I. **Project Title:** Assessing intervention strategies for controlling insect populations on farms

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II. **Abstract**

Three methods to control insect populations were tested on a commercial naturally ventilated finishing facility in west-central Minnesota. The tested methods included the use of insect screens on the sidewall openings, the use of insecticides and a combination of both. A non-treated room was included as a control. Parameters measured included the number of flies/room, the number of mosquitoes/room, the number of insect bites/pig and the number of fly specs/room. In order to assess whether the treatments had any deleterious effects on the animal environment, CO2, temperature and relative humidity were measured as well. Results indicated that the use of screens significantly reduced the number of flies and mosquitoes/room and the number of insect bites/pig. No negative effect was observed on any of the environmental parameters. These results support the use of insect screening of sidewall inlets to control fly populations.

III. Introduction

Porcine reproductive and respiratory syndrome virus (PRRSV) is an economically significant pathogen of the swine industry. It is possible to eliminate PRRSV from farms, but these farms can become re-infected even with heightened bio-security, and the cause of the infection cannot always be attributed to known methods of transmission. Vector competency and local spread of PRRSV by houseflies has been described up to 2.44 km. Therefore, to reduce the risk of insect-born transmission of PRRSV, cost-effective strategies to reduce insect populations need to be scientifically evaluated.

IV. Objective

The purpose of the study was to evaluate the effectiveness of 3 intervention strategies for the control of on-farm insect populations.

V. Procedures

The study was conducted in a naturally ventilated finishing facility in west-central Minnesota during the summer of 2004. The facility housed approximately 1600 hogs from 25-120 kg and was operated using all in-all out animal flow by barn. To initiate the study, the facility was emptied, power washed, disinfected, sprayed with insecticide to reduce the existing insect population and then rinsed to remove residual insecticide. The barn consisted of 4 rooms, with load-out rooms (3 m width) separating rooms. The treatments selected included 1). insect screening of the sidewall openings, 2). pyrethroid-based insecticide (Tempo SC Ultra premise spray (Bayer), 11.8% beta-cyfluthrin), 3.) the combination of screen and insecticide, and 4). No treatment (negative control). The study was conducted for an 8-week period and each treatment was applied for a 2-week period. Parameters measured included the number of flies/room, the

number of mosquitoes/room, the number of insect bites/pig, and the number of fly specs/room. Environmental parameters that were evaluated included CO_2 levels/room, temperature and relative humidity levels/room. Parameters were evaluated biweekly. Flies were collected using baited jug traps (2 traps per room and 2 traps outside of each room), and 2 white cards (7.6 cm x 12.7 cm) were also placed on the walls of each room to evaluate the number of fly specs. In addition, CO_2-light traps were placed in each room to collect mosquitoes, and 4 pigs were randomly selected from each room and the number of insect bites/pig counted. CO_2, levels were measured biweekly using Sensidyne gas tech syringes and temperature and relative humidity measurements were recorded using HOBO data loggers. During the treatment periods, screens were cleaned as needed using brushes and leaf blowers. After completion of the 2-week sampling period, the rooms were power washed and the treatments were randomly rotated to a different room to prevent room bias and the entire procedure was repeated.

VI. Results

Statistically significant differences ($p < 0.0005$) in the number of flies/room and the number of mosquitoes/room and the number of bites/pig were observed in all treatments when compared to the non-treated rooms (Figures 1 and 2) . Treatments that involved screens were statistically superior to treatments involving the use of insecticide alone; however, no differences were seen between treatments that utilized screens. No difference ($p > 0.05$) across treatments was detected in the levels of CO_2/room, temperature/room or relative humidity/room. These results demonstrate that if properly managed, insect screens can be applied to naturally ventilated facilities, resulting in successful reduction of insect populations without deleterious effects on the animal environment.