/Cairo	5 - 870	65,000	200,000	440	15,000	1,000
Seminole/Donalsonville	2 - 100	—	None	100	4,000	4,000
Subtotal	17 - 4,475	165,000	455,000	915	102,000	5,300

TABLE 1. CONTINUED

County/Seat	Dairies-cattle	Pigs	Poultry	Horses	Range cattle	Feedlot cattle
Alabama						
Houston/Dothan	8 - 1,500	10,000	5,000	None	40,000	—
Geneva/Geneva	2 - 350	27,000	None	200	64,000	2,000
Covington/Andalusia	2 - 300	20,000	160,000	—	—	—
Escambia/Brewton	7 - 980	10,000	None	2,100	8,000	4,000
Baldwin/Bay Minette	15 - 1,500	—	—	—	20,000	—
Subtotal	34 - 4,630	67,000	165,000	2,300	132,000	6,000
Total	104 - 20,383	317,374	1,055,300	13,707	338,570	12,800

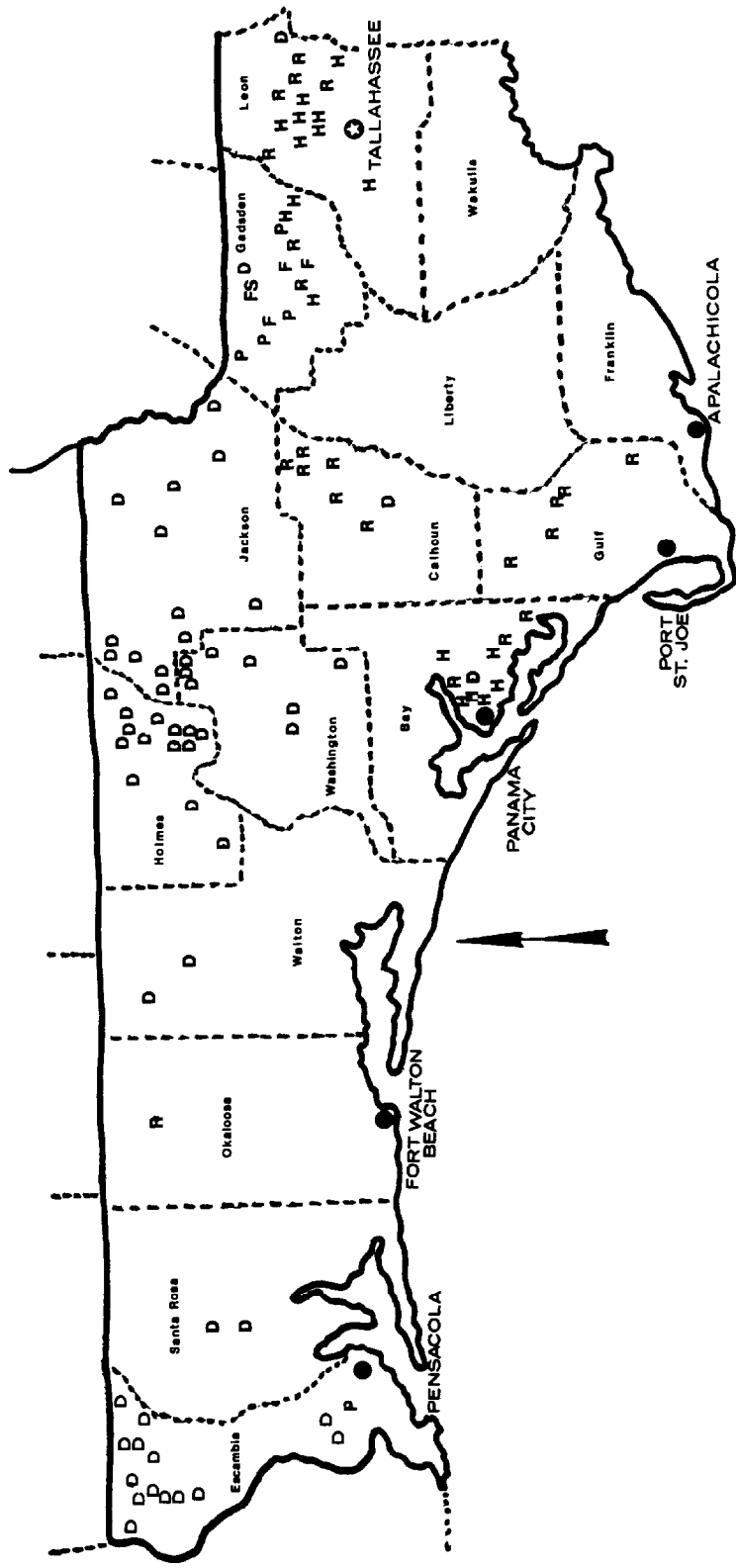


Fig. 1. Location of stable fly breeding areas in northwest Florida. D = dairies; R = range cattle; F = feedlots; H = horse farms; S = swine farms; P = poultry—caged-layer operations.

During the hot weather of the late spring and summer stable fly production declined sharply at these farms.

Of the 15 counties in Northwestern Florida surveyed, 6 had very few potential stable fly breeding areas, because these counties had little agriculture except timber production. Of the 5 bordering counties in Georgia, there was a total of 17 dairies housing ca. 4,500 cows and 102,000 range animals plus ca. 1,000 horses; all of these farms had great potential for fly breeding. Also, in the 5 counties of Alabama, which border Florida, there are 34 dairies, 2 feedlots, and numerous stables housing ca. 2,300 horses. All of these areas breed flies and are located within the recorded flight range for the stable flies of the Gulf coast beaches.

To effectively prevent the migration of flies to the Gulf coast beach resorts of Northwest Florida, fly control must be carried out at the source. One of the main sources appears to be livestock farms ca. 70 miles north of the beaches, which are feeding "green chop" silage and hay to their animals. In this survey we located over 200 potential, large stable fly breeding areas or sites. Almost all of these sites could be prevented from producing large numbers of flies by simple changes in silage and hay feeding and storage management and waste removal practices. If fly production was curtailed at these farms not only would the migration of flies to the beach resorts be greatly reduced, but also the farmers should see an increase in weight gain and milk production in their animals.

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