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# Stable Fly Population Dynamics in Eastern Nebraska in Relation to Climatic Variables

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**Research Project:** ORIGIN, DEVELOPMENT AND POPULATION GENETICS OF STABLE FLIES AFFECTING PASTURED AND CONFINED LIVESTOCK

**Location:** **Agroecosystem Management Research**

**Title:** Stable Fly Population Dynamics in Eastern Nebraska in Relation to Climatic Variables

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**Interpretive Summary:** Stable flies are among the most important pests of cattle and other livestock in North America. Their biting and annoyance reduce weight gains in cattle costing producers more than $1 billion per year in production losses. The factors that control population levels of this fly are poorly understood. A better understanding of these factors would permit producers to make informed decisions on when and where to implement control procedures based upon predicted populations levels. In this study, we evaluated the relationships between stable fly population levels and climatic variables. Temperature was the most important variable for the rise and fall in stable fly populations in Spring and Fall respectively. However, reduced precipitation appeared to be the primary factor involved in the mid-summer decline in stable fly numbers. Winter temperatures, November-February, had a significant effect on the intensity of early-summer stable fly populations. This is presumably due to increased feeding of cattle during colder winters producing more residue at the winter feeding sites resulting in larger stable fly populations. Models are presented which will help producers predict stable fly populations at least in eastern Nebraska. These models will need to be tested in other locations to determine their applicability to other regions of the United States.

**Technical Abstract:** Stable flies, Stomoxys calcitrans (L.), are among the most economically important arthropod pests of livestock in North America. In this study, we monitored the seasonal dynamics of a stable fly population in eastern Nebraska for five years. Models based upon temperature and precipitation were developed to determine the affects of those variables on population levels as well as project population trends for improving timing of control efforts. Stable flies appear in eastern Nebraska in late-March to early-April and build to a peak population the last week of June and first week of July. In most years, the population decreases in mid summer and then increases to a second peak in mid-September. Temperature (Degree Days) one to two weeks prior to collection and precipitation three to seven weeks prior to collection were the most important weather variables with degree days accounting for 78% of the variation and precipitation accounting for 8%. The relationship between populations, temperature and precipitation did not differ significantly among years. Lower precipitation levels explain the observed mid-summer drop in the stable fly populations. Temperature and precipitation models were able to predict stable fly populations for both the early season peak and the total season. Longer-term temperature trends were also correlated with the size of the early season peak. The relationship was negative for the previous November - February and positive for April and May.