Codling Moth Trapping and Degree-Day Accumulations in Northern Utah

Shawn Steffan

Dept. of Biology

Utah State University

Logan, UT

Utah State University Extension

extending usu to you

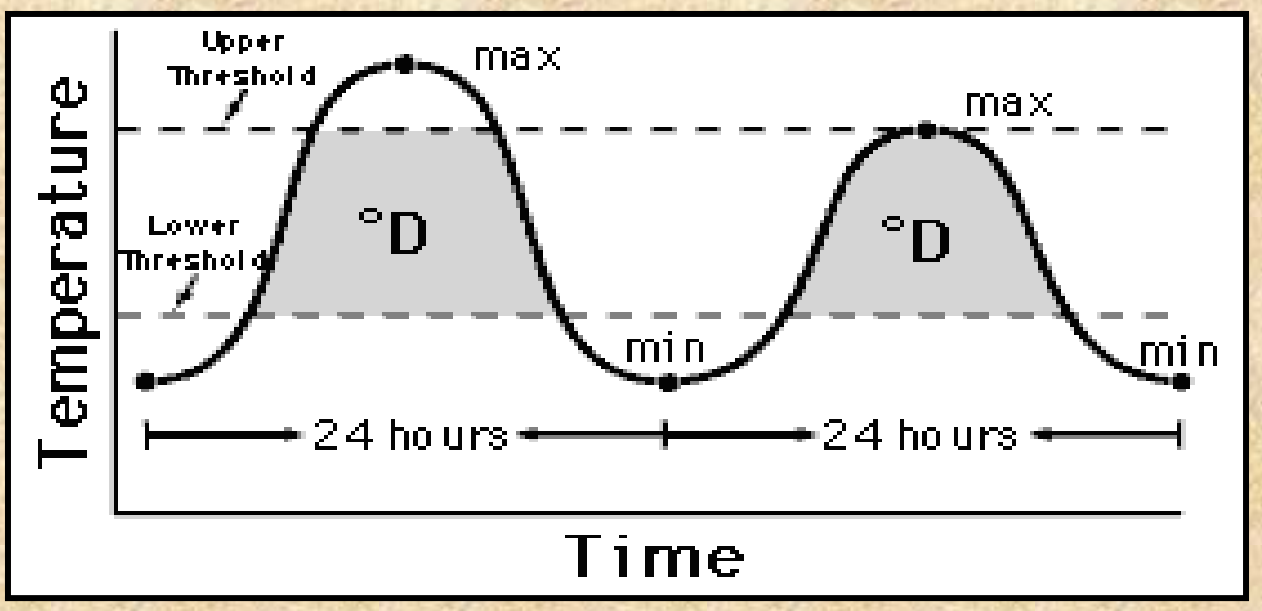
November 5th, 2003

Why was it such a bad year for CM?

- Large overwintering populations?
- **Mild winter?**
- Cool, prolonged spring?
- Record-breaking summer heat?
- Resistance to insecticides?
- **Imperfect control tactics?**

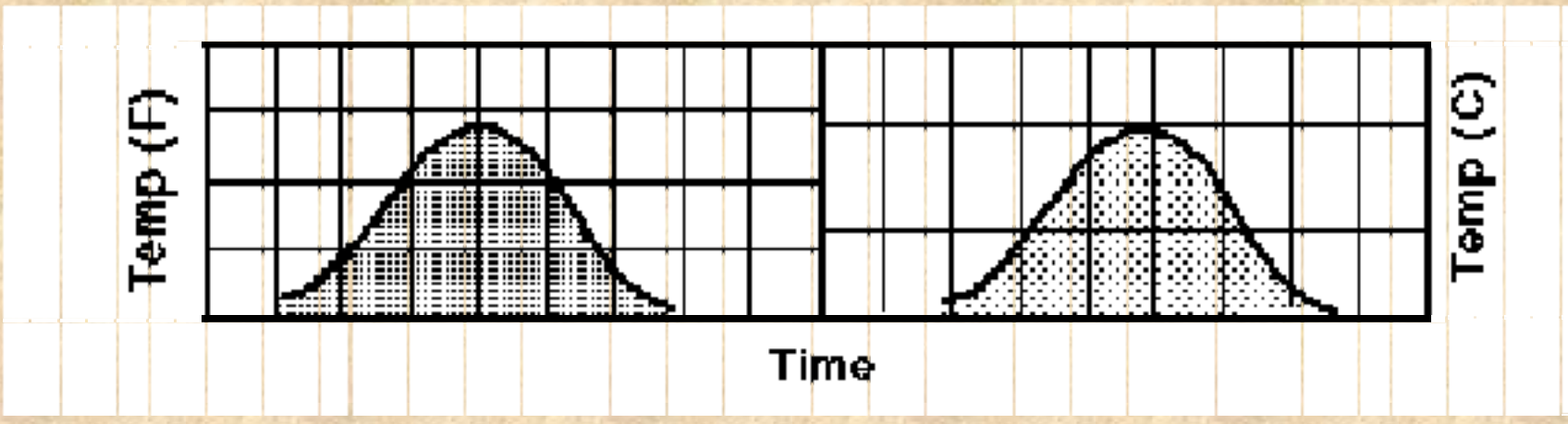
Codling Moth Degree-Days

- *What* are D-Ds?
  - ✓ Unit of measure (time and temperature unit).
  - ✓ Time spent within a specific temperature range.
  - ✓ Varies by pest species because temperature thresholds are species-specific.



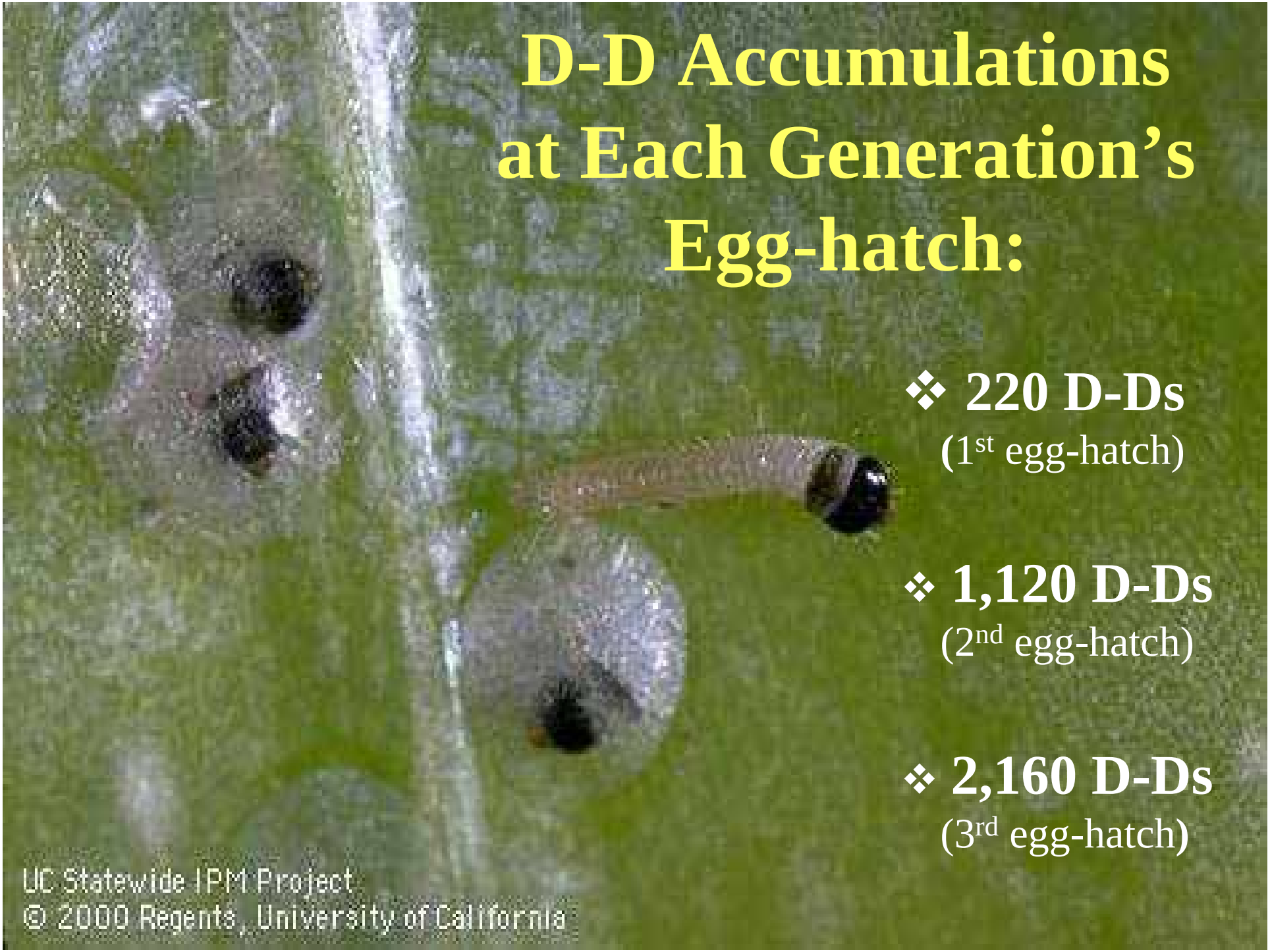
Why are D-Ds so useful for managing CM?

- ✓ **All arthropods are cold-blooded and grow only as much as temperatures allow.**
- ✓ Arthropod pests generally don't care about calendar dates.
- ✓ **D-Ds help pin down the developmental stage of pests, allowing us to more accurately predict pest activity.**



Important Stages in a Codling Moth's Life

- Pre-ovip. Flight: **58** D-Ds
- Eggs: **158** D-Ds
- Larval Feeding: **471** D-Ds
- Pupae: **431** D-Ds
- Total for Generation: **1,118** D-Ds

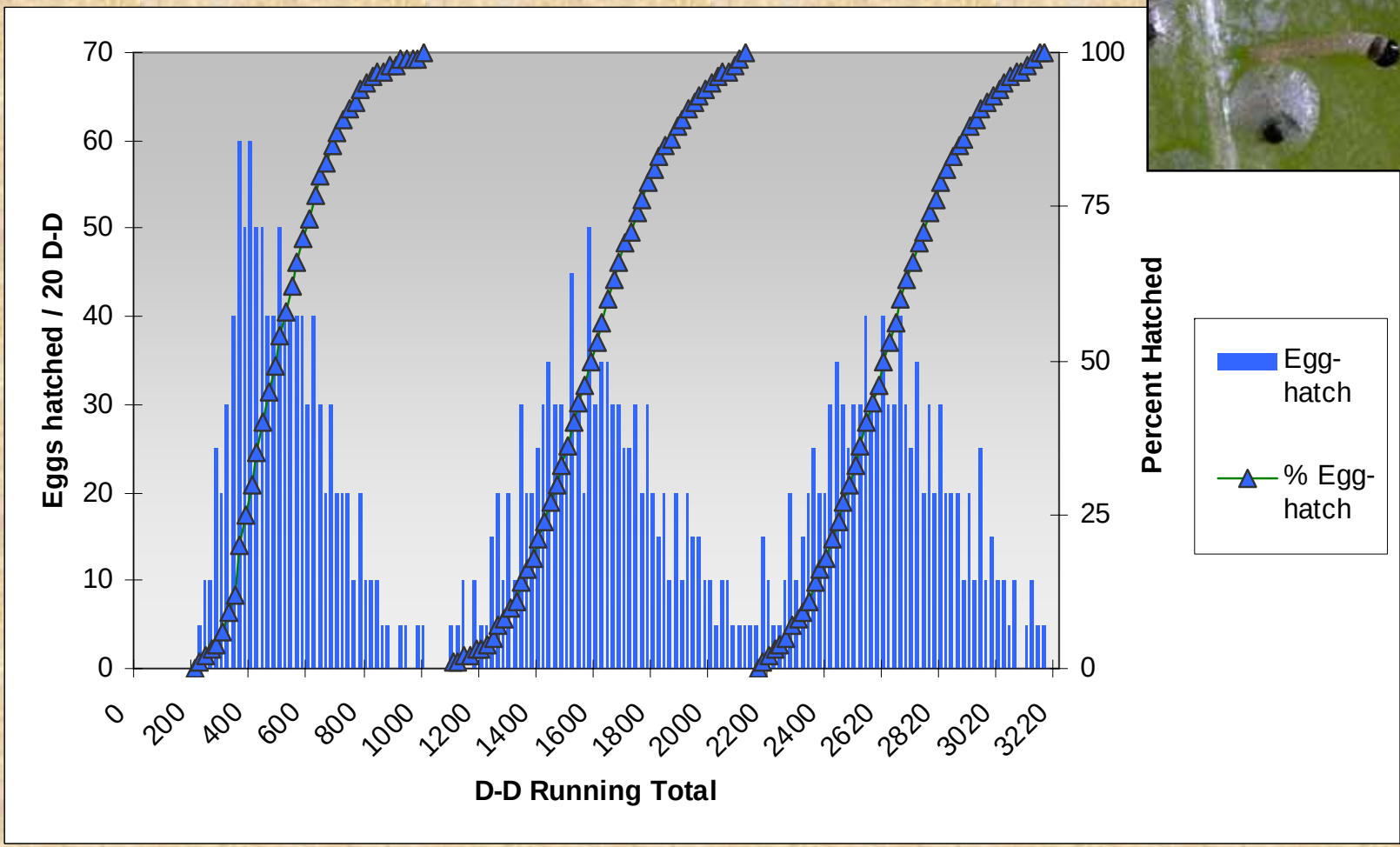


D-D Accumulations at Each Generation's Egg-hatch:

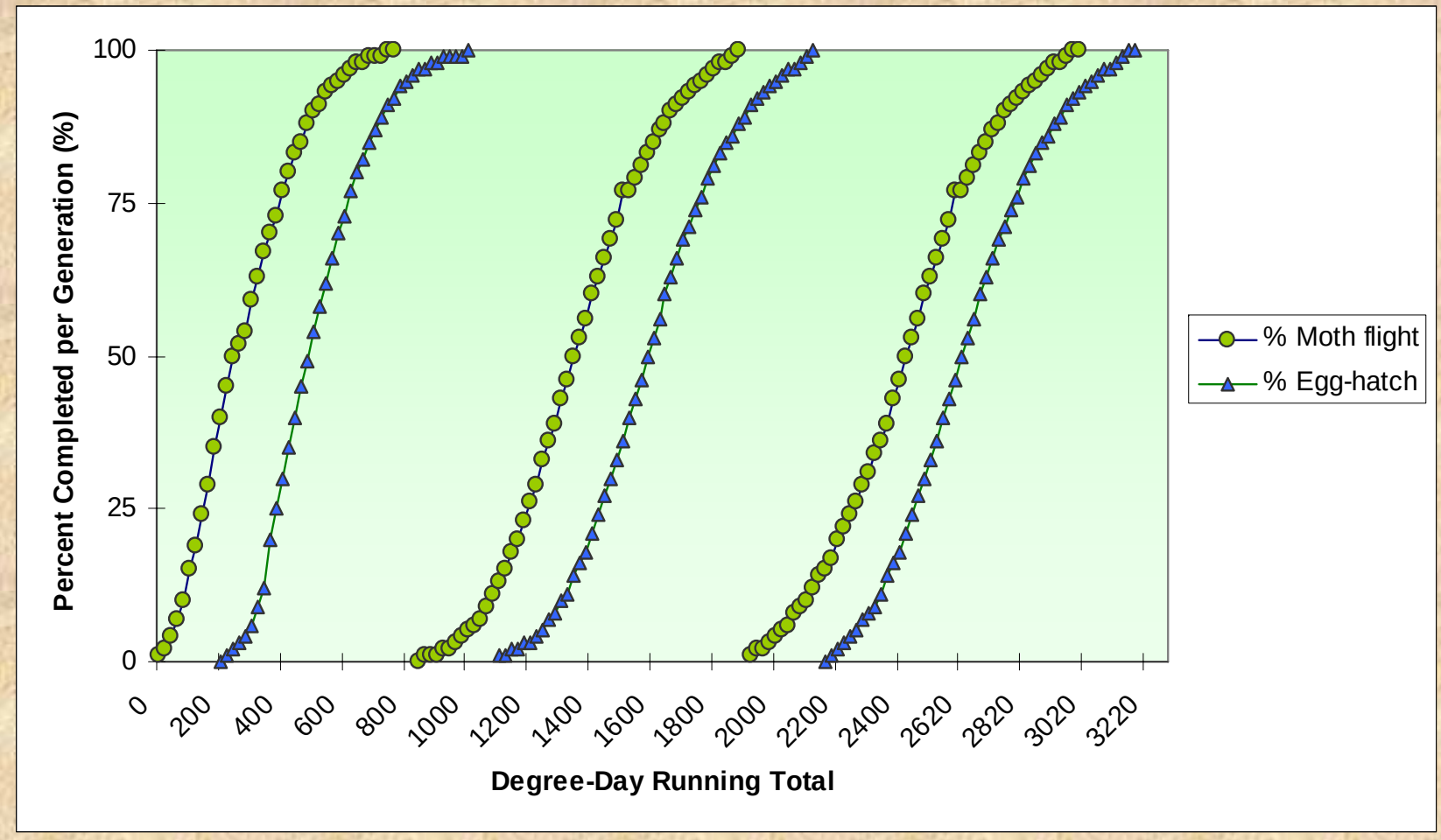
- **220 D-Ds**
  (1st egg-hatch)
- **1,120 D-Ds**
  (2nd egg-hatch)
- **2,160 D-Ds**
  (3rd egg-hatch)

General Pattern of Codling Moth Flight and Egg-hatch, Relative to Degree-Days

General Pattern of Codling Moth *Egg-Hatch* and % *Hatch Completed* (Relative to Degree-Days)



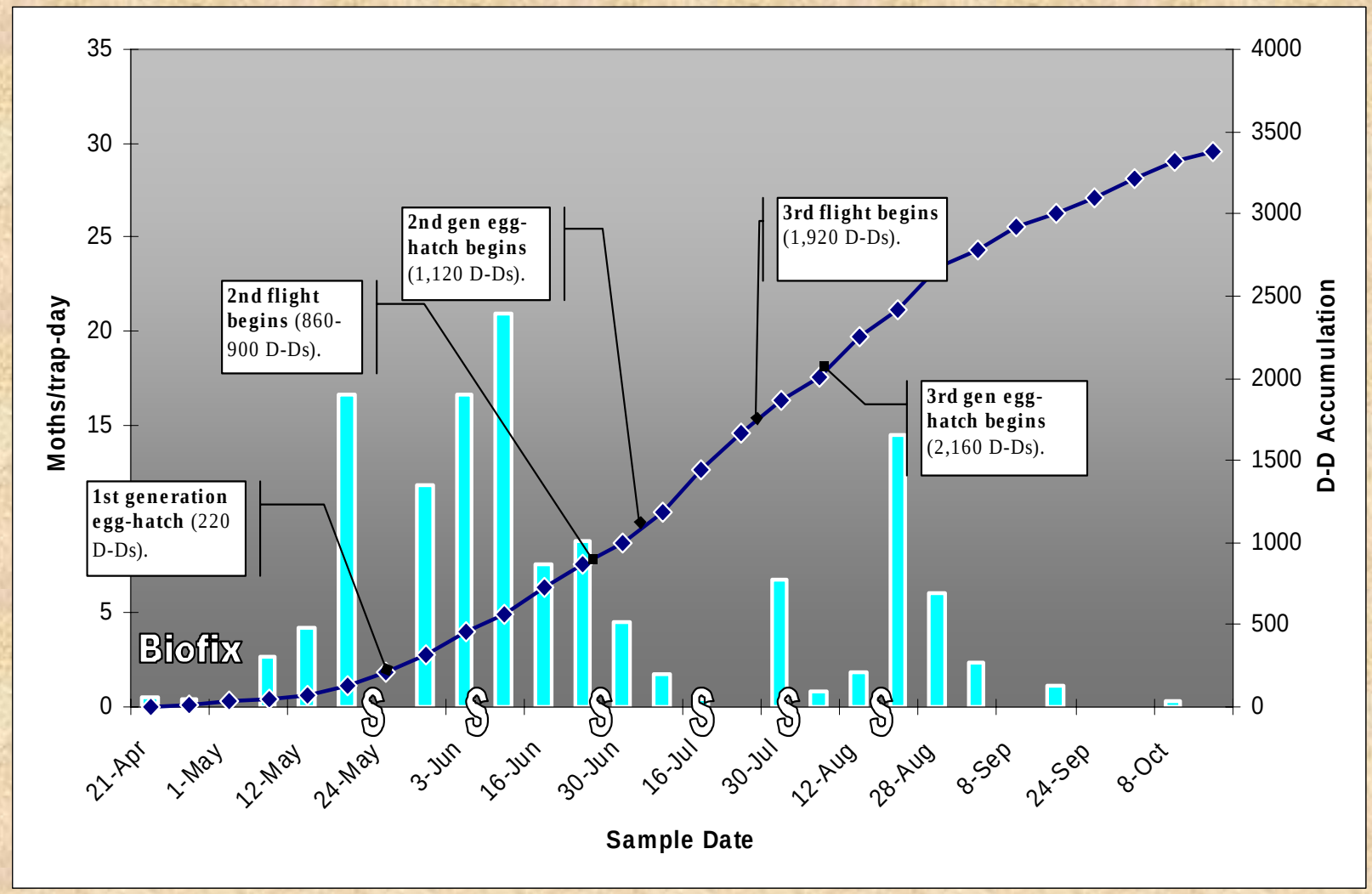
Percentages (%) of CM Flight and Egg-hatch Relative to Degree-Days



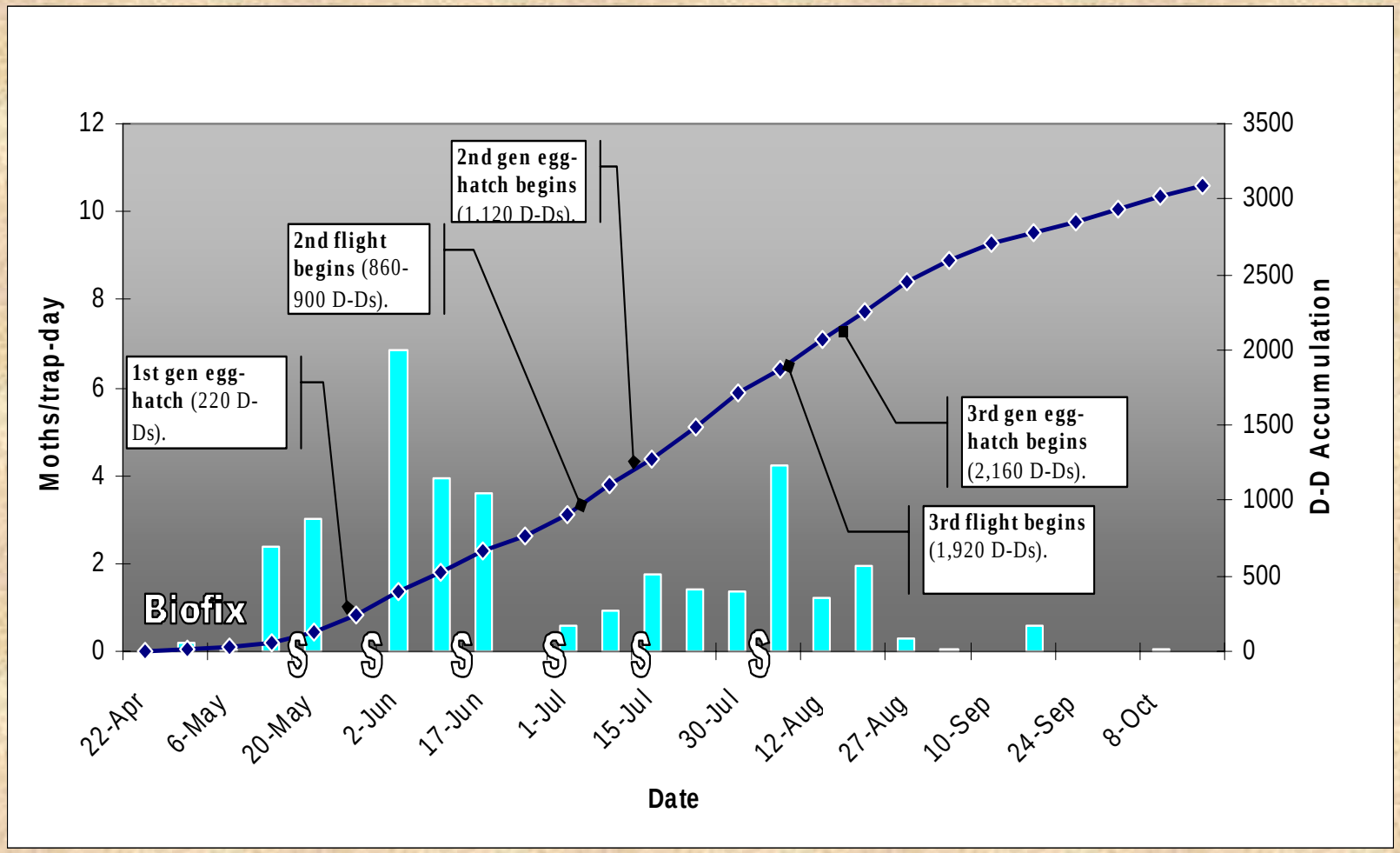
Case Studies from ’03 Season

- ✓ **Case 1:** *No mating disruption;* ***high CM pop****; poorly timed apps; over-reliance on a single material; insecticide resistance documented.*
- ✓ **Case 2:** *No mating disruption;* ***moderate CM pop****; well-timed apps; use of IGR and conventional materials.*
- ✓ **Case 3:** *Mating disruption;* ***moderate CM pop****; well-timed apps; use of various materials.*
- ✓ **Case 4:** *Mating disruption;* ***moderate CM pop****; many applications; use of various materials.*
- ✓ **Case 5:** *Mating disruption (applied 1 week late);* ***high CM pop****; well-timed applications; various materials.*
- ✓ **Case 6:** *No mating disruption;* ***high CM pop****; well-timed apps early in season; insufficient management late in season.*

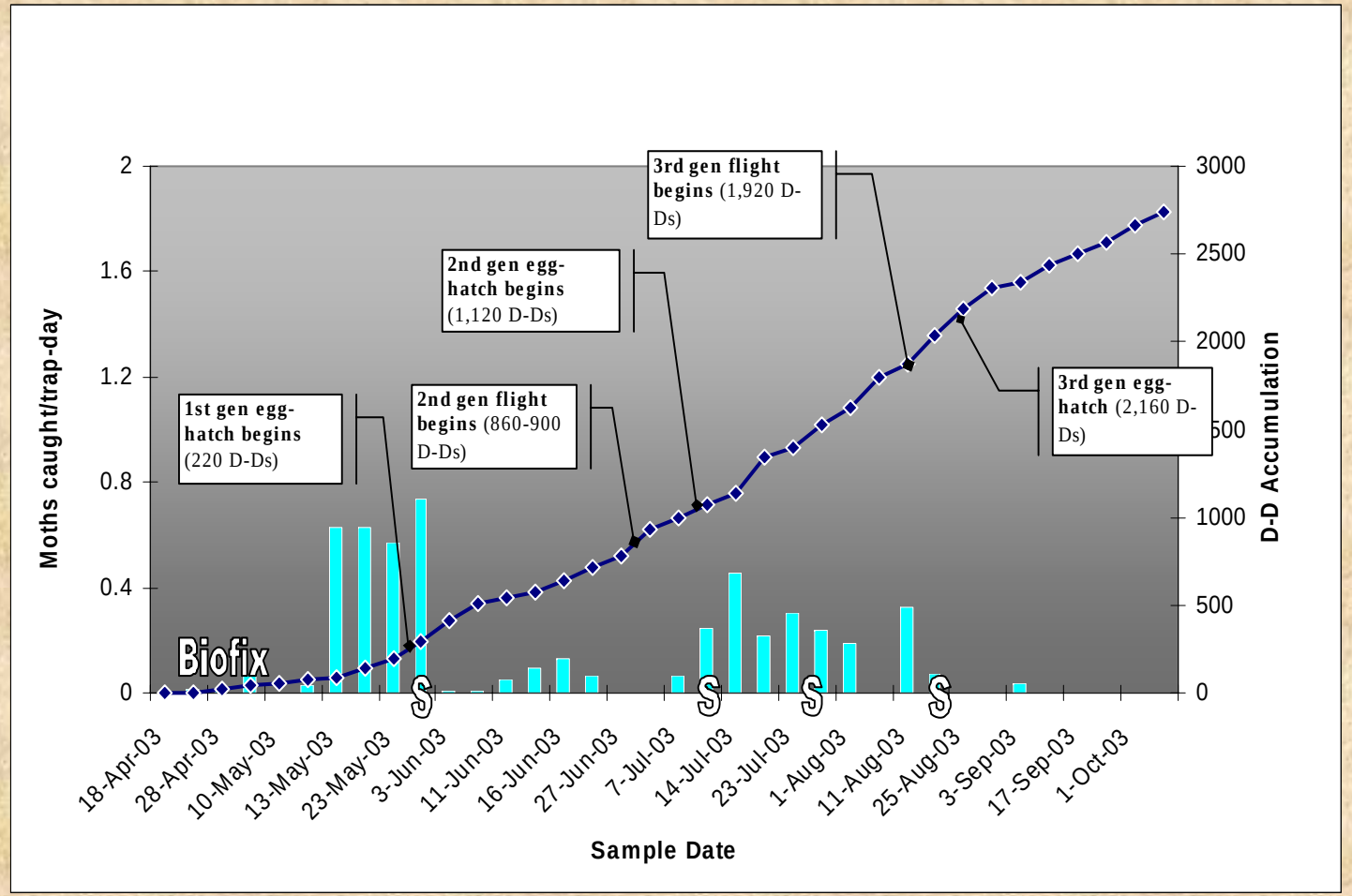
Case 1: Codling Moth Flight and Degree-Day Accumulation for Apples in *Perry (Boxelder Co.)*



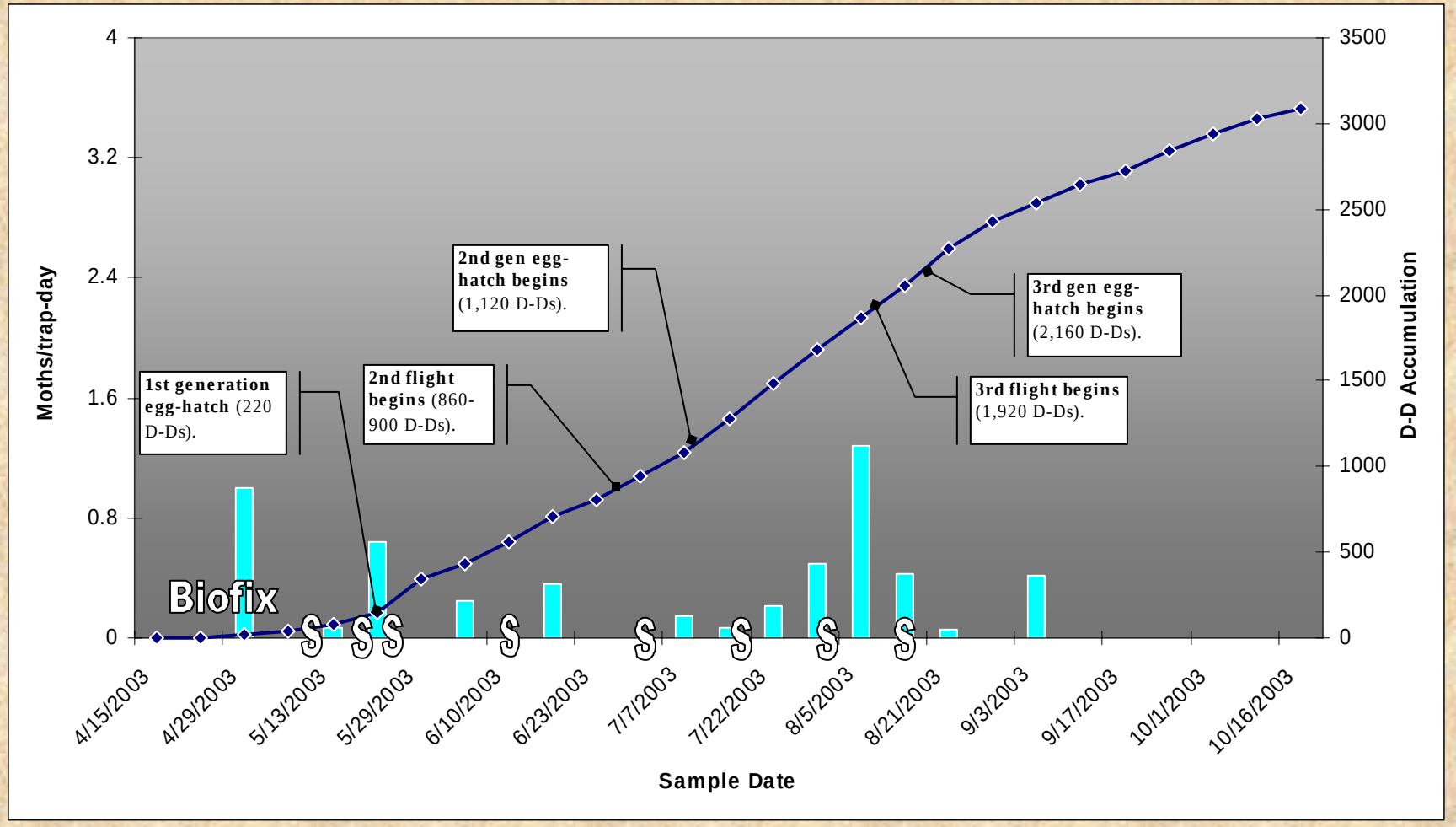
Case 2: Codling Moth Flight and Degree-Day Accumulation for Apples in *Kaysville (Davis Co.)*



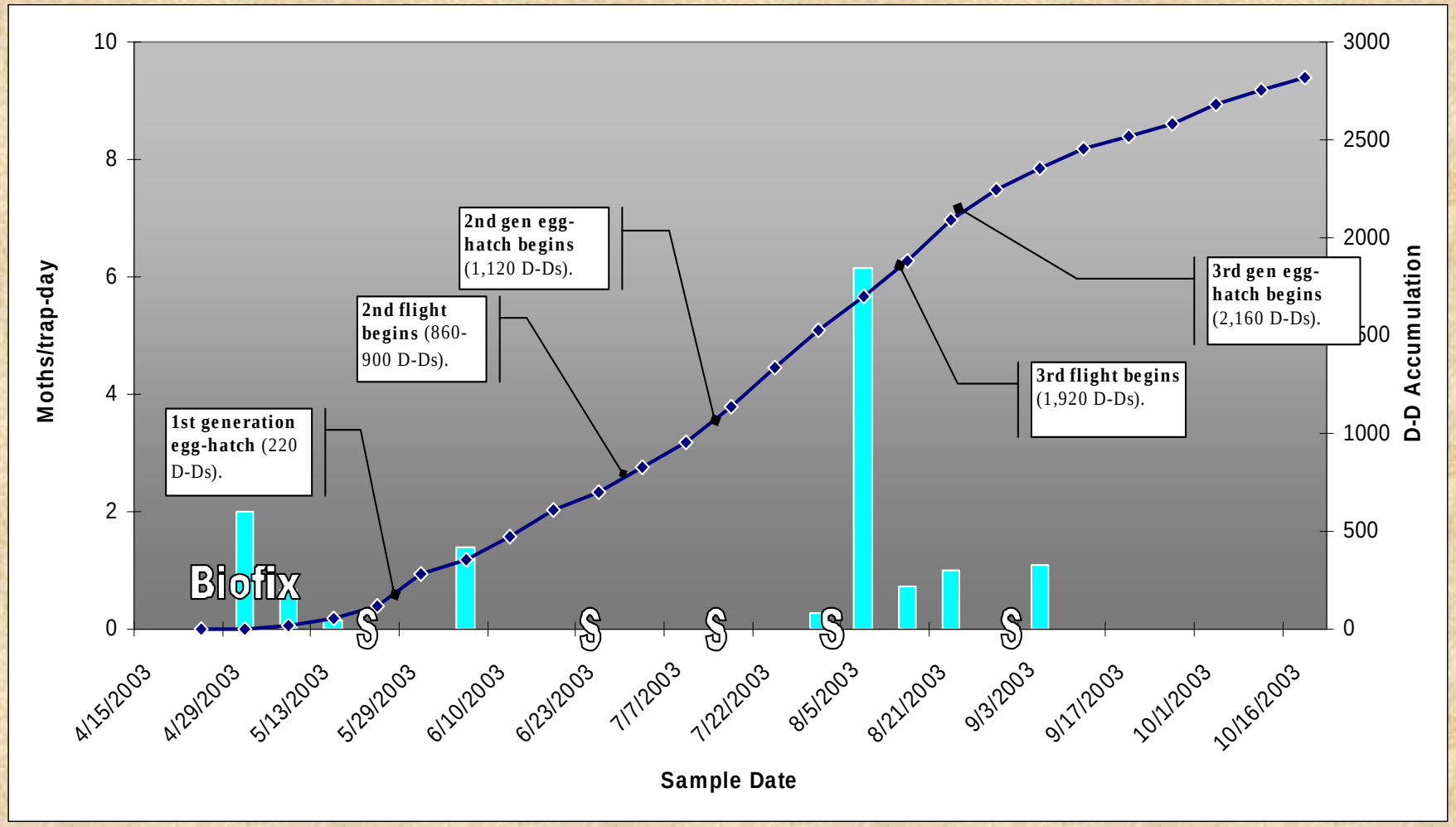
Case 3: Codling Moth Flight and Degree-Day Accumulation for Apples in *Payson (Utah Co.)*



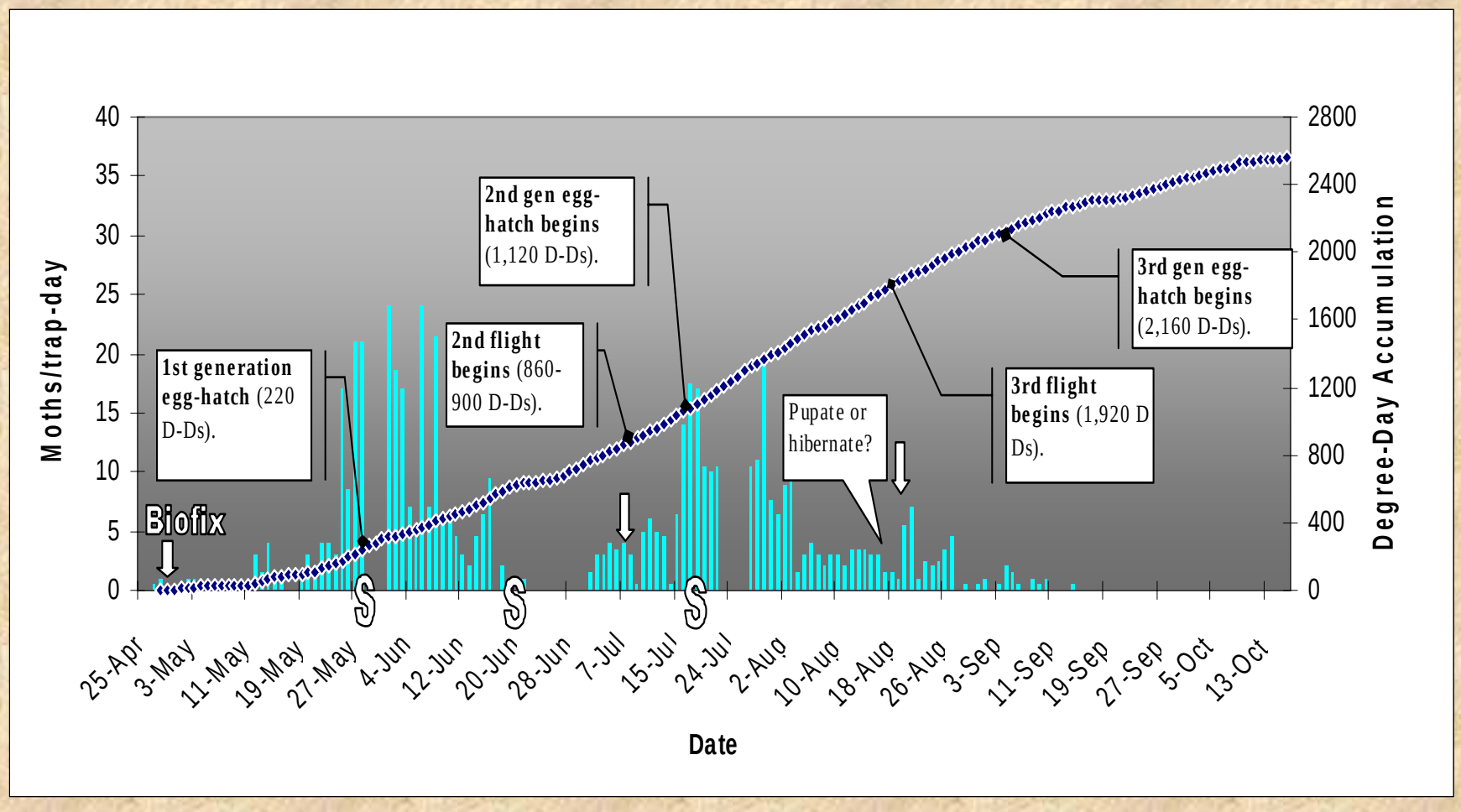
Case 4: Codling Moth Flight and Degree-Day Accumulation for Apples in *Genola (Utah Co.)*



Case 5: Codling Moth Flight and Degree-Day Accumulation for Apples in *Lincoln Point (Utah Co.)*



Case 6: Codling Moth Flight and Degree-Day Accumulation for Apples in *North Logan (Cache Co.)*



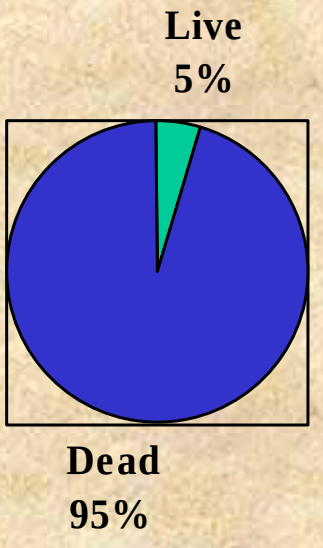
CM Damage Estimates

- ✓ **Case 1:** Not harvested due to CM damage (83% worm entry).
- ✓ **Case 2:** Moderate CM damage (1.3% worm entry).
- ✓ **Case 3:** Very low CM damage (damage estimates forthcoming).
- ✓ **Case 4:** Very low CM damage (damage estimates forthcoming).
- ✓ **Case 5:** High CM damage (approx. 20% worm entry).
- ✓ **Case 6:** Moderate CM damage.

Why was it such a bad year for CM?

- Large overwintering populations?
- **Mild winter?**
- Cool, prolonged spring?
- Record-breaking summer heat?
- Resistance to insecticides?
- **Imperfect control tactics?**

Effects of Scaling



Improve the Odds for 2004

- **Use Pheromone Mating Disruption to *reduce the egg load.***
- **Time the cover sprays based on known biological events** (run traps).
- **Achieve better coverage by using higher gallonages and verifying uniformity within the canopy.**
- **Sanitation** (remove infested apples from orchard).
- **Rotate insecticide classes** (implications for spray timing).