Destruction of sclerotia of *Sclerotinia minor* and *S. sclerotiorum* in wet soil

Michael E. Matheron

Extension Plant Pathologist

Yuma Agricultural Center

THE UNIVERSITY OF ARIZONA®

Sclerotinia drop of lettuce

Sclerotinia minor *S. sclerotiorum*

Conditions that favor Sclerotinia drop of lettuce

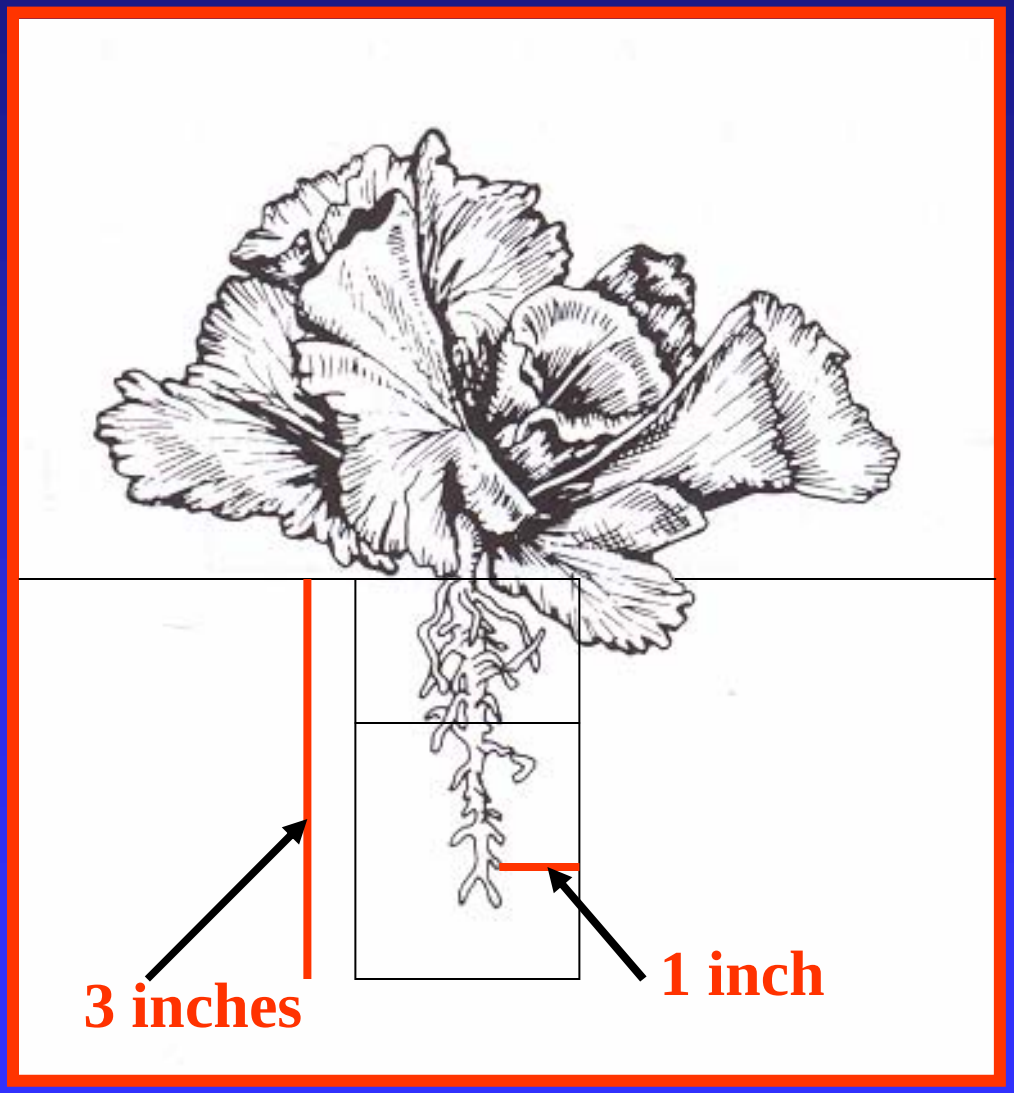
- High population of sclerotia in soil
- Moist soil
- Sclerotia of both species can survive up to 8-10 years in soil
  - Sclerotium germination decreases with time and depth of burial
- Both fungi grow from 50 to 77 F and optimally at 68 F

Incorporation of crop residue and sclerotia into soil

Management of Sclerotinia drop in lettuce

- Sclerotia are the survival structures of the pathogen, which remain dormant in soil until activated by the presence of lettuce
- Disease control measures for Sclerotinia drop focus on destroying or inactivating these sclerotia

Infection zone for *Sclerotinia minor*



Ascospores of *S. sclerotiorum*

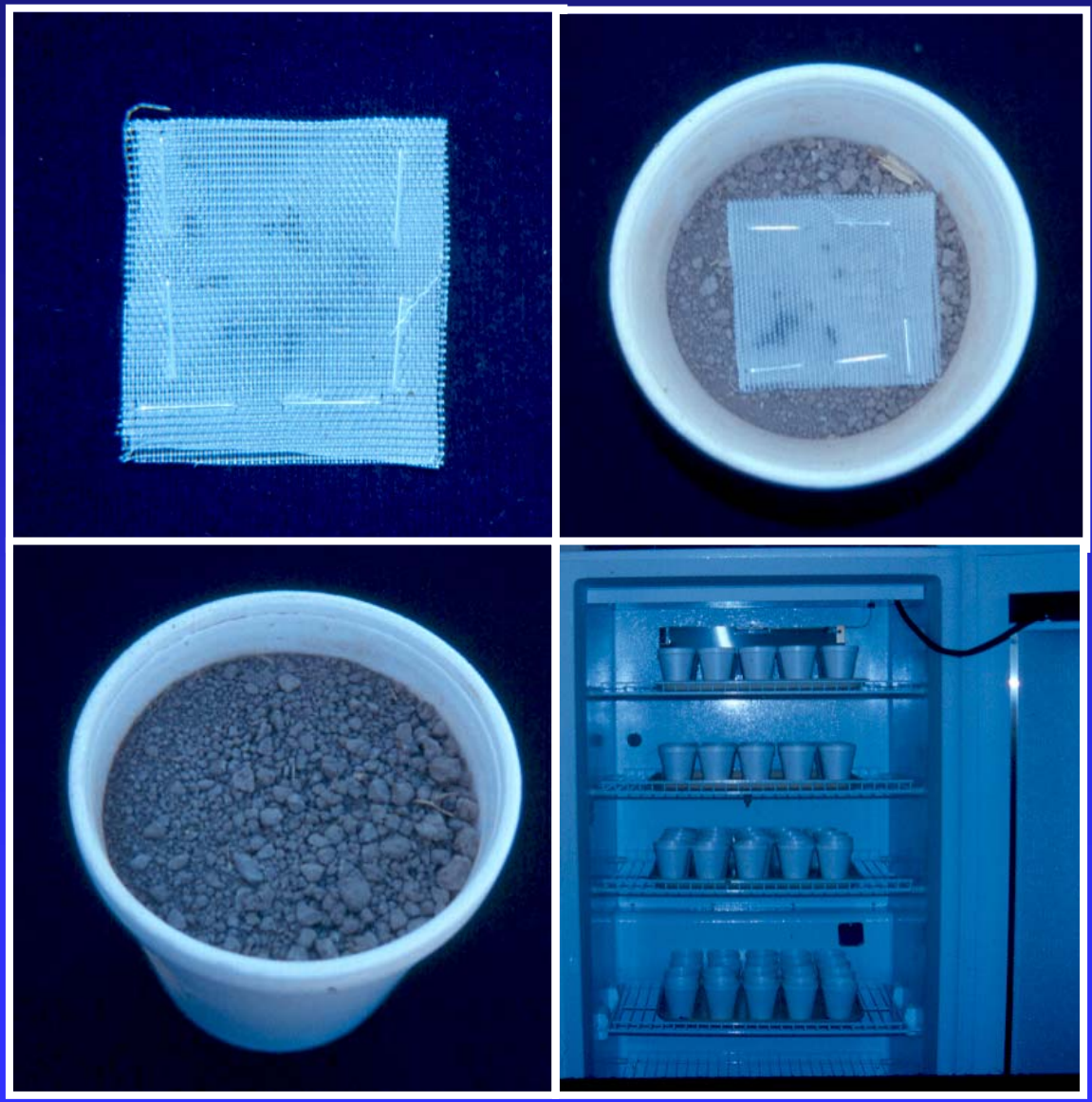
How can sclerotia be destroyed or inactivated?

- **Destruction in wet soil**

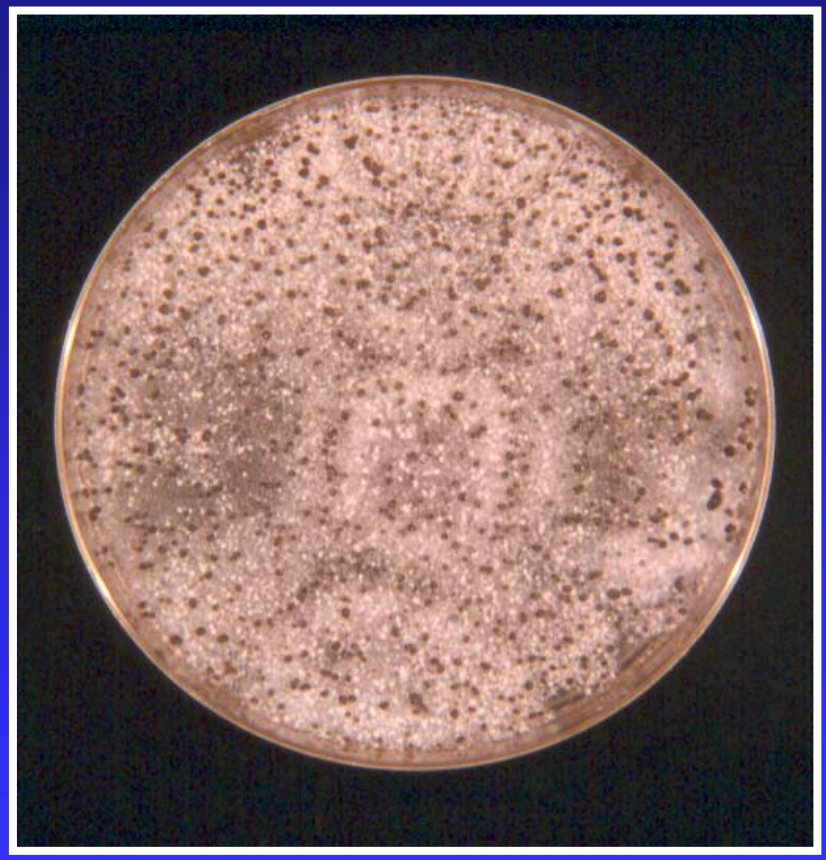
Laboratory studies: Effect of temperature and moisture on viability of sclerotia

- Sclerotia of *S. minor* or *S. sclerotiorum* were buried in a dry field soil (7-56-37 sand-silt-clay) in a series of containers 3 inches in diameter and 4 inches deep
- Sclerotia in soil were incubated at 58, 68, 77, 86, 95 and 104 F for 1 to 4 weeks
- Soil in containers was either kept dry or saturated with water
- After burial in soil for 1, 2, 3, or 4 weeks, sclerotia were tested for viability after surface-sterilizing with bleach and alcohol by plating onto acidified potato dextrose agar

Laboratory studies

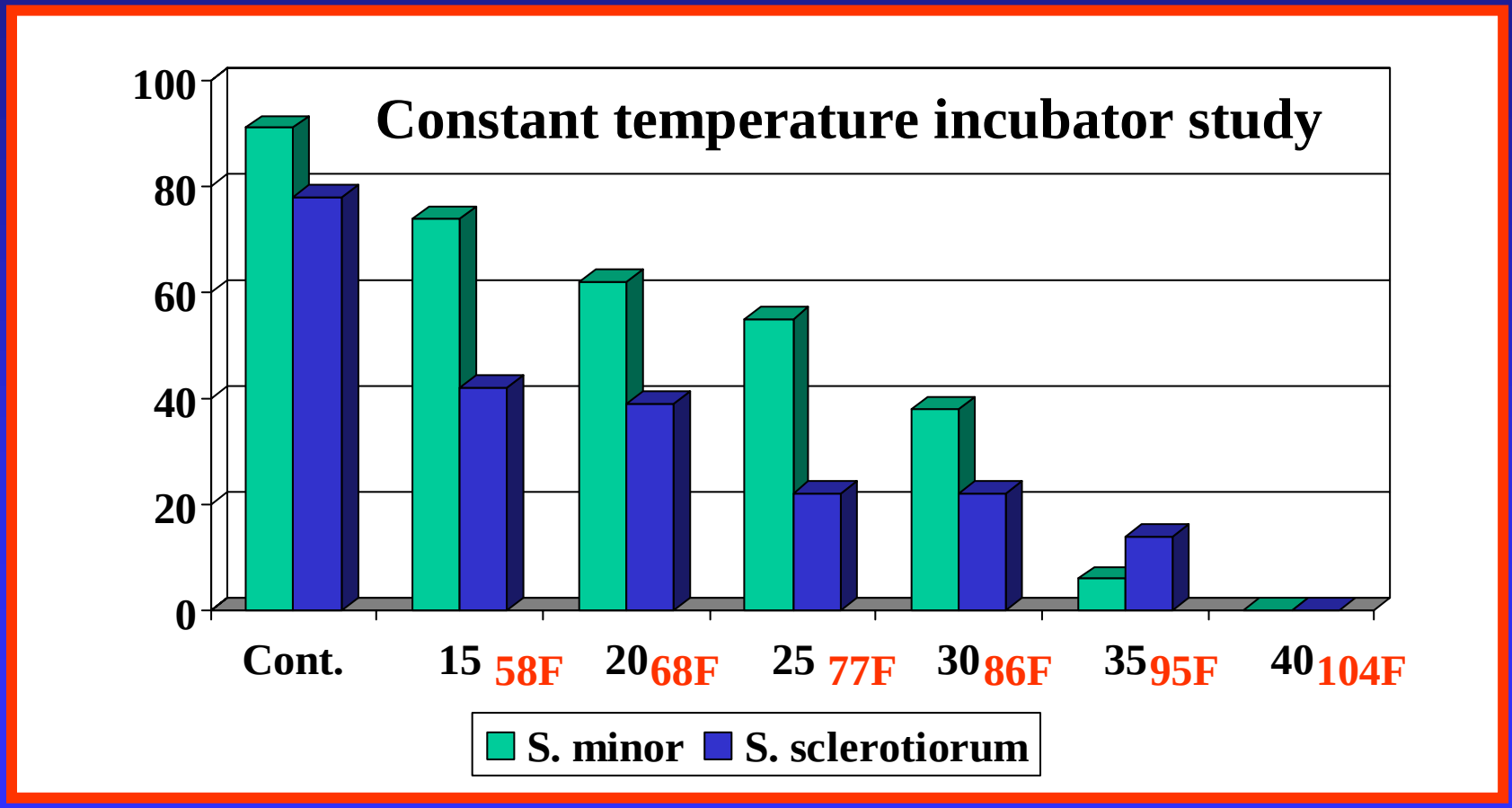


Mycelial growth from sclerotia on PDA



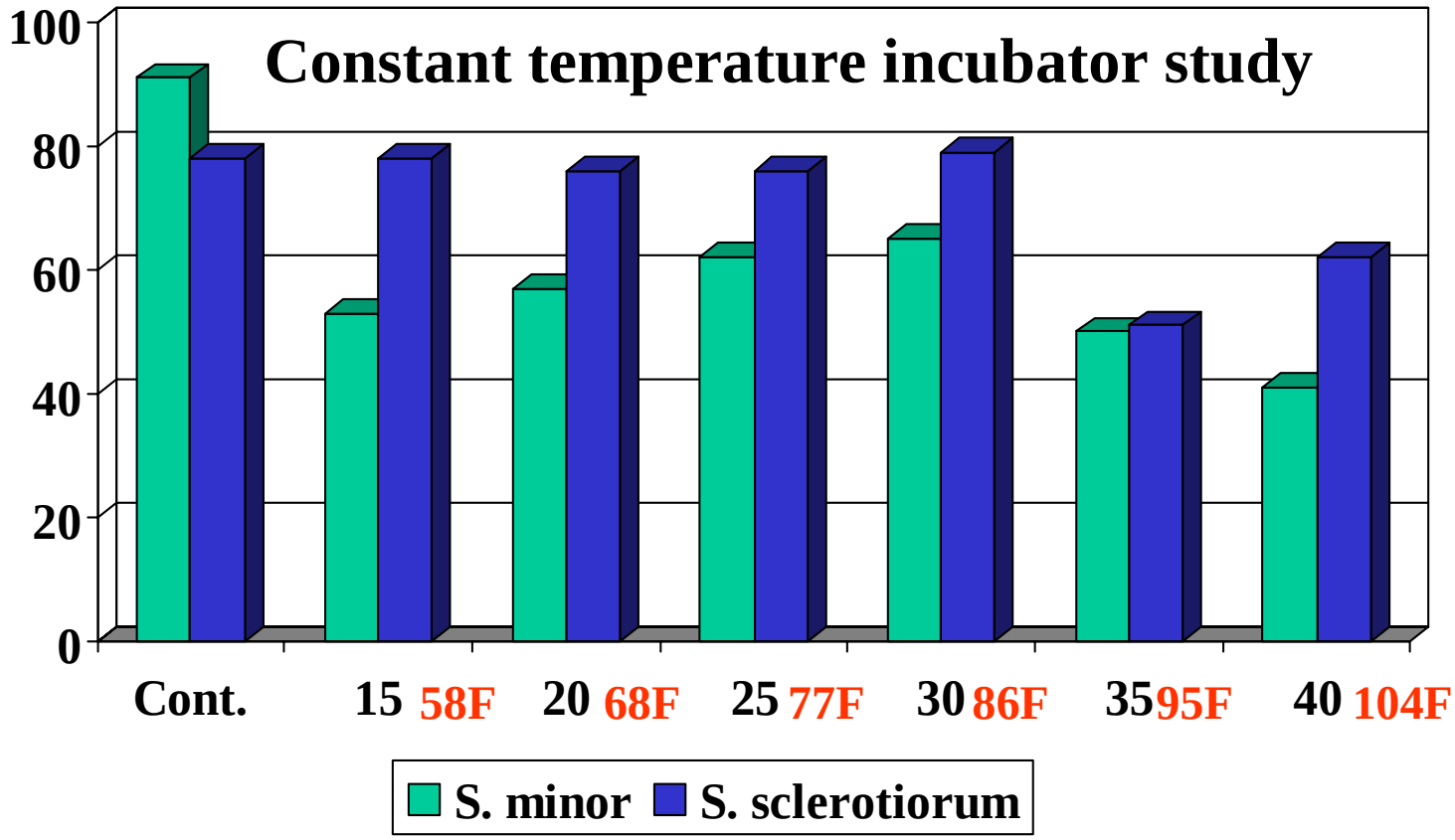
Germination of sclerotia in wet soil

(Average for the 1 to 4 week study period)



Germination of sclerotia in dry soil

(Average for the 1 to 4 week study period)



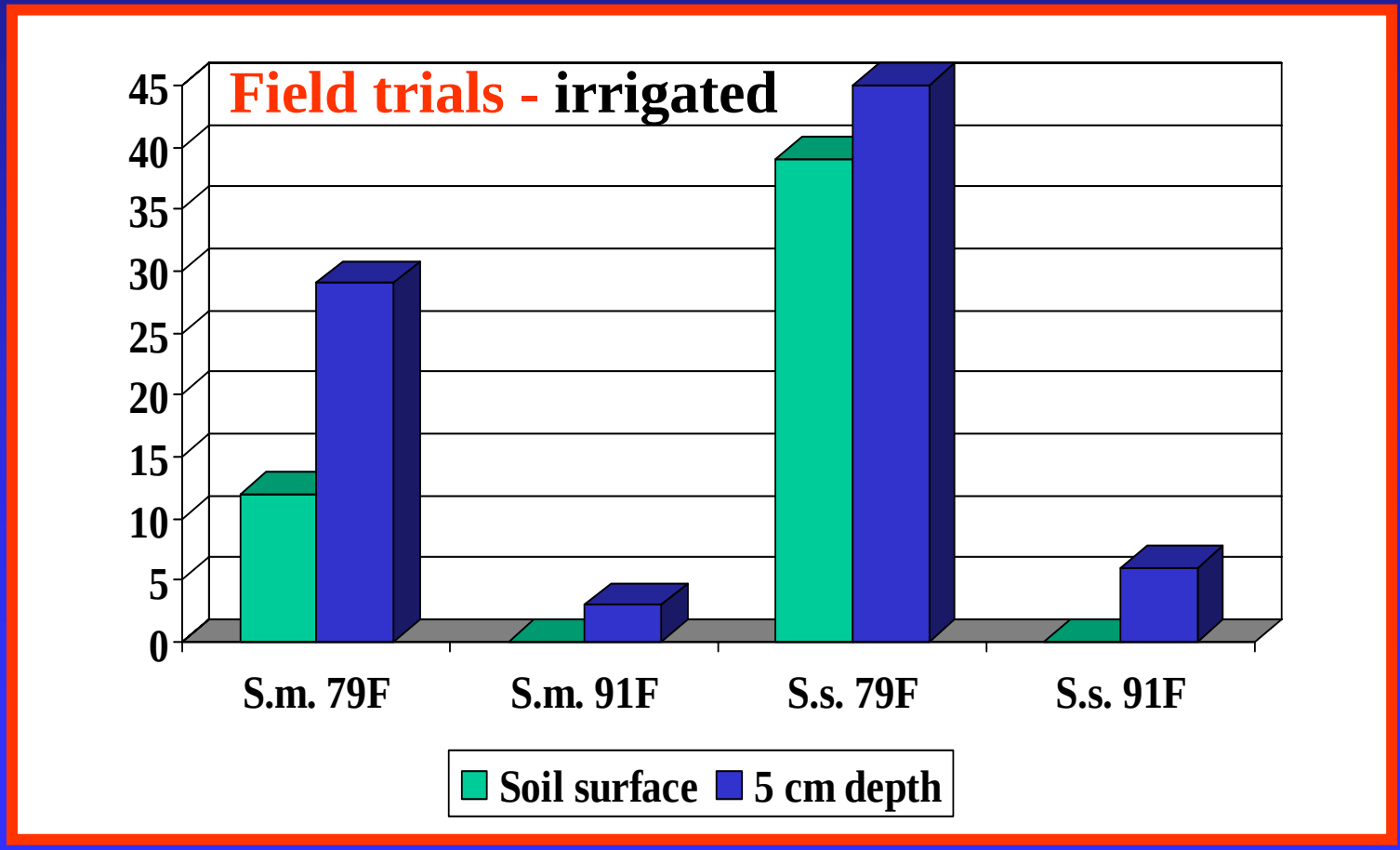
Field studies: Effect of temperature and moisture on viability of sclerotia

- Sclerotia of *S. minor* or *S. sclerotiorum* were placed at a depth of 0 or 2 inches (5 cm) within furrows
- Soil was either irrigated every 7 to 14 days or maintained in a dry state
- Sclerotia were collected after 2, 4, 6 and 8 weeks, surface-sterilized and tested for ability to germinate on potato dextrose agar
- This test was performed when mean soil temperature was 26 C (79 F) and 33 C (91 F)

Field studies: wet and dry soil

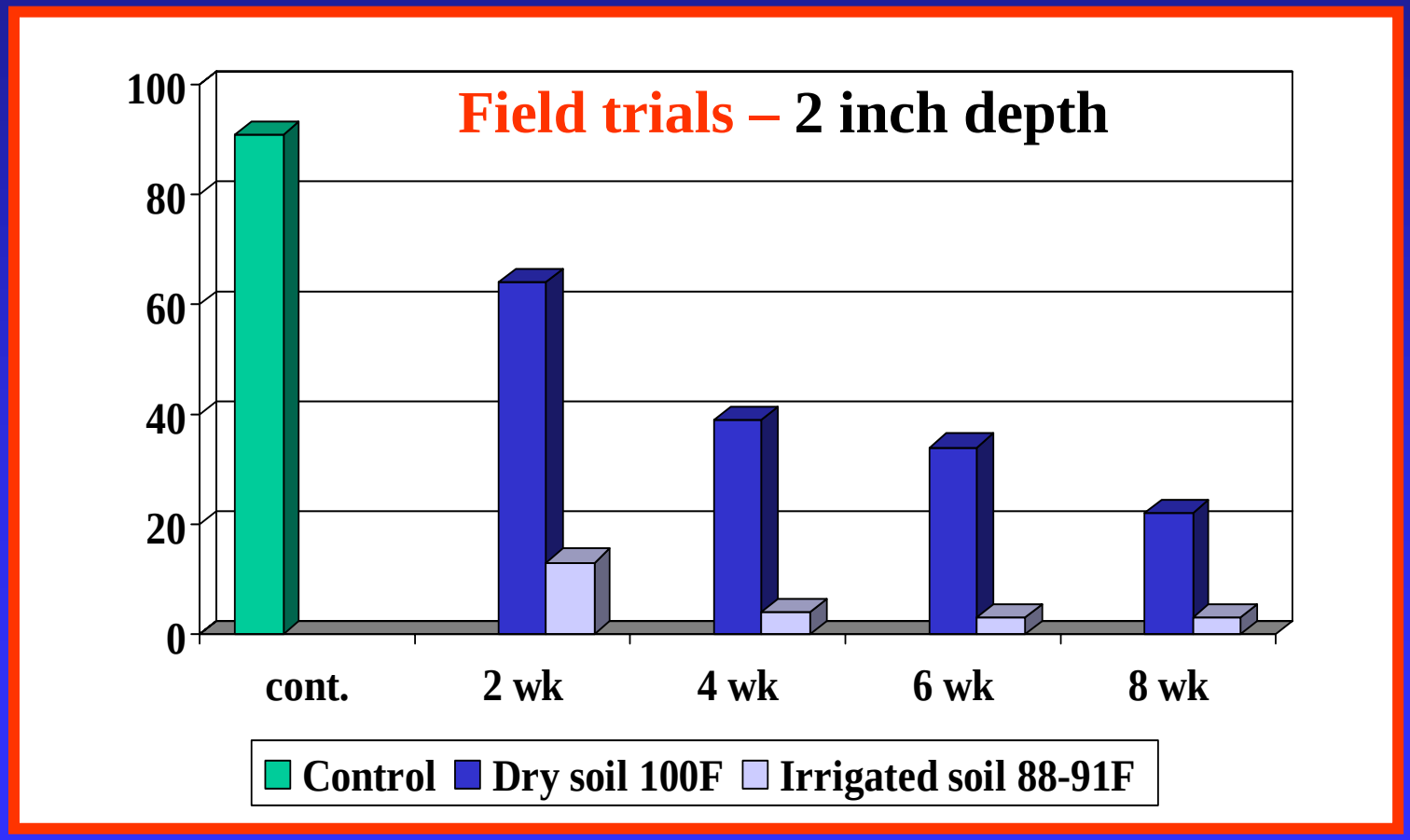
Effect of mean soil temperature and soil depth on germination of sclerotia

(After 8 weeks)



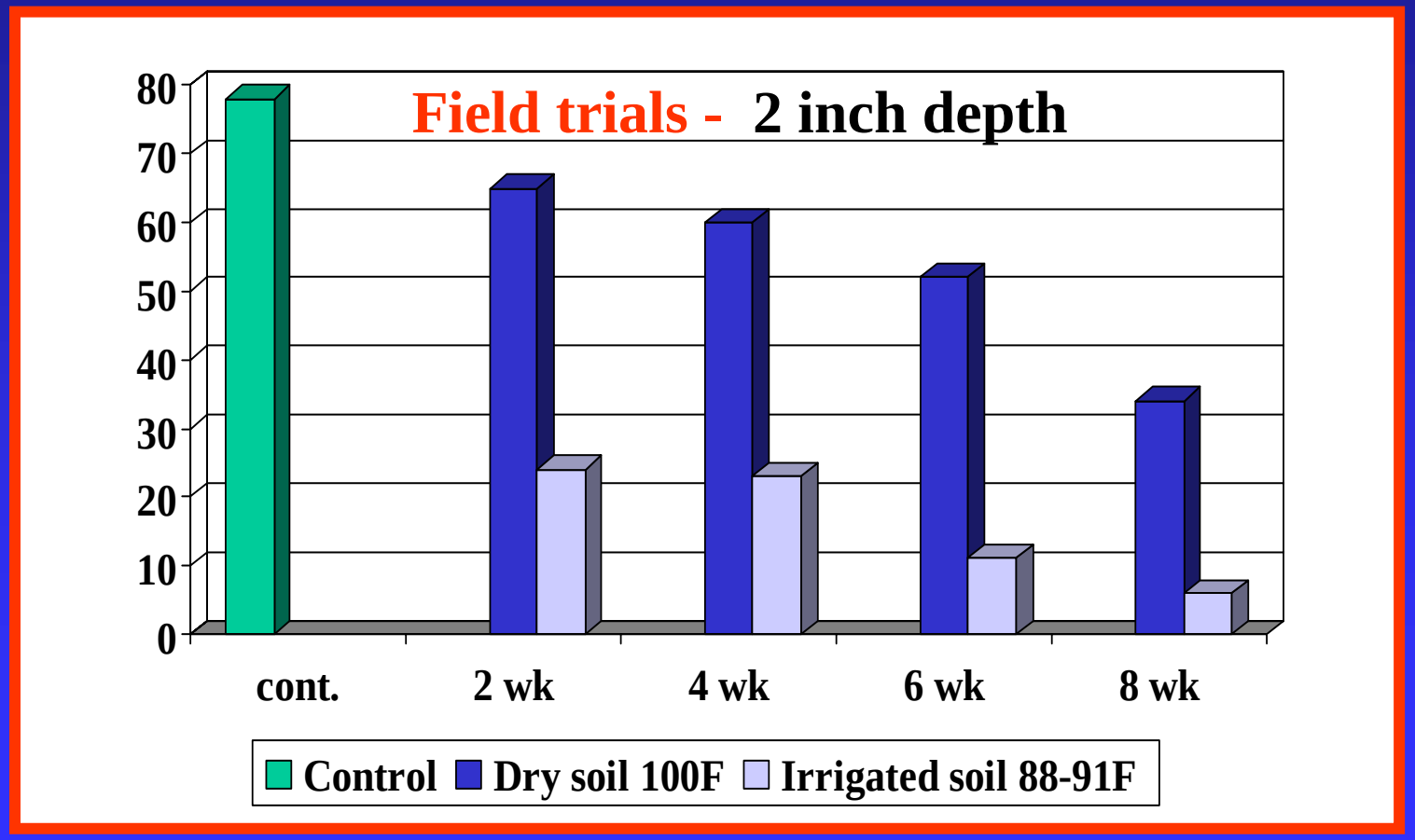
S. minor: germination of sclerotia in dry vs. irrigated soil (7-14 day interval)

(after 8 weeks)



S. sclerotiorum: germination of sclerotia in dry vs. irrigated soil (7-14 day interval)

(after 8 weeks)



Conclusions

- **In irrigated soil, sclerotia of *S. minor* are inactivated at a greater rate than *S. sclerotiorum***
- **Sclerotia of both pathogens survive much better in dry soil than in irrigated soil**

Effect of irrigation frequency on germination of sclerotia

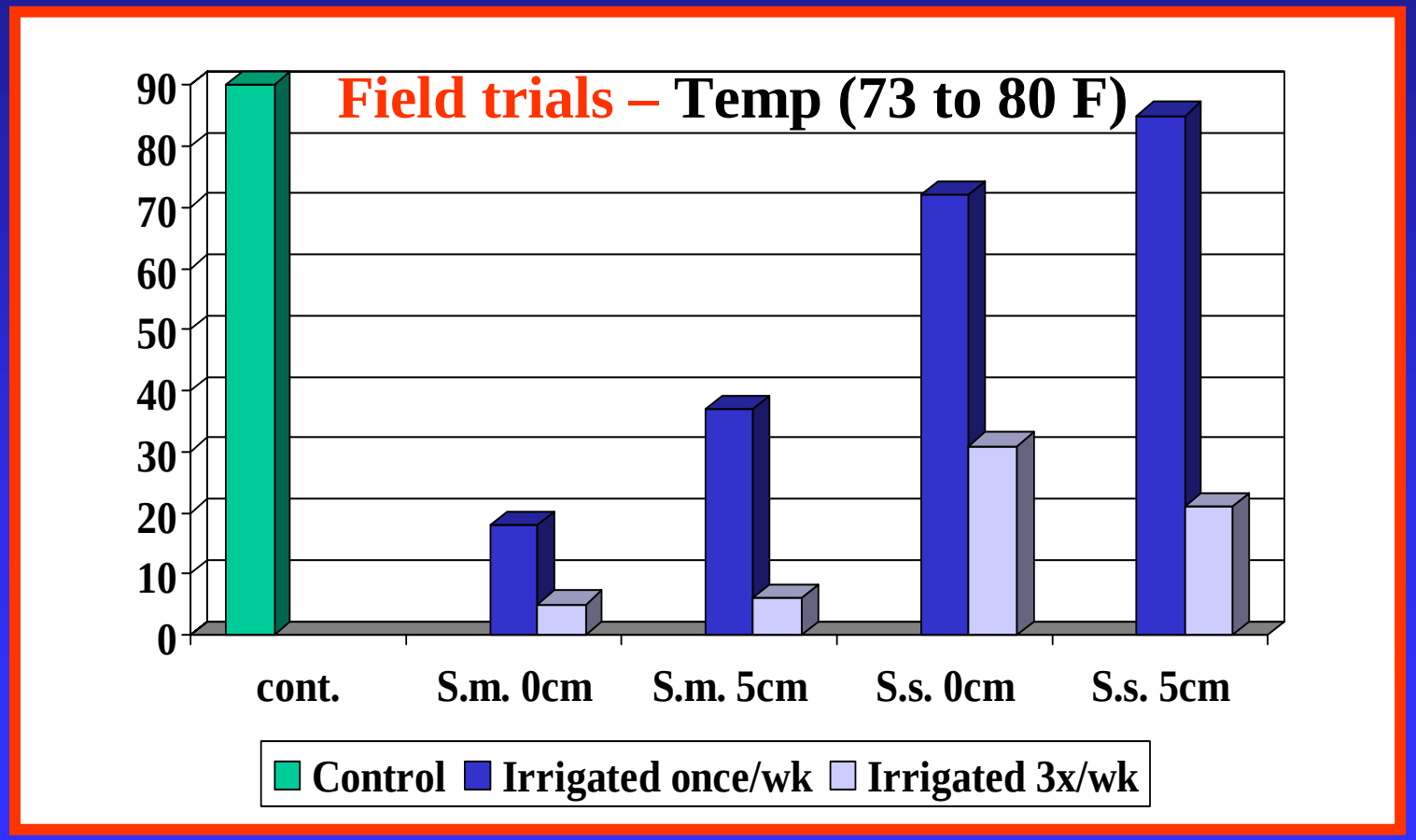
Once per week

compared to

3 times a week

Effect of irrigation frequency on germination of sclerotia

(after 8 weeks)

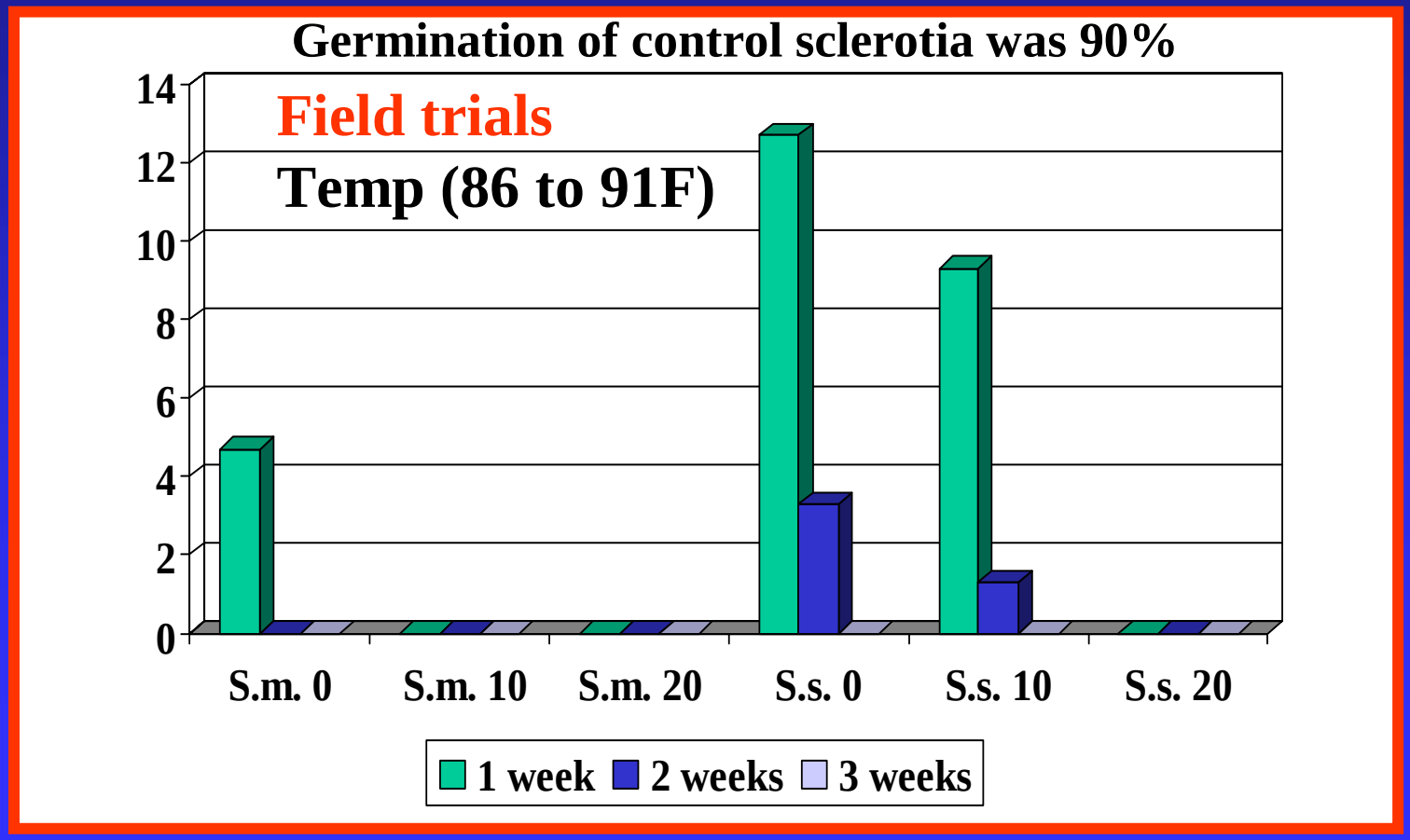


Effect of soil flooding on germination of sclerotia

Soil flooding experiments

Effect of soil flooding on sclerotia germination at soil depths of 0, 10 and 20 cm

(after 8 weeks)



Land preparation activities in July and August prior to lettuce seeding