The efficacy of insecticides tank mixed with nonionic surfactant and in combination with food mimicking baits on SWD infestation, and mortality was assessed in June and July, 2014. The experiment was conducted on a commercial blueberry farm in Sampson County, NC, in a planting of rabbiteye blueberries, var. “Tiff Blue.” Trial plots were approximately 0.10 acre each and consisted of a single row with a buffer row between plots. Treatments were replicated three times in an RCB design. Treatments were applied via trailer-mounted airblast sprayer (Jacto Arbus 1000) calibrated to deliver an average spray volume of 71 gal/ac. Treatments (Table 1) were applied on 25 June and 3 July.

Adult SWD monitoring traps (yeast, sugar, and water solution) were located in an adjacent field in which additional research was being conducted. These traps confirmed local presence of SWD. SWD infestation in field grown fruit was measured by collecting 30 berries per plot on 2 July (7 d after treatment 1) and 50 berries per plot on 10 July (7 d after treatment 2). Apparently undamaged fruit were randomly collected from the center, three plants in each plot, and placed in plastic SWD rearing containers. Samples were brought back to the laboratory and held for 7 d after which fruit were examined for infestation under a stereo microscope.

Because field infestation rates can be highly variable, semifield bioassays were also conducted to assess the performance immediately after treatment (0 DAT, acute activity) and 7 d after treatment (7 DAT, residual activity). Standard bioassay arenas, constructed from 32 oz. deli containers fitted with a floral water wick in the bottom, were used. An approximately 10-inch long stem and five apparently undamaged berries from each plot were collected from the middle bush in each plot and placed into an arena. In the laboratory, the berries were placed into a 1-oz plastic cup then placed back into the arena to prevent movement of the berries during the experiment. Five female and 5 male SWD, from a laboratory maintained research colony, were placed in each arena, and mortality was assessed at three time points: 1, 3, and 5 d after infestation (DAI).

Table 1

| Treatment name | Materials/formulation | Rates |
|----------------|-----------------------|-------|
| Exirel         | Exirel 10SE + Dyne-Amic| 8 fl oz/acre + 0.0125% vol/vol |
| Exirel + bait  | Exirel 10E + Dyne-Amic + Monterey Insect Bait | 8 fl oz/acre + 0.0125% vol/vol + 0.5% vol/vol |
| Exirel + bait + sugar | Exirel 10 SE + Dyne-Amic + Monterey Bait + Sugar | 8 fl oz/acre + 0.0125% vol/vol + 0.5% vol/vol + 2 lb/100 gal |
| Bait           | DyneAmic + Monterey Bait | 0.0125% vol/vol + 0.5% vol/vol |

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Fruit from bioassay arenas were dissected to measure fly reproduction 7 DAI and the total number of live offspring (larvae plus pupae) was counted. Data for both application dates were combined and subjected to analysis of variance via SAS Mixed (v. 9.4), and means were separated via the LSMeans procedure. Treatment and replicate were considered independent variables.

SWD were detected in the neighboring blueberry field, with average weekly adult captures ranging from 0.14 and 7.78 during this experiment. Fruit infestation was low in the experimental plots, with only one third instar found in any fruit. Neither female nor male mortality was increased by any of the treatments (Table 2).

None of the treatments significantly reduced the number of larvae plus pupae present (Table 3). There were several rain events throughout the experimental period, which may have impacted any residual activity of the applied materials.

It is noteworthy that the tested materials performed differently in bioassays conducted as part of a research station-based experiment early in the growing season in which plots were established in southern highbush blueberries (var. Legacy). In particular, Exirel treatments resulted in significant mortality in laboratory bioassays in the earlier trial. One possible explanation for this difference is plant architecture, which influences spray coverage. The plants treated in this trial were very large, and the plants in the research station-based trial were very small. It is possible that even with a high spray volume (over 70 gpa) and treating both sides of a row, coverage was still inconsistent enough to impact efficacy.

| Treatment            | Proportion of dead flies in 0 DAT bioassays | Proportion of dead flies in 7DAT bioassays |
|----------------------|--------------------------------------------|------------------------------------------|
|                      | Male     | Female  | Male     | Female  |
| Exirel               | 0.267 a  | 0.3 a   | 0.1 a    | 0.033 a |
| Exirel + bait        | 0.167 a  | 0 a     | 0.1 a    | 0 a     |
| Exirel + bait + sugar| 0.233 a  | 0.1 a   | 0 a      | 0 a     |
| Bait                 | 0.133 a  | 0.133 a | 0.067 a  | 0 a     |

Means within columns followed by the same letter are not statistically different (LSD *P* > 0.05).

| Treatment            | Fruit infestation in 0 DAT bioassays (larvae+pupae) | Fruit infestation in 7 DAT bioassays (larvae+pupae) |
|----------------------|------------------------------------------------------|-----------------------------------------------------|
|                      | Total offspring                                      |                                                     |
| Exirel               | 12.83 ± 6.8 a                                       | 36.33 ± 10.59 a                                     |
| Exirel + bait        | 13.83 ± 6.8 a                                       | 53.8 ± 10.59 a                                      |
| Exirel + bait + sugar| 19.83 ± 6.8 a                                       | 37.03 ± 10.59 a                                     |
| Bait                 | 23.83 ± 6.8 a                                       | 32.77 ± 10.59 a                                     |

Means within columns followed by the same letter are not statistically different (LSD *P* > 0.05).