Field Trial of a Controlled Vapor Delivery Method in an IPM System

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Stressed Tree

Turpentine

Ethanol

α-Pinene

Objective

- To evaluate the effectiveness of a prototype and novel vapor delivery system under practical field settings.
  - 1) Does the AI allow for equal dispersion of bait chemicals across the two week trapping period?
  - 2) Does this allow for consistent insect captures across the two week trapping period?

Bait Vials

Traditional Method

New Method (Septum)

Traditional VS Septum

Traditional - Challenges

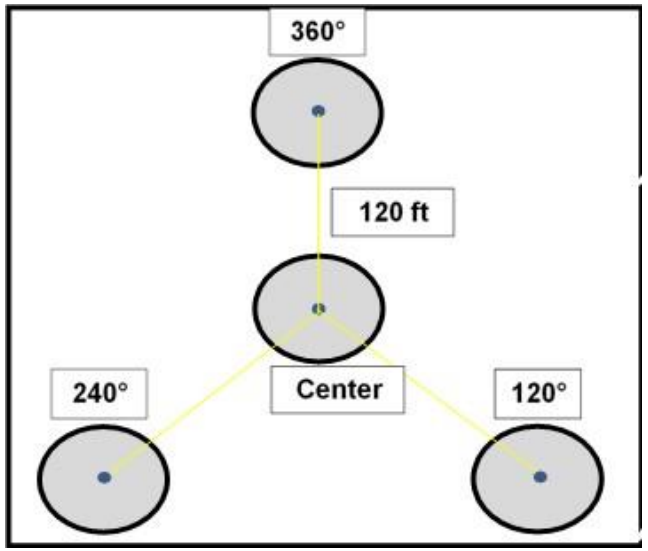
- Inconsistent rate of release
- Short-term release only
- High cost of chemicals
- High costs of labor and gas
- Spillage
- Rain

Septum - Benefits

- A constant rate of release over long periods of time
- Conservation of chemicals
- Conservation of time and energy
- A range in rates of release that can be fine-tuned for specific uses
- No spillage
- Negligible rain infiltration

Field Site Testing

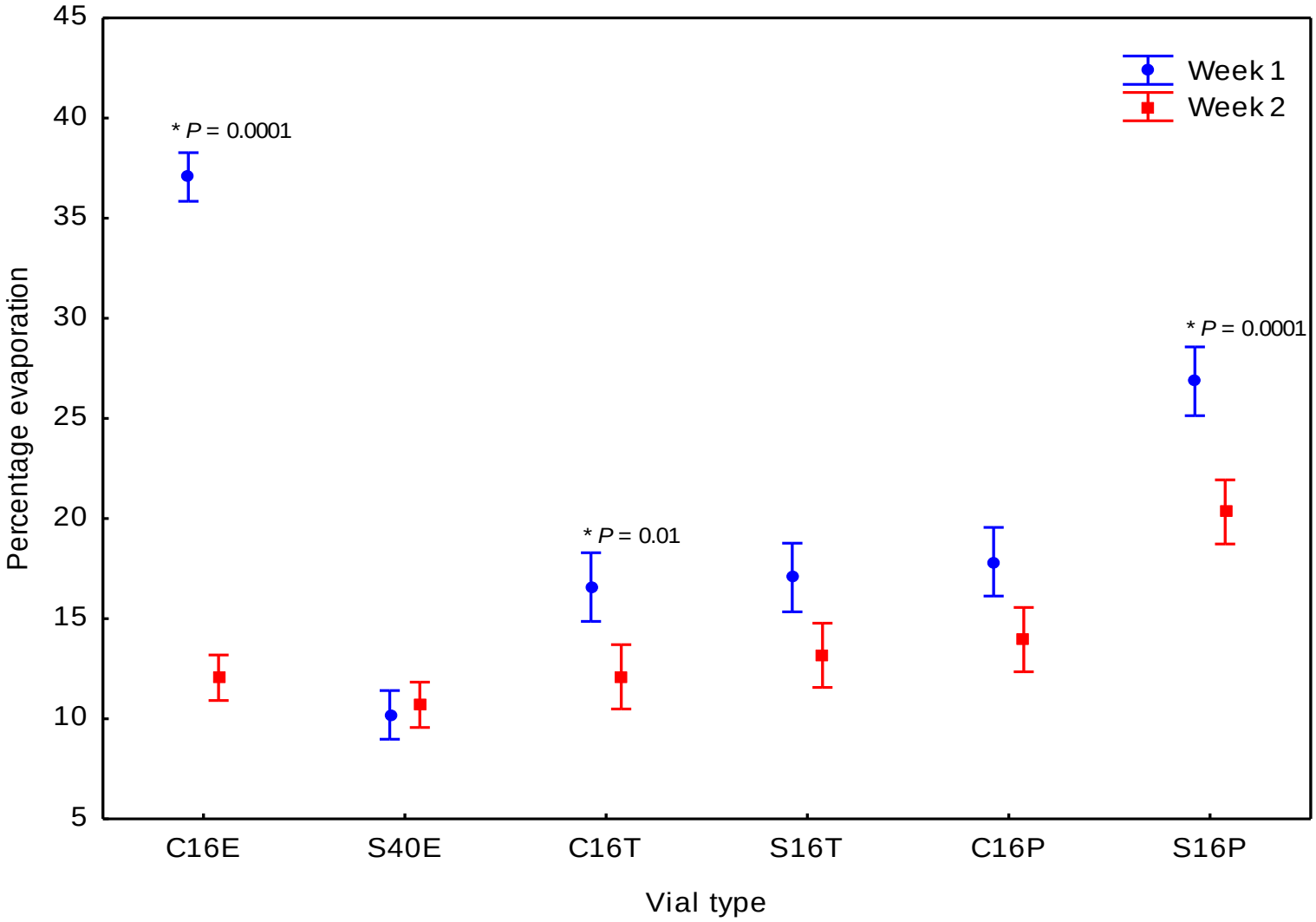
- 15 sites
- Four treatments at each site
  - Open- ethanol and turpentine
  - Open- ethanol and α-pinene
  - Septum- ethanol and turpentine
  - Septum- ethanol and α-pinene



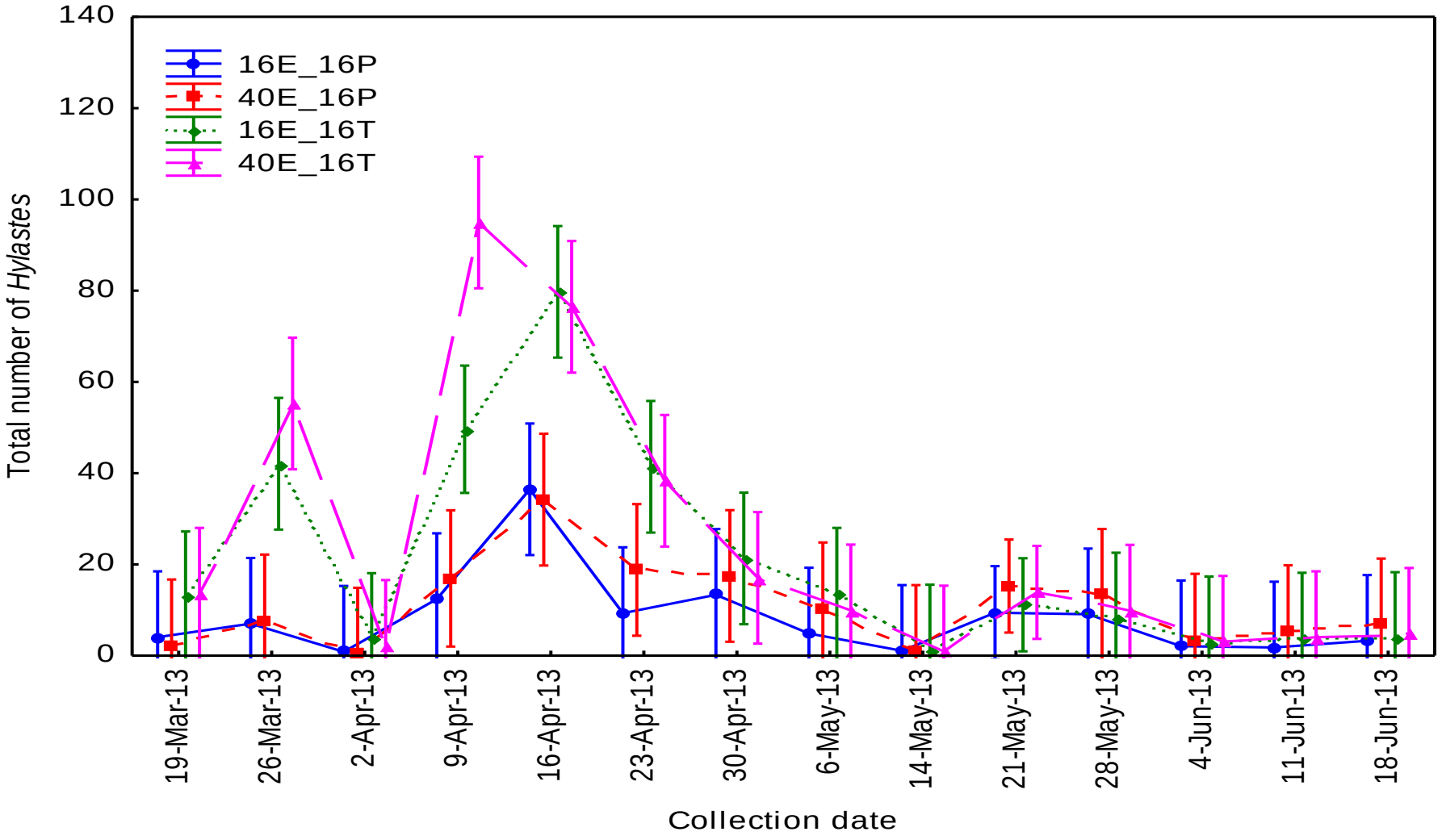
Field Testing

- Every week
  - Vial weight is measured to determine rate of release
  - Beetles are collected to determine efficacy of the Septum Method compared to the Traditional Method
- Every other week
  - Vials are emptied of remaining chemicals and re-baited

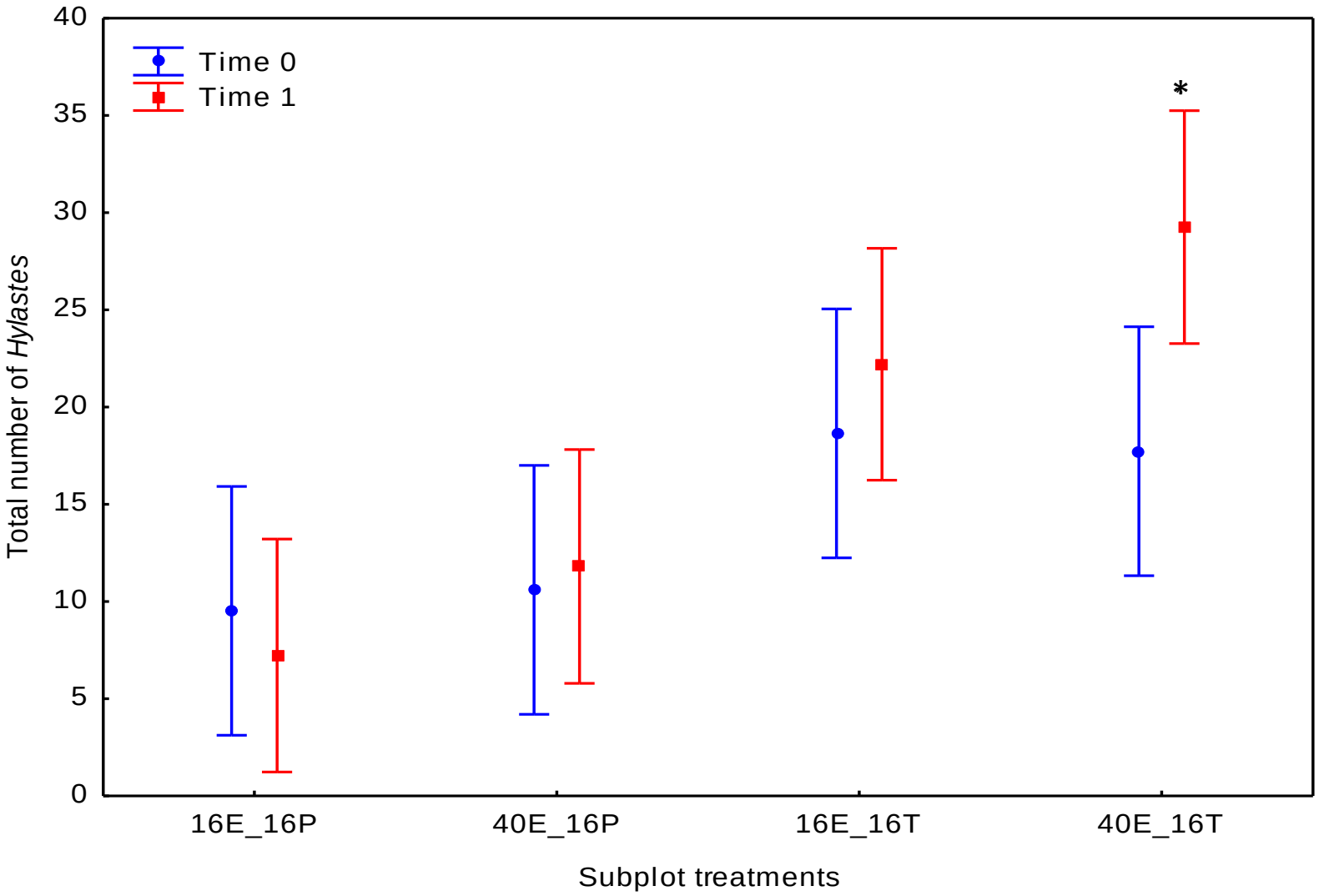
Results


45
40
35
30
25
20
15
10
5
Percentage evaporation
Week 1
Week 2
* P = 0.0001
* P = 0.01
* P = 0.0001
C16E
S40E
C16T
S16T
C16P
S16P
Vial type

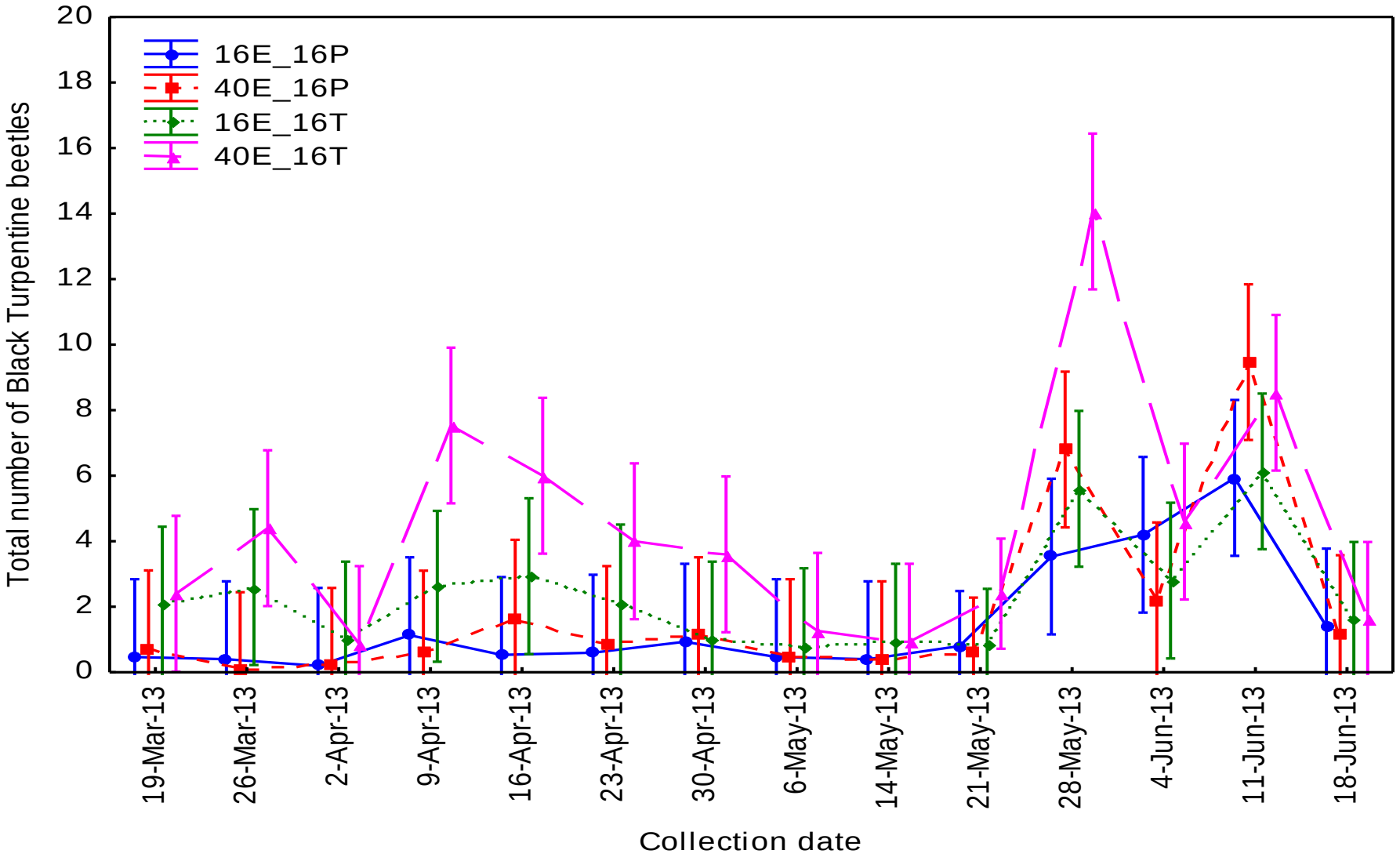
Root-Feeding Bark Beetles



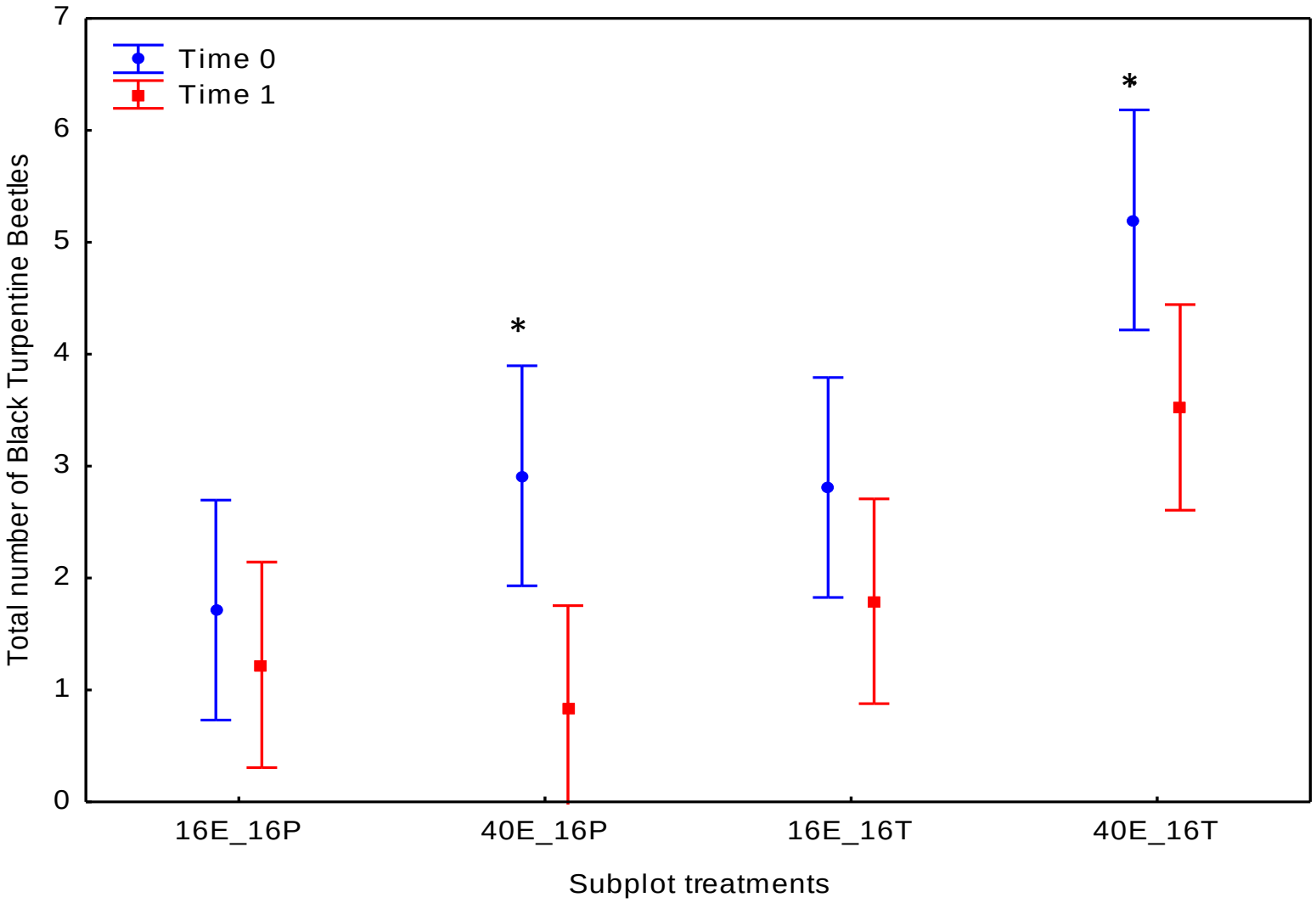
Root-Feeding Bark Beetles



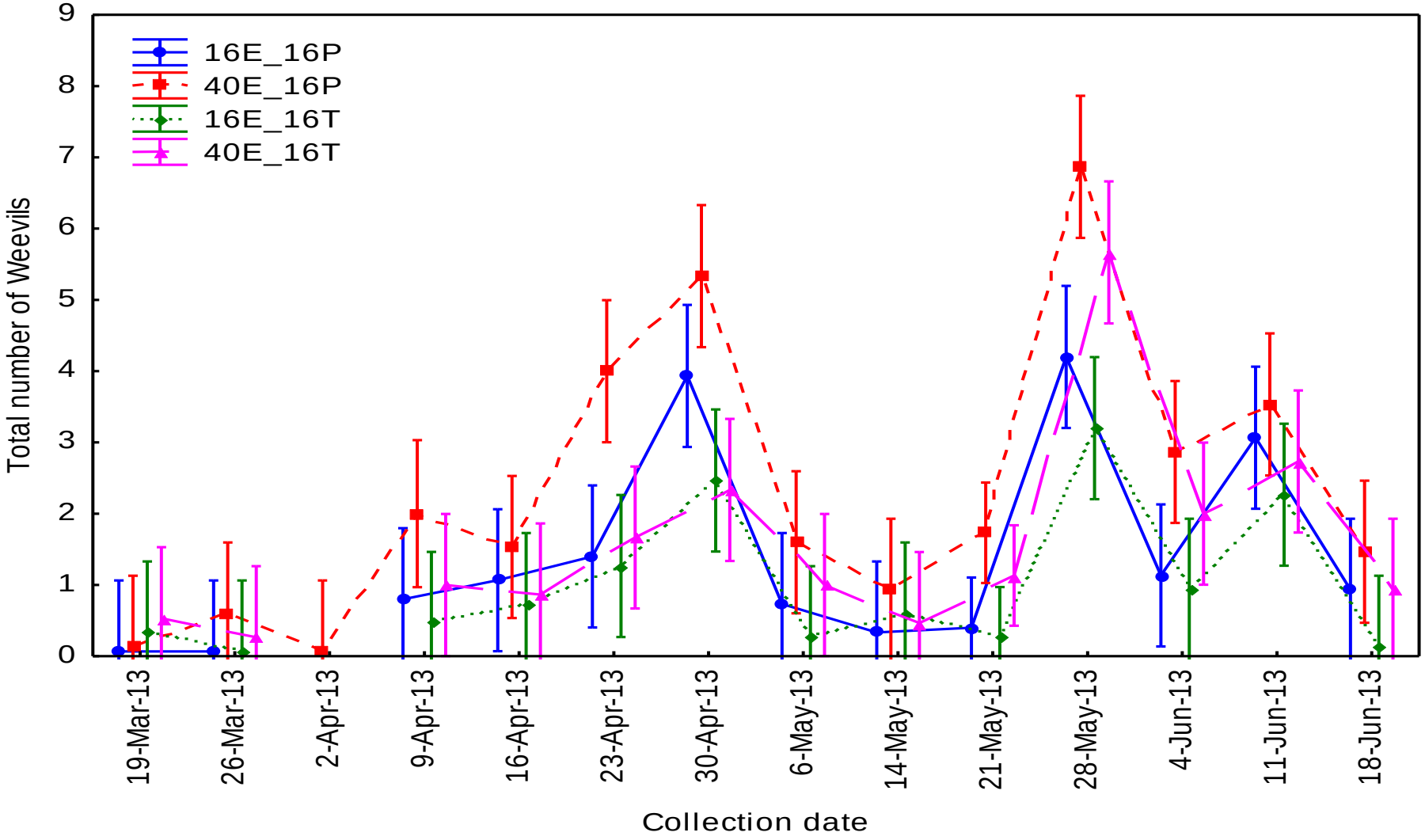
Dendroctonus terebrans



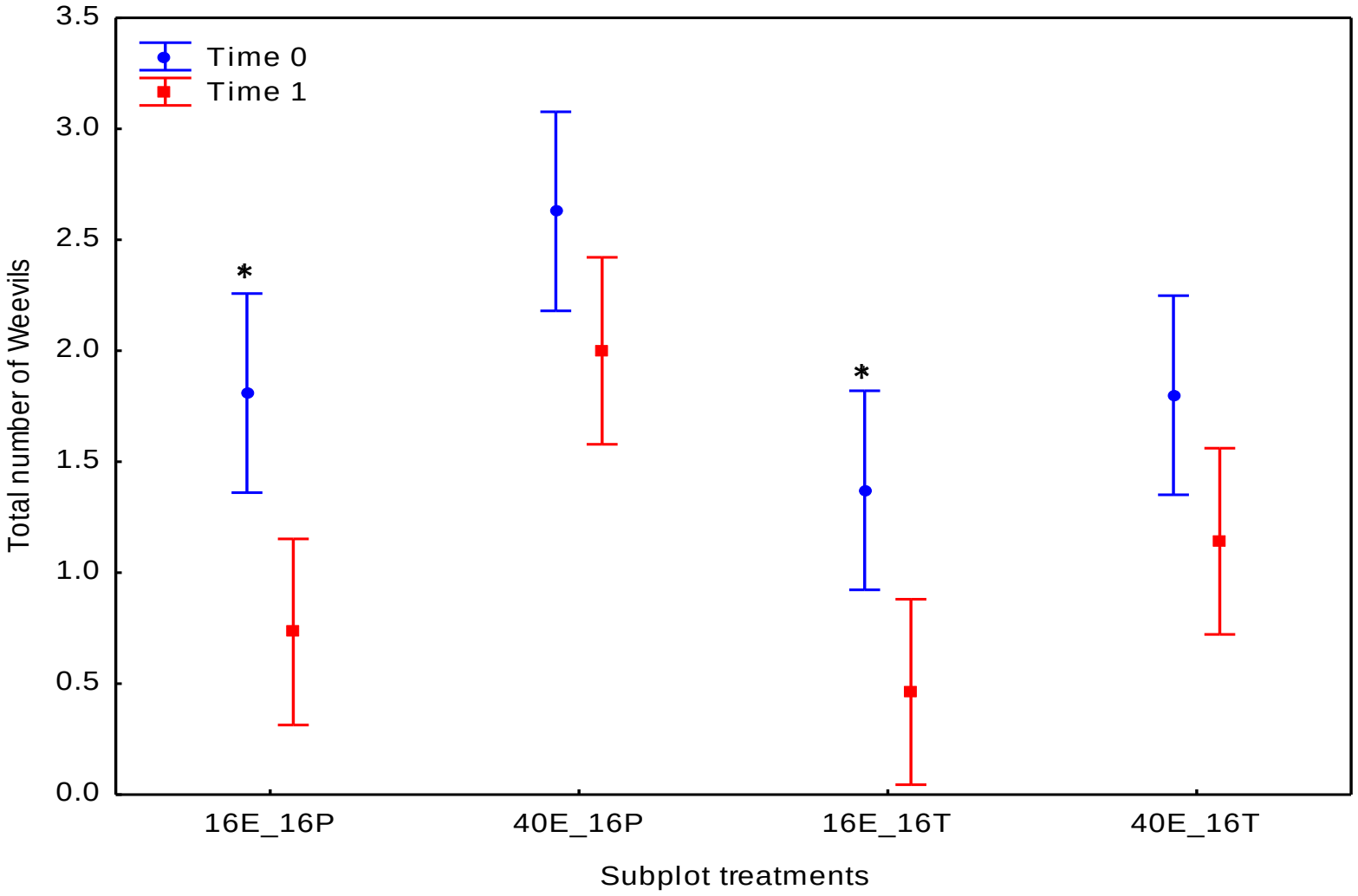
Dendroctonus terebrans



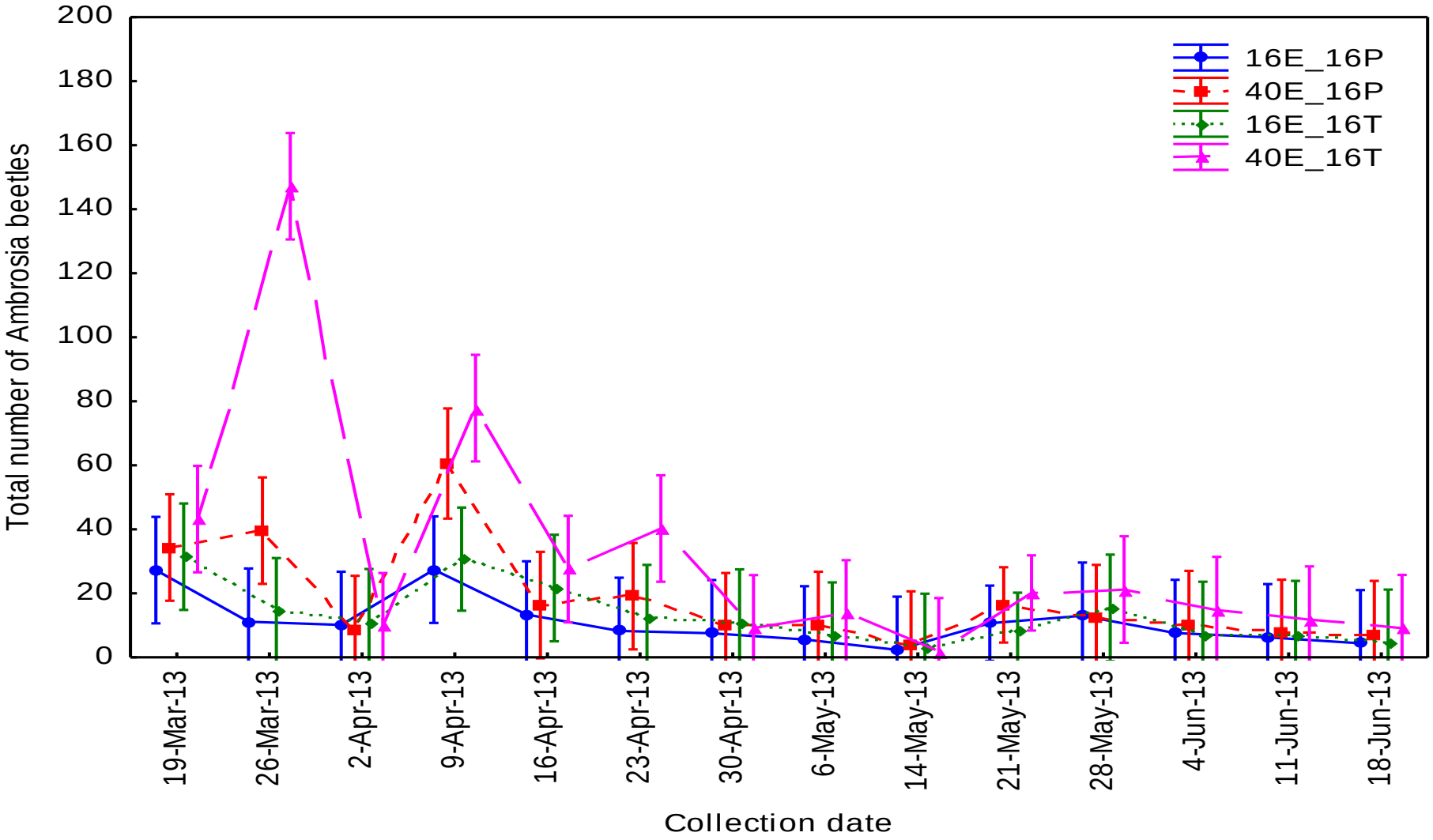
Weevils


16E_16P
40E_16P
16E_16T
40E_16T
Total number of Weevils
0
1
2
3
4
5
6
7
8
9
19-Mar-13
26-Mar-13
2-Apr-13
9-Apr-13
16-Apr-13
23-Apr-13
30-Apr-13
6-May-13
14-May-13
21-May-13
28-May-13
4-Jun-13
11-Jun-13
18-Jun-13
Collection date

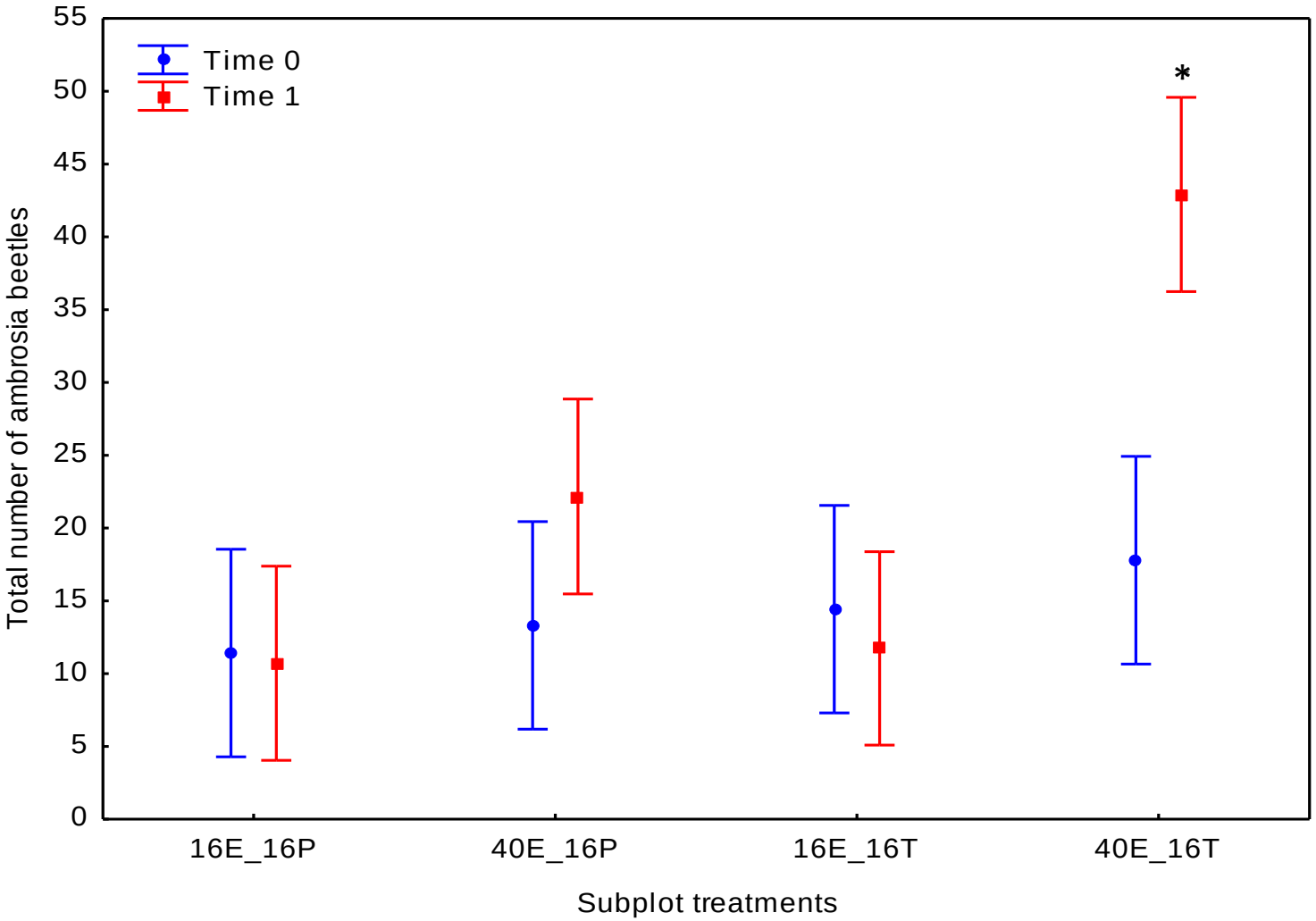
Weevils


Time 0
Time 1
Total number of Weevils
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
*
*
16E_16P
40E_16P
16E_16T
40E_16T
Subplot treatments

Ambrosia Beetles



Ambrosia Beetles



Discussion

- Septum was effective in equalizing vapor dispersion between weeks, especially with the ethanol.
- Weekly captures were only affected if ethanol was one of the main attractors for the insect.

Research Impacts

- Constant rate of release over time which will lead to:
  - Cost saving in chemicals
  - Cost savings in time and energy

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