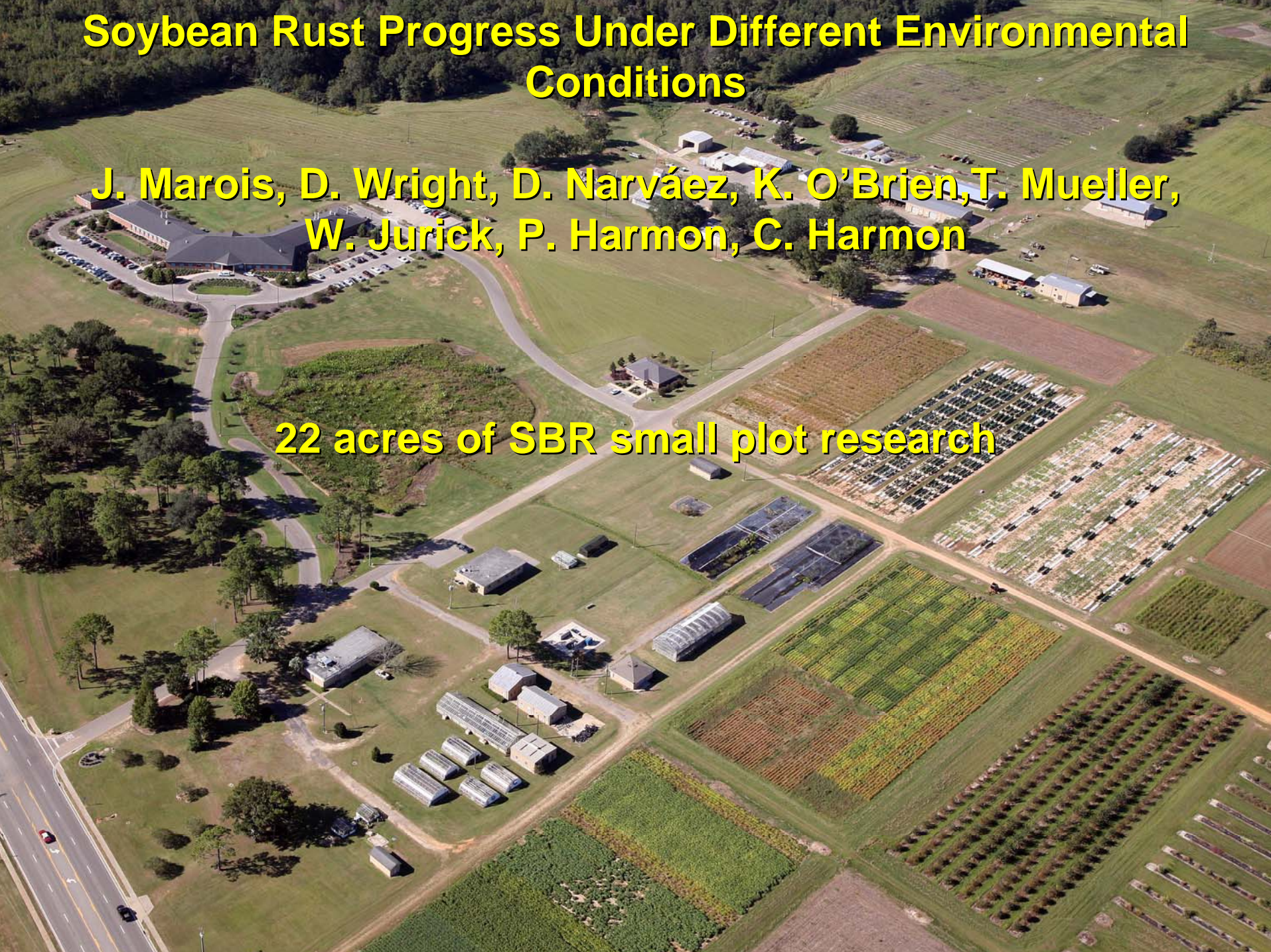


Soybean Rust Progress Under Different Environmental Conditions

J. Marois, D. Wright, D. Narváez, K. O'Brien, T. Mueller,
W. Jurick, P. Harmon, C. Harmon

22 acres of SBR small plot research





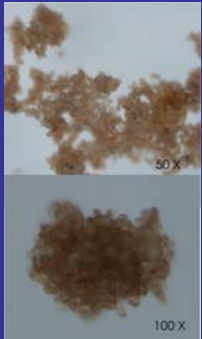




Disease Cycle

Free water on leaf surface
Minimum: 6 h
Optimum: 12 - 14 h

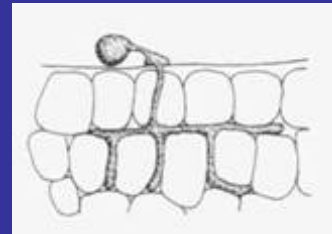
Penetration



Infection



M. Tamauti



G.N. Agrios

Symptoms show up 5 days after inoculation

Reproduction

Germination

(optimum 18°C - 26°C)

Penetration



W.M. Paiva

6-7 days occurs spore liberation



J.T. Yorinori

One pustule releases spores for 3 weeks

Deposition

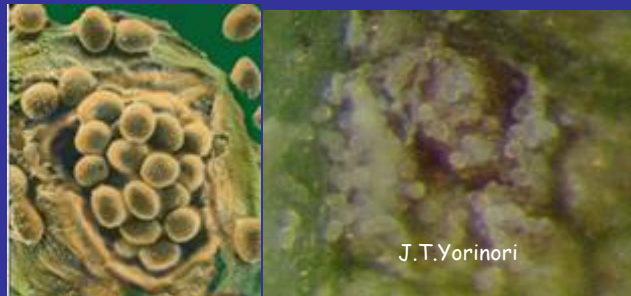
Dry and wet



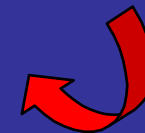
Dissemination: wind

Dissemination

Survival ?



J.T. Yorinori



Teliospore

Source: Embrapa

Environment and Soybean Rust

- Optimum temperatures from 13° C - 26° C, no lesions <9° C or >28° C
- Frequency of rain events - optimum twice a week
- Duration of leaf wetness 8-12 hrs
- Relative Humidity between 75-80 % required for spore germination and infection

Effects of duration, frequency, and temperature of leaf wetness periods on soybean rust.

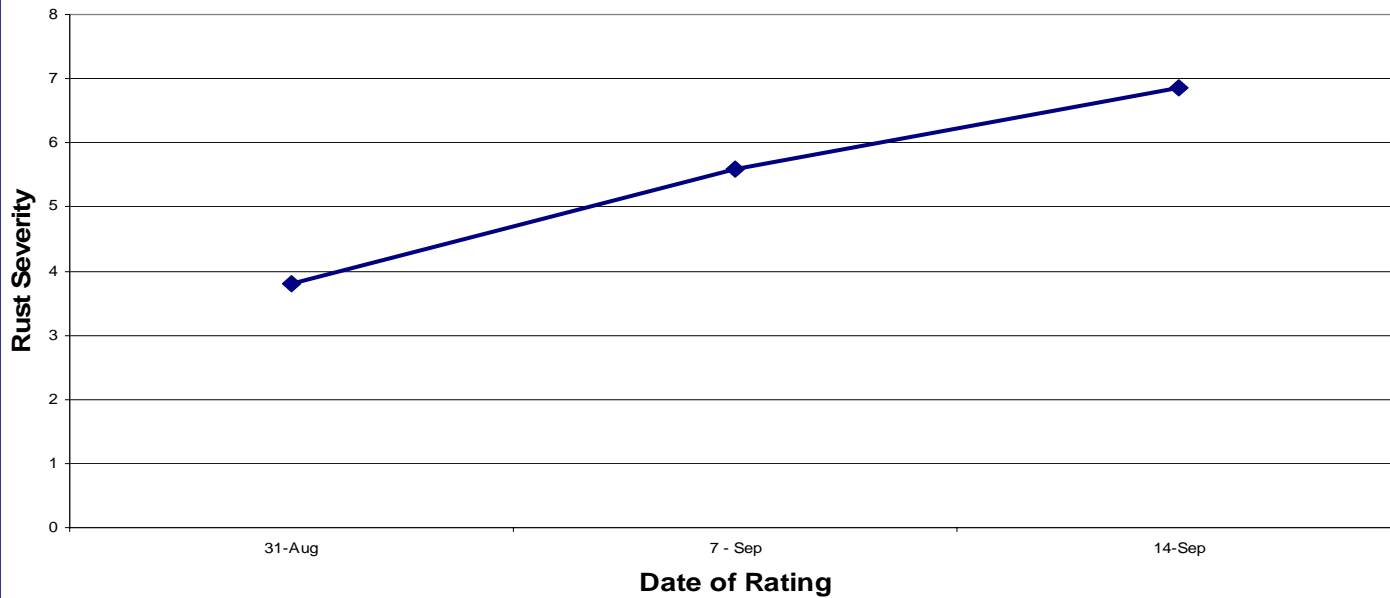
Melching, et al Plant Disease 73:117-122. 1989.

On soybean leaves at 20 C in the dark, uredospores of *Phakopsora pachyrhizi* began germinating 1.5 hr after dew was provided and reached a maximum level after 6-7 hr. Susceptible soybeans inoculated with viable uredospores developed no rust at dew periods less than 6 hr. At 6 hr, trace levels of primary rust lesions developed at 18, 20, 23, and 26.5 C. After 8 hr of dew at 18-26.5 C, lesion intensities were 10-fold higher than those at 6 hr at the corresponding temperatures. Increasing dew duration from 12 to 16 hr resulted in no significant increase in rust intensity, even at the most favorable temperatures (18-26.5 C). No lesions developed at 9 and 28.5 C, even with dew periods as long as 20 hr. Uredospores on unwetted soybean leaves progressively lost infectivity during sunshine conditions, but exhibited enhanced infectivity during 1 or 2 days on dry foliage under cloudy conditions.

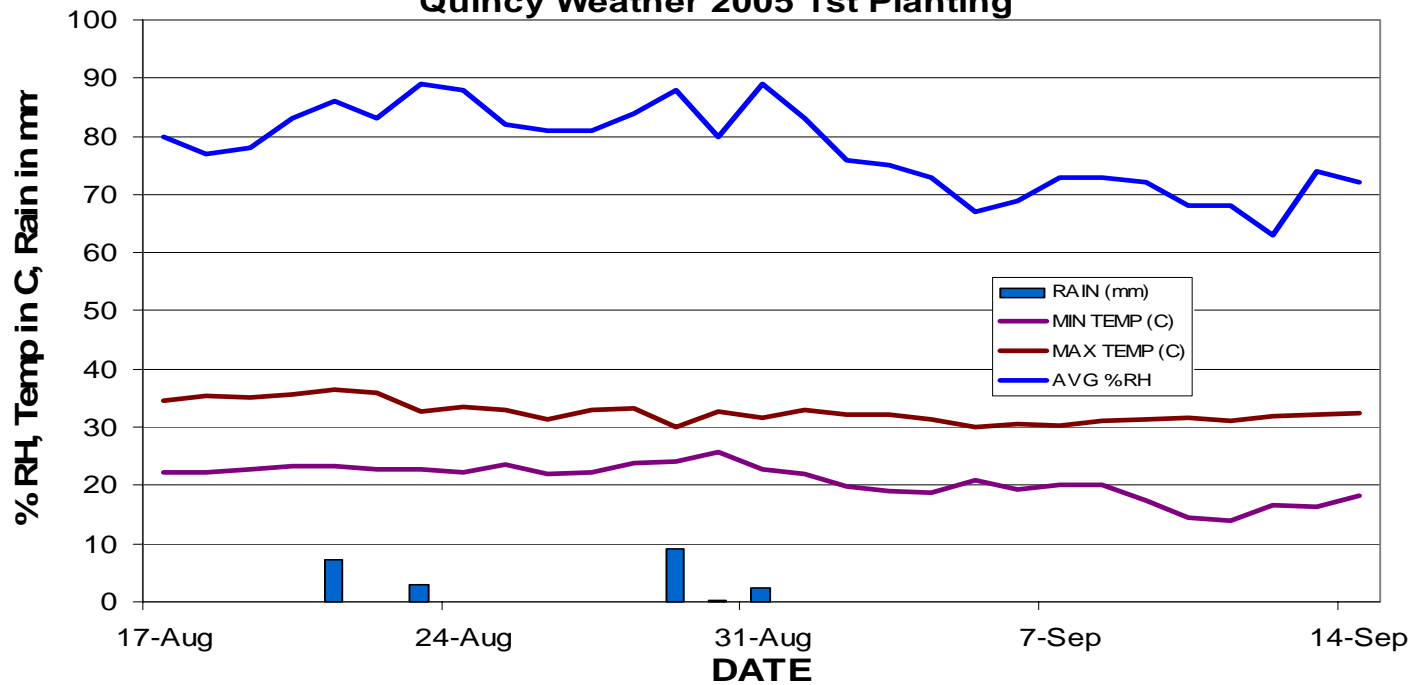
Disease Foci in Sentinel Plot 2 wks After Detection



Soybean Rust Severity 2005 1st Planting
Planted 13 May, Rust detected 25 August

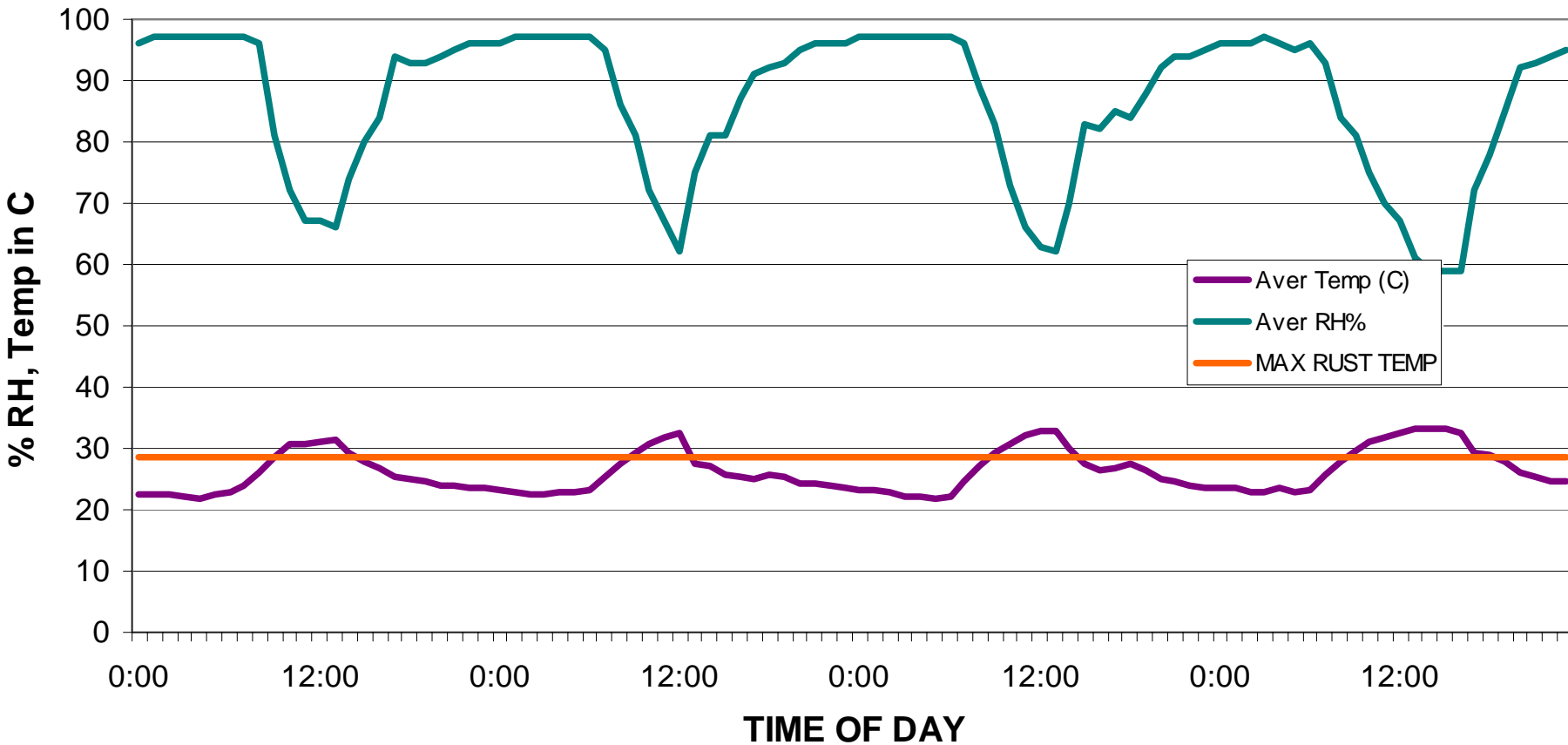


Quincy Weather 2005 1st Planting



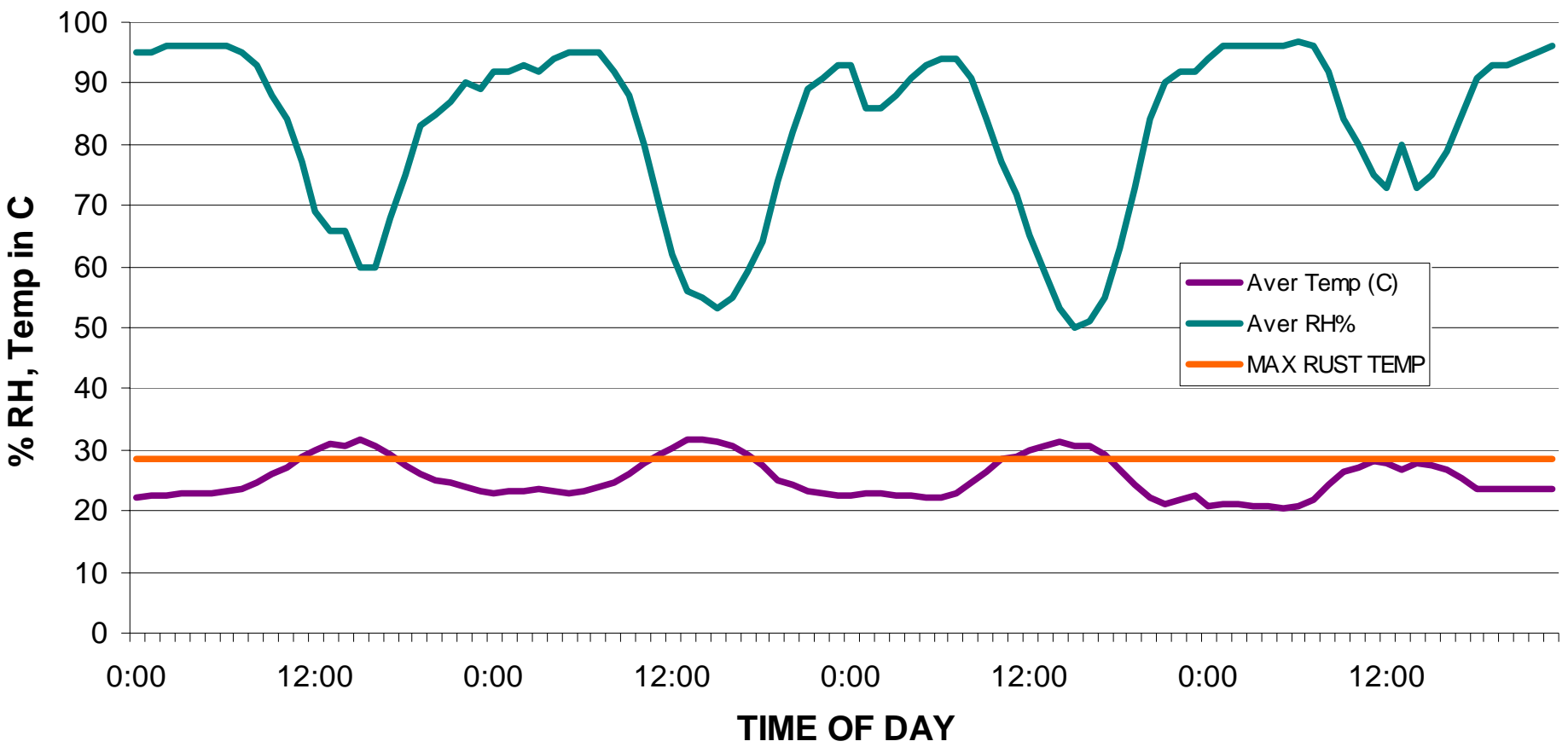
Daily Weather July 15,16,17 2005

Wet Period

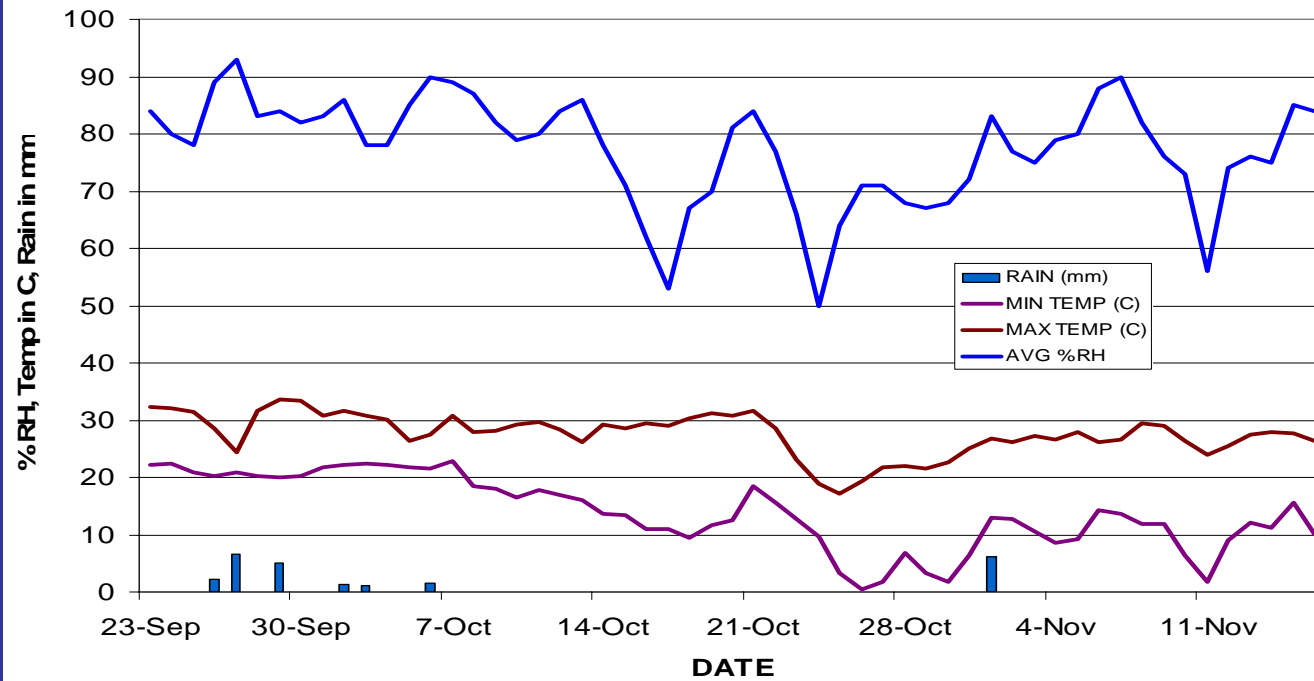
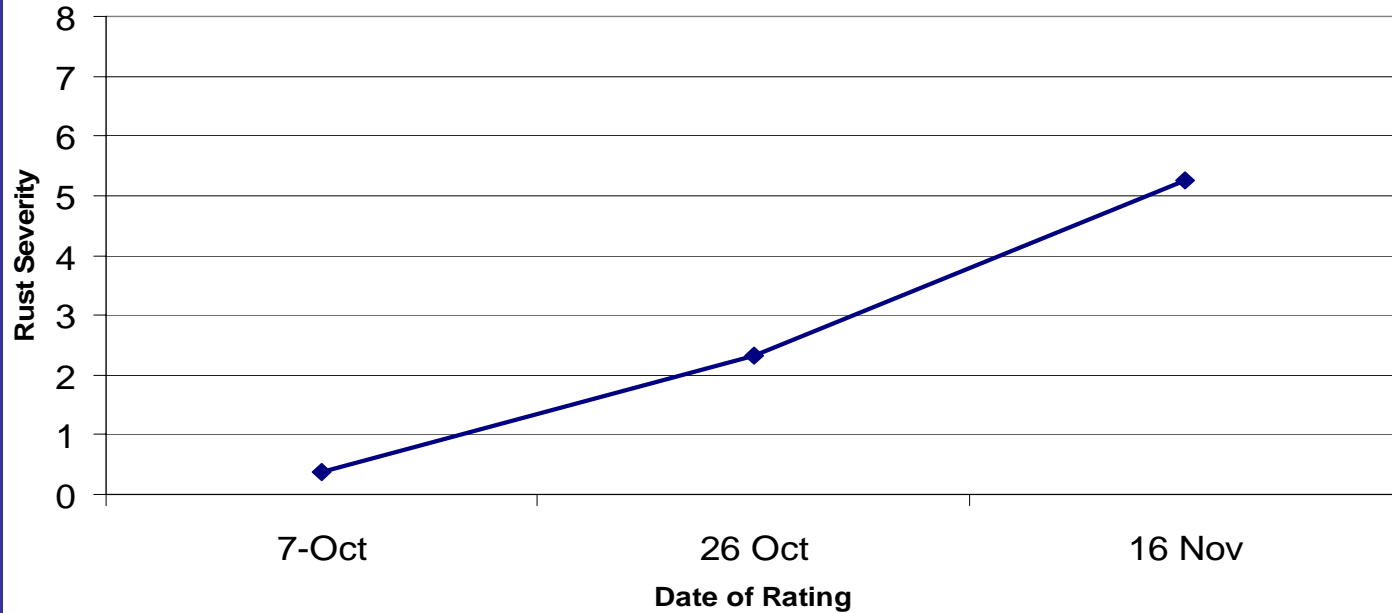


Daily Weather September 23,24,25 2005

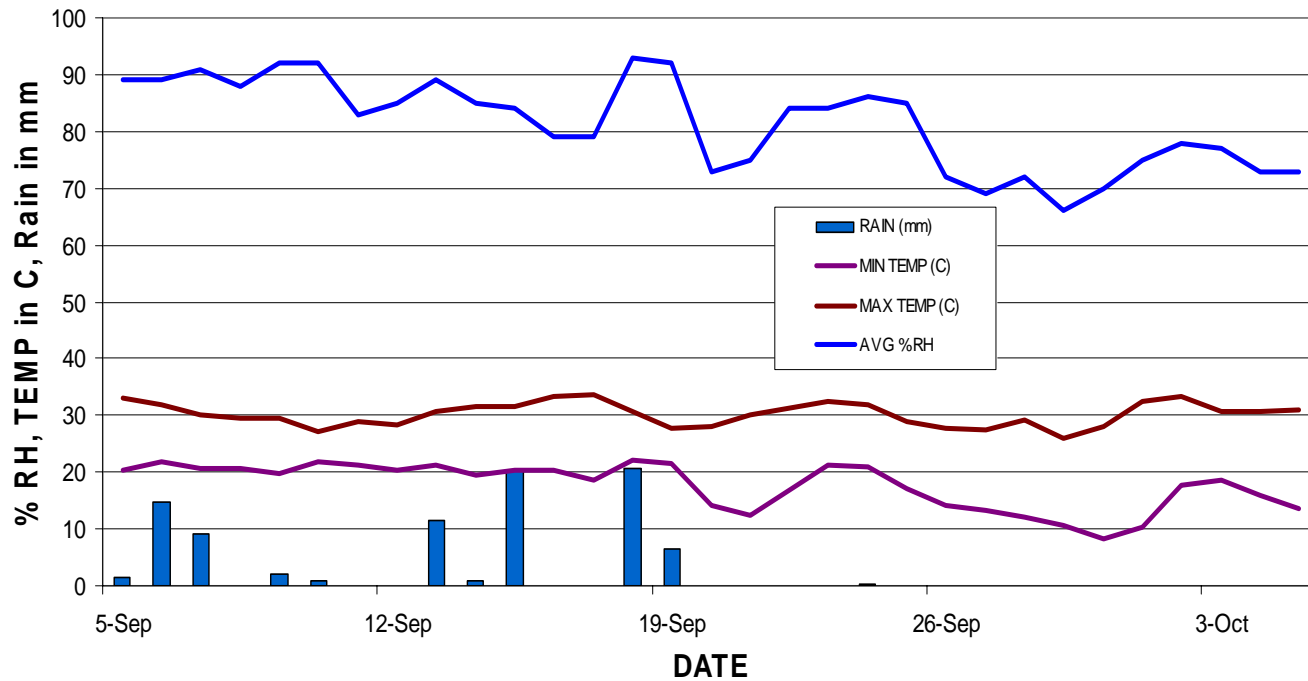
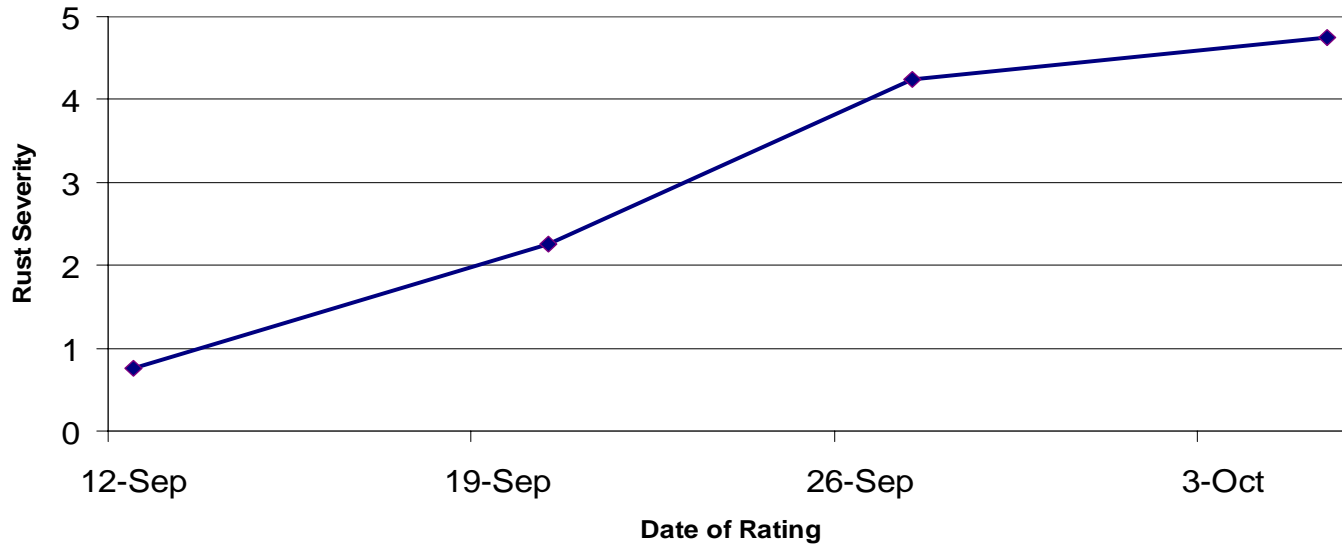
Dry Period



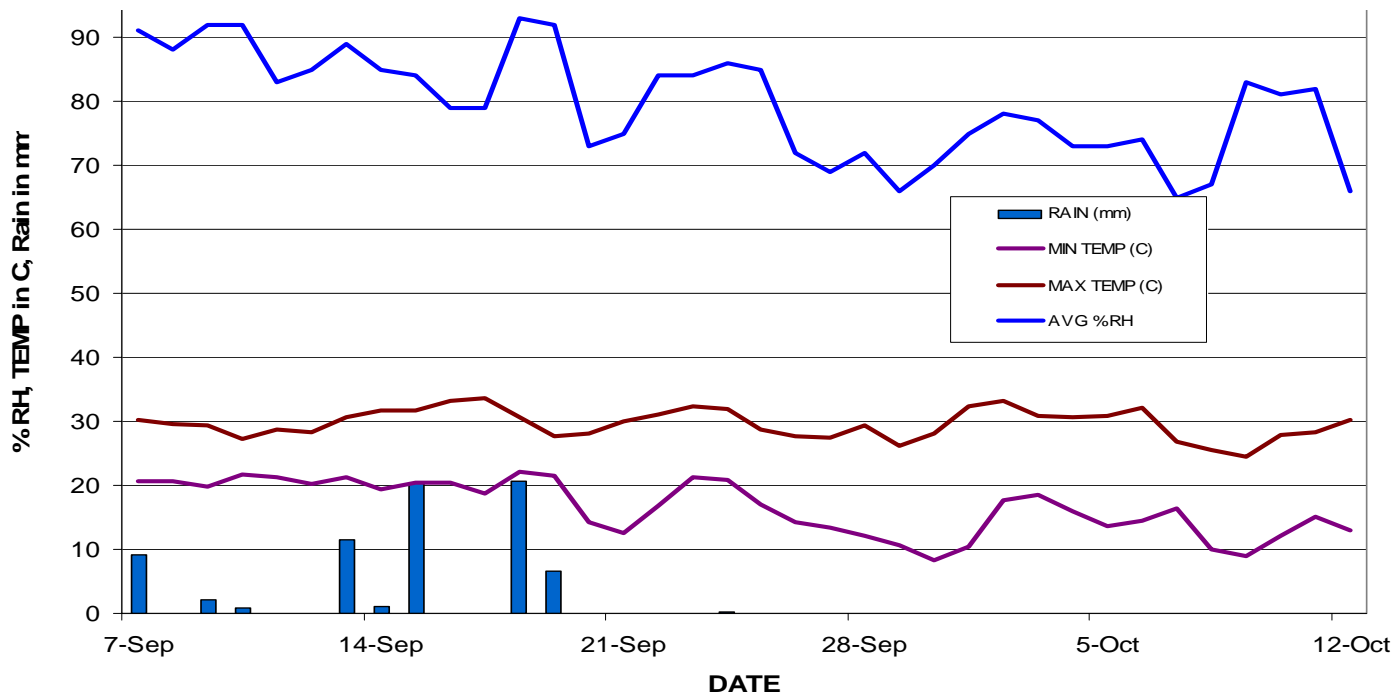
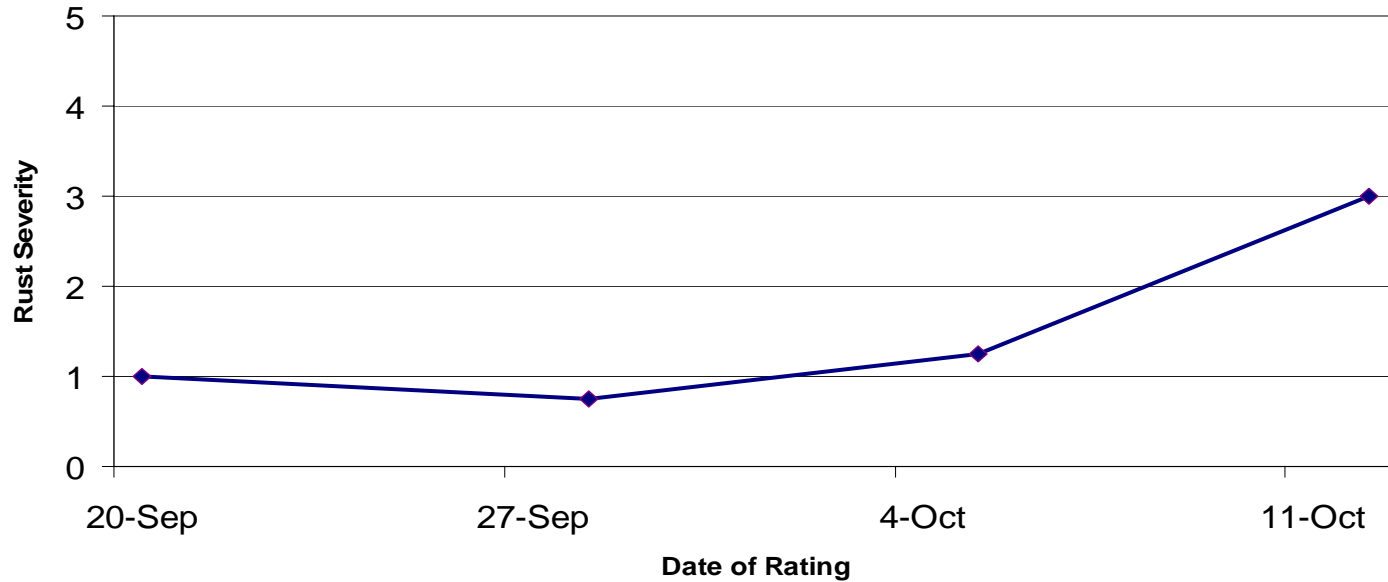
Soybean Rust Severity 2005 2nd Planting
Planted 31 August, Rust detected 26 September



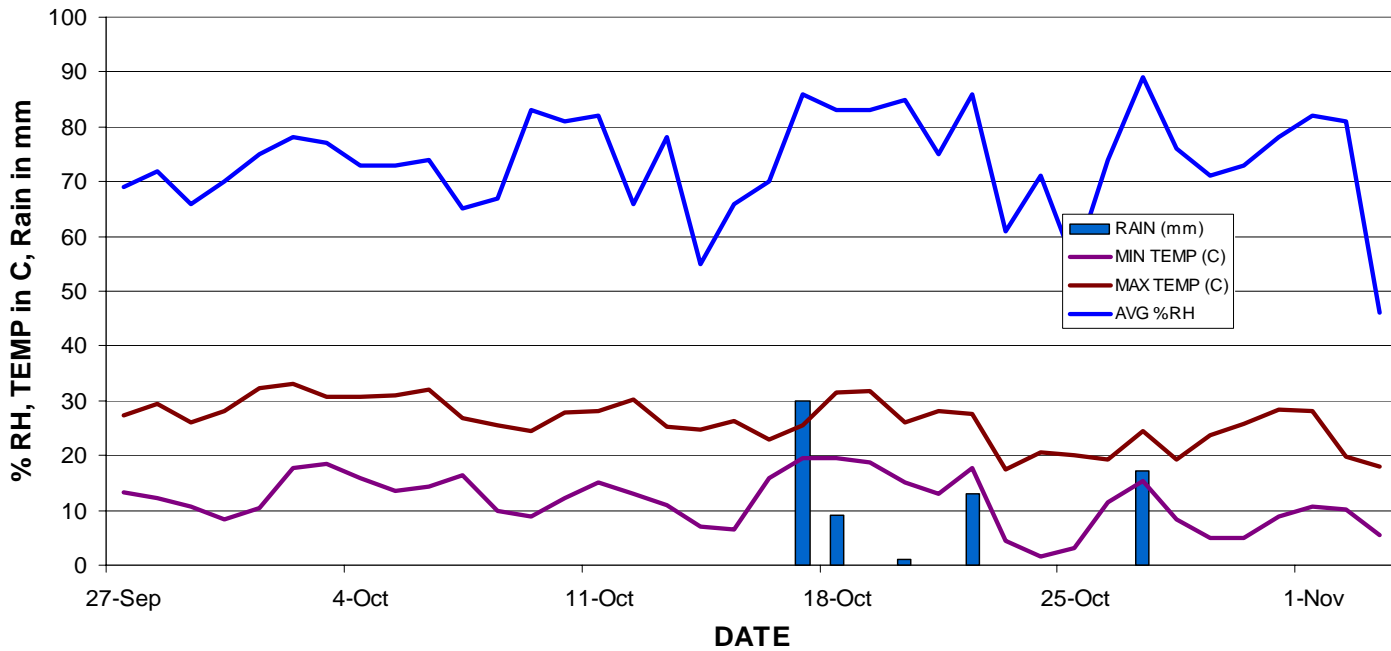
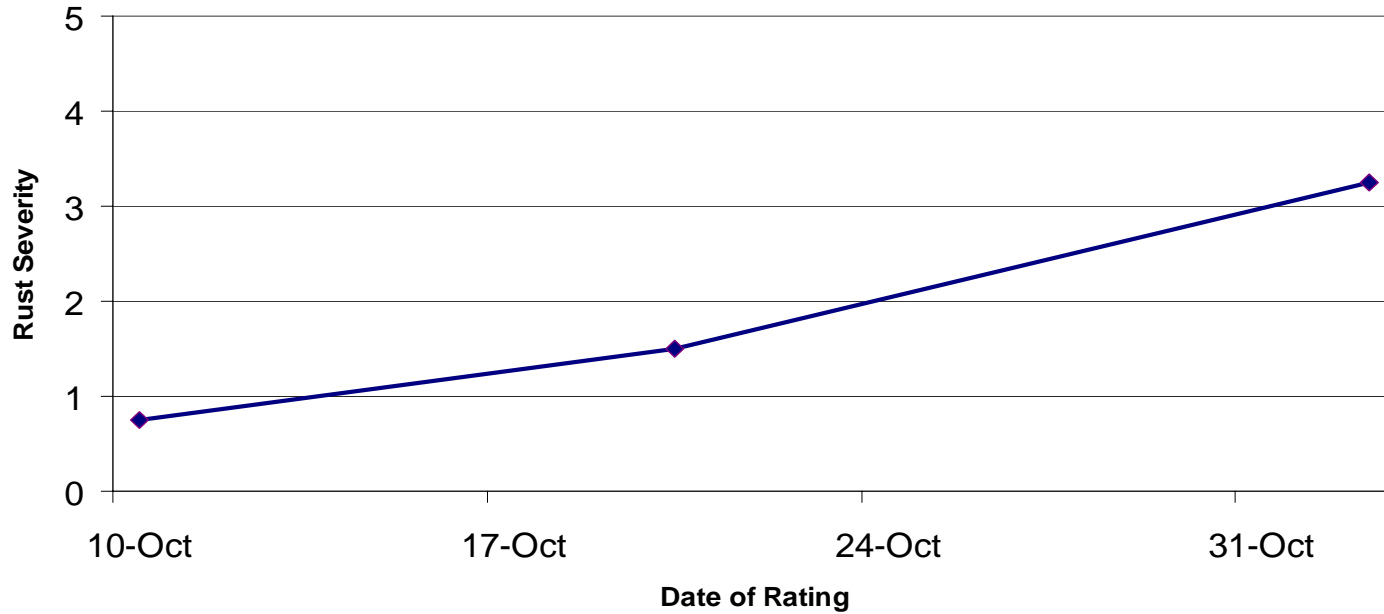
Soybean Rust Severity 2006 1st Planting
Planted 31 May, Rust detected August 27



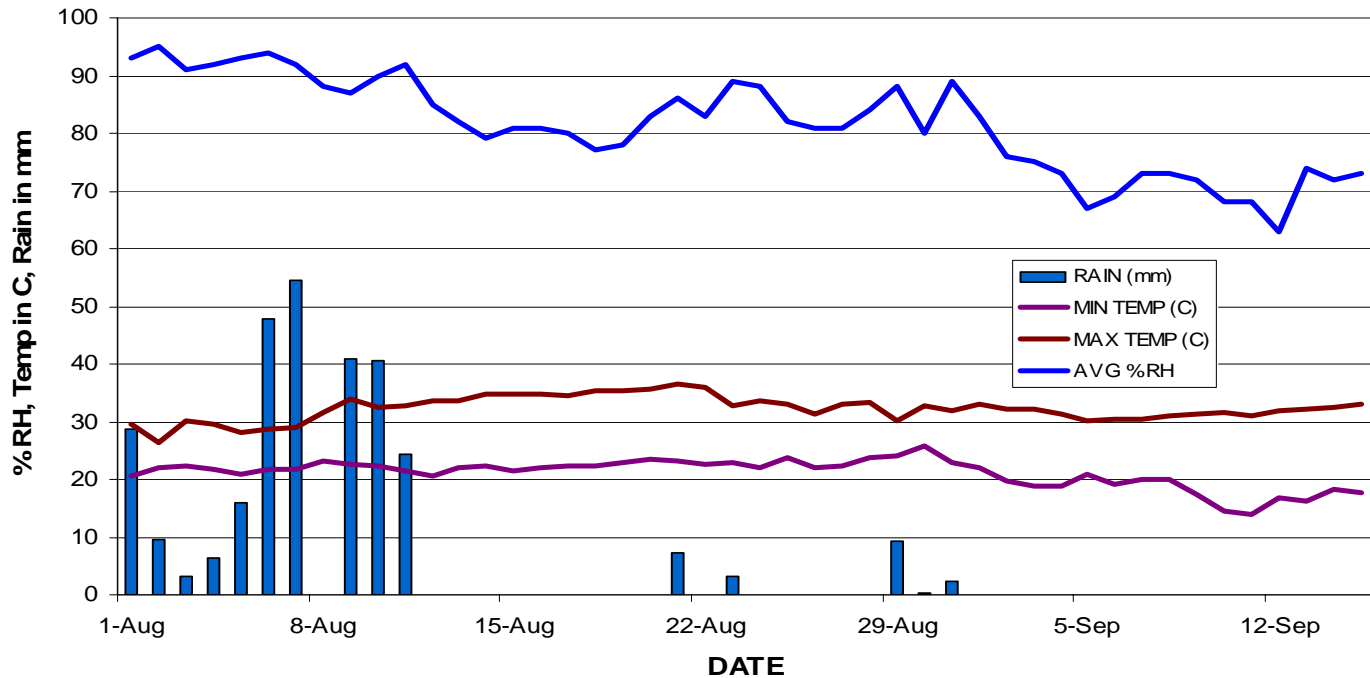
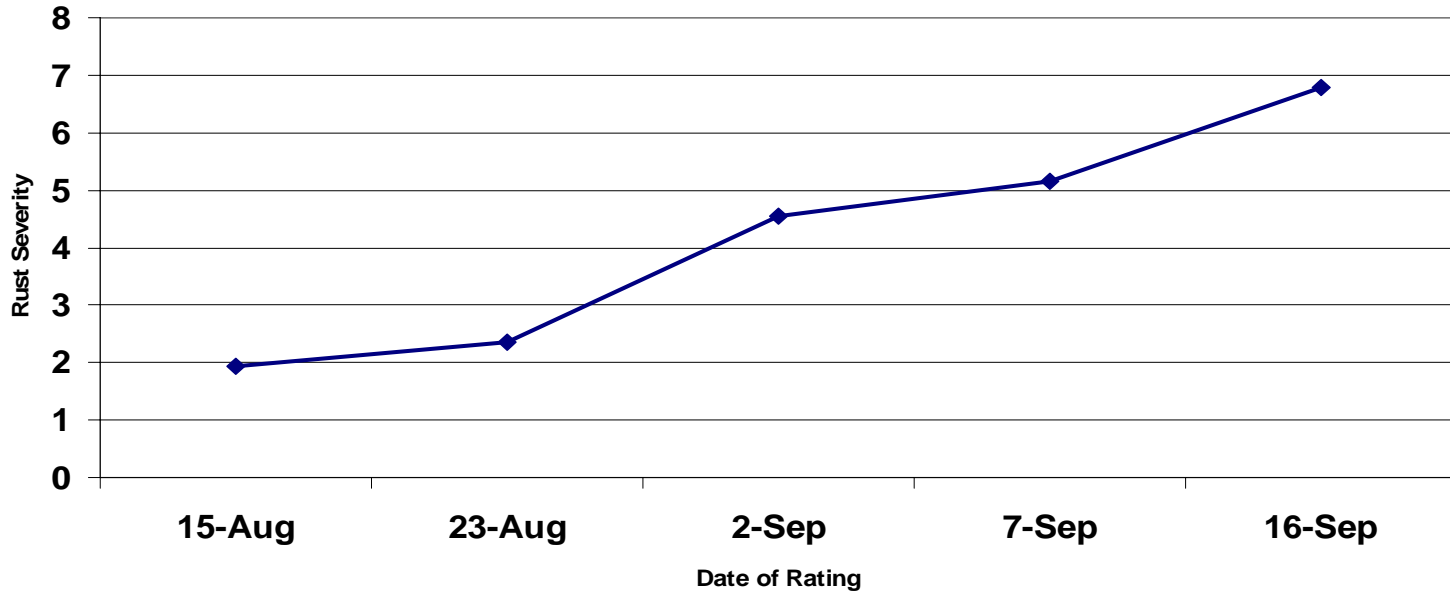
Soybean Rust Severity 2006 2nd Planting Planted 2 June



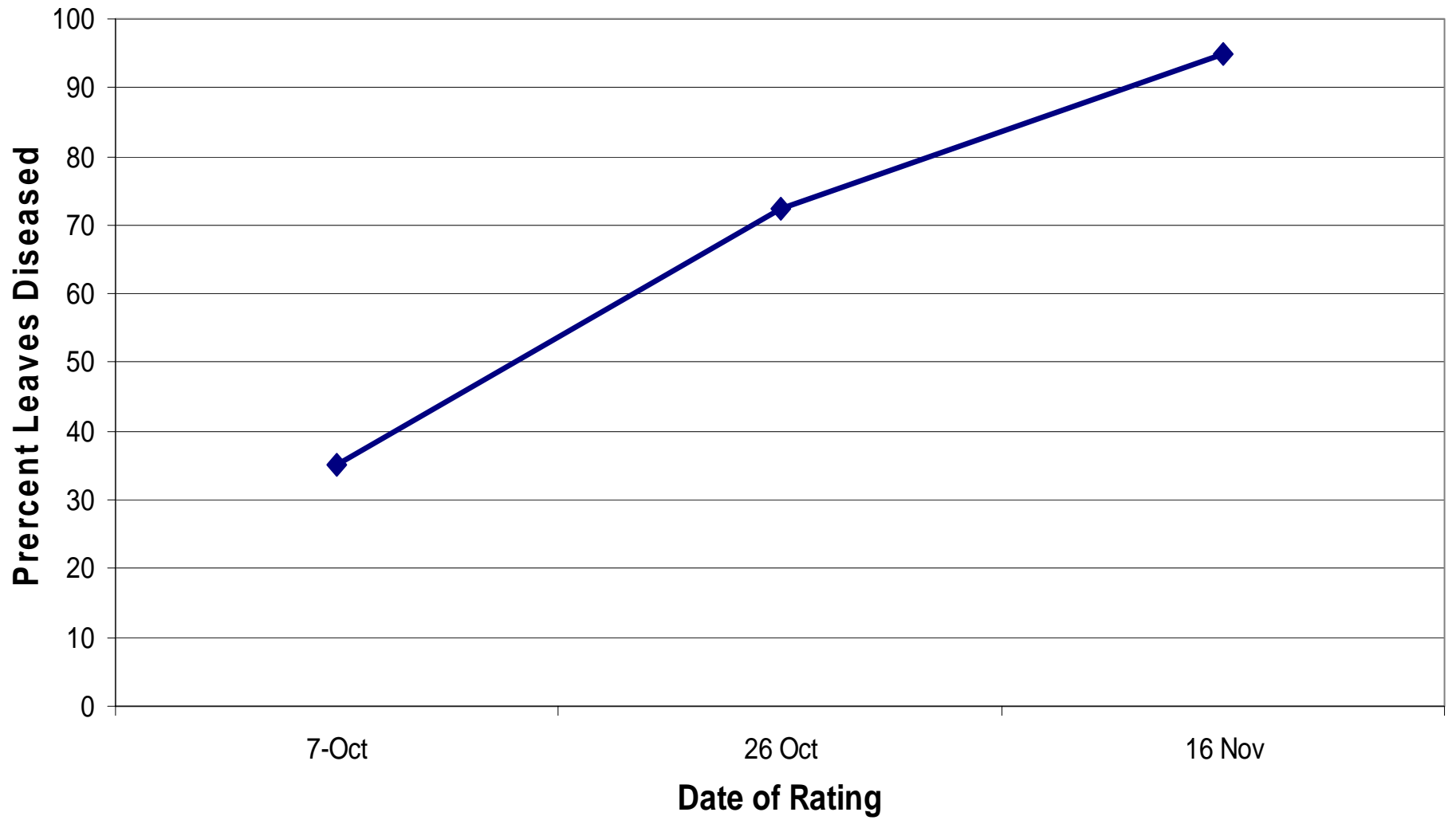
Soybean Rust Severity 2006 3rd Planting Planted 24 August



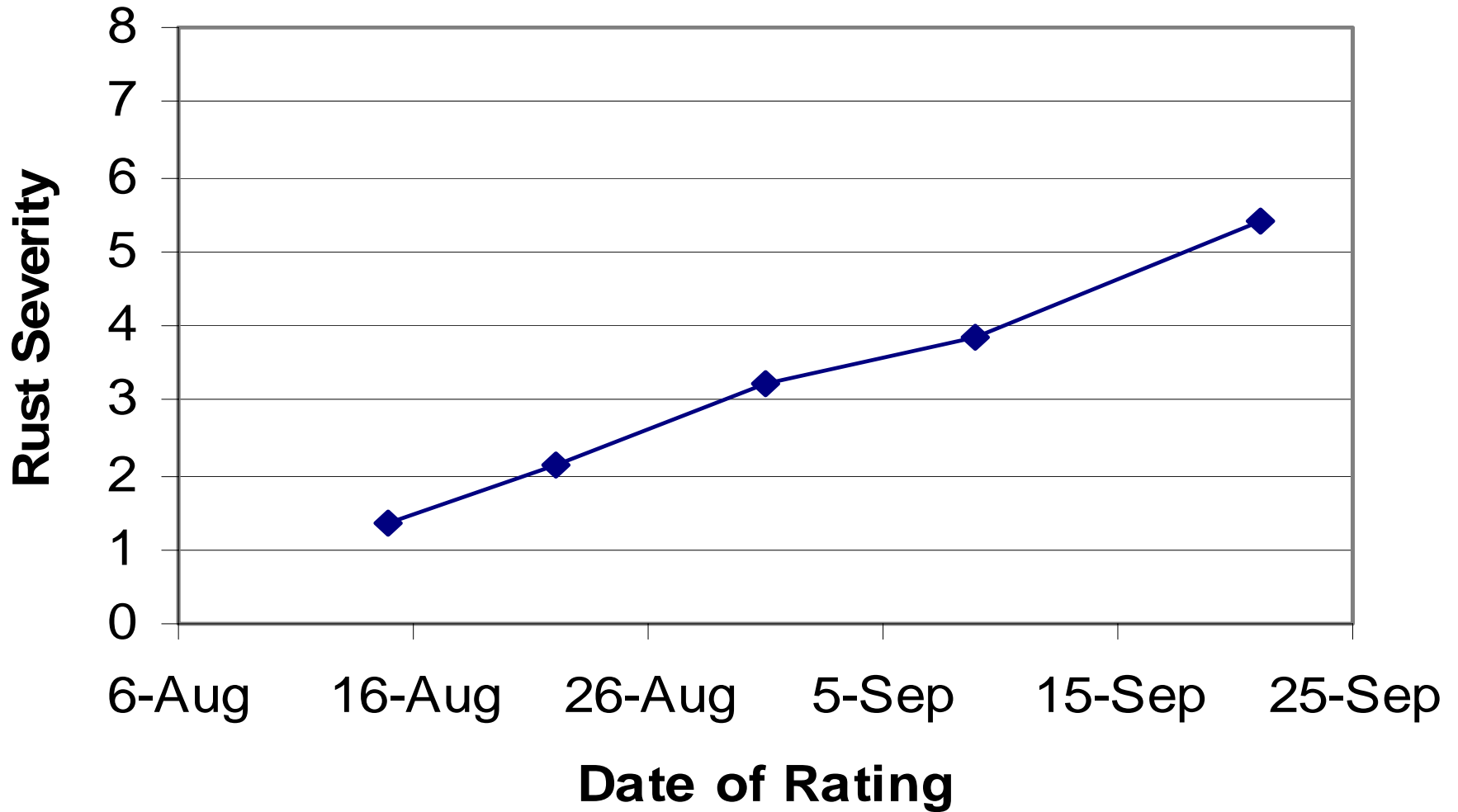
Soybean Rust Severity 2005 Sentinel Plot Planted 15 March
Rust Detected 10 August



Soybean Rust Incidence 2005 2nd Planting
Planted 31 August, Rust detected 26 September

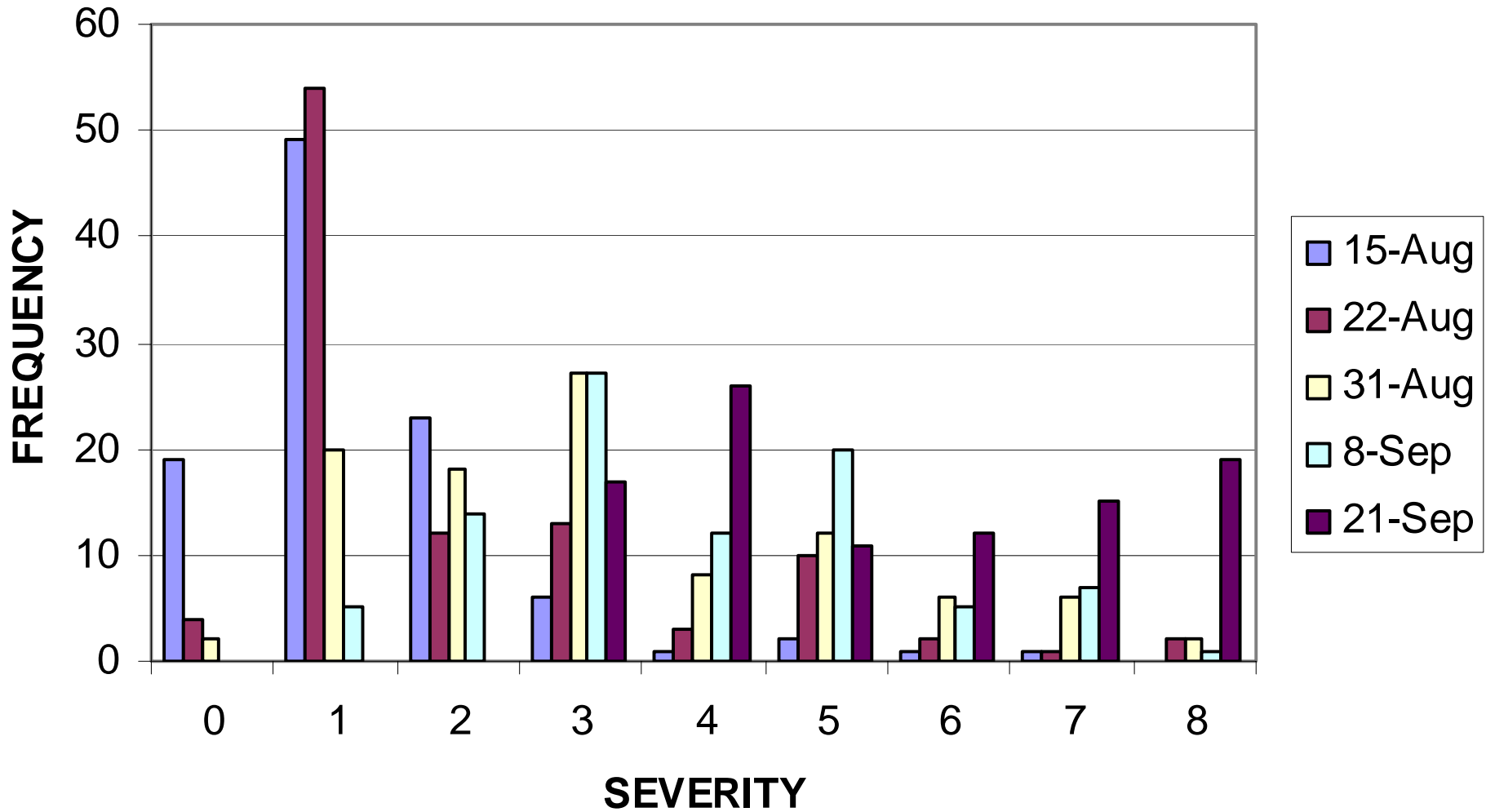


Escambia County Sentinel Plot 2005

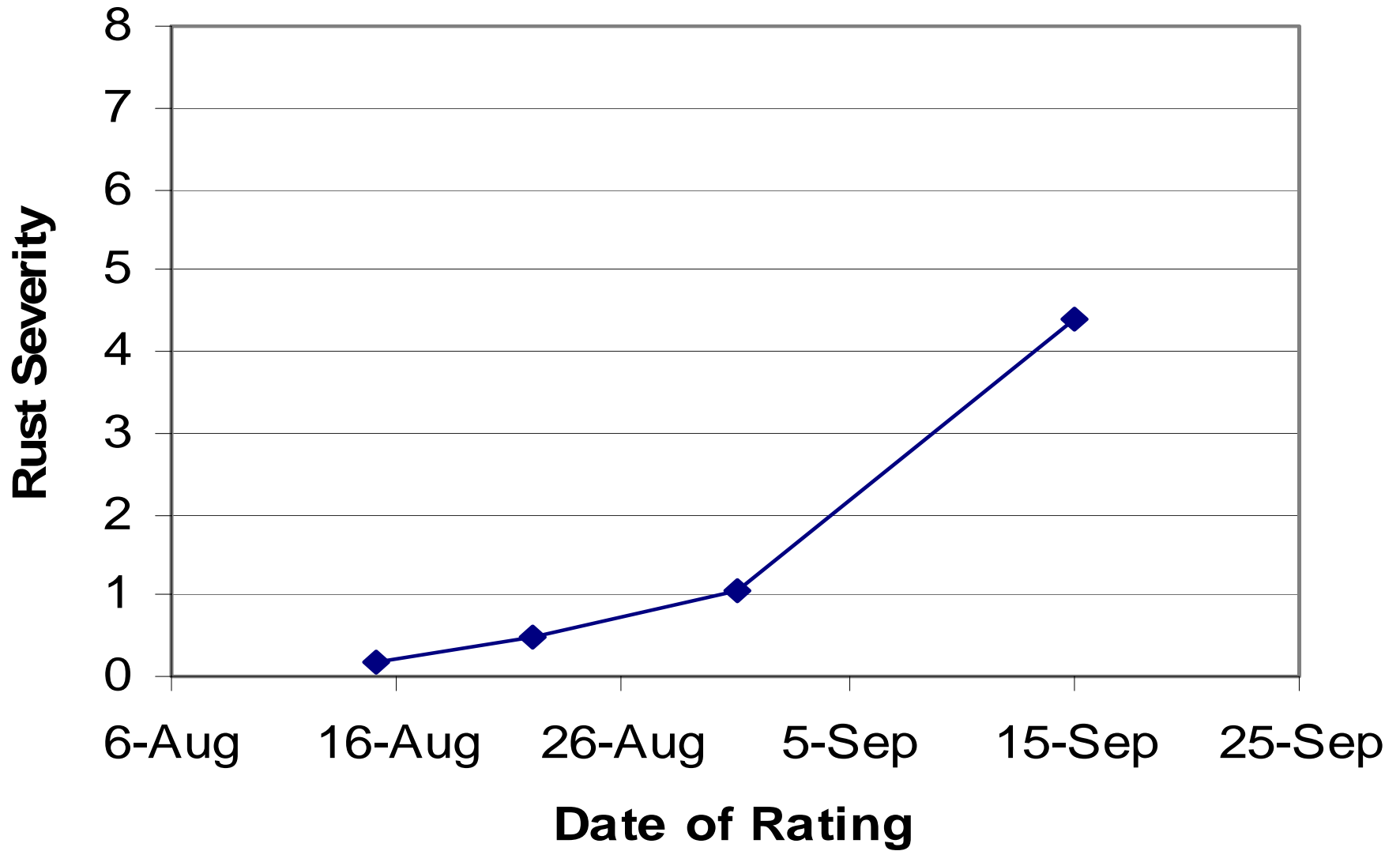


0=0%, 1=<2.5%, 2=2.5-5%, 3=5-10%, 4=10-15%, 5=15-25%, 6=25-35%, 7=35-67.5%, 8=67.5-100%

Escambia County Sentinel Plot 2005 (detected 18-July)

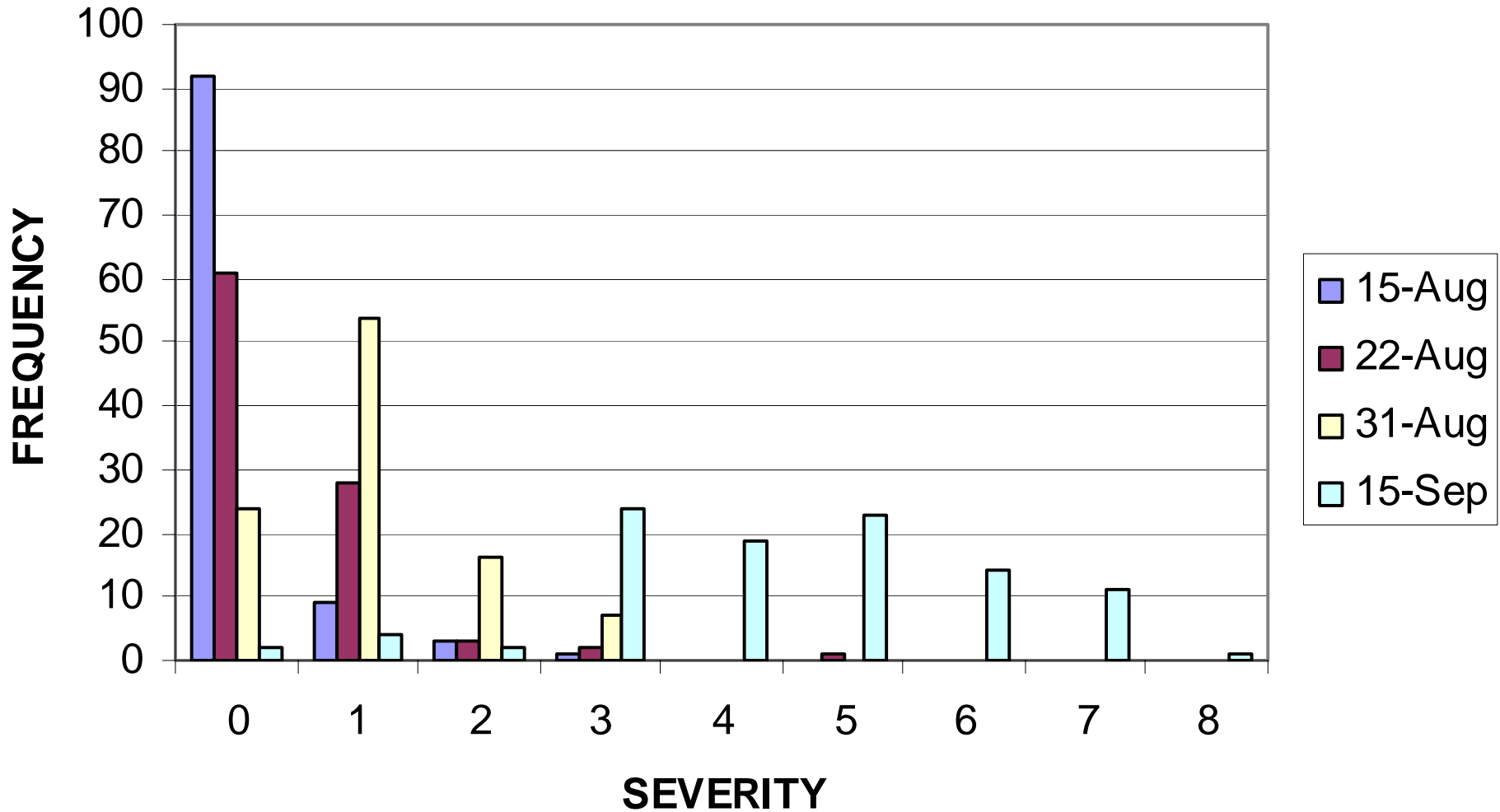


Santa Rosa County Sentinel Plot 2005



0=0%, 1=<2.5%, 2=2.5-5%, 3=5-10%, 4=10-15%, 5=15-25%, 6=25-35%, 7=35-67.5%, 8=67.5-100%

SANTA ROSA COUNTY (detected 8-Aug)



CONCLUSIONS

- The severity of rust on 100 leaf samples doubled about every 7 days.
- The incidence of rust regularly reached 100% or near it
- The frequency distribution of severity values progressed from a right sided tail to a bell curve then to a left sided tail
- Even during the dryer and cooler weather, once established SBR is able to increase at logistic rates in the Southeast.

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Wayne Jurick, Dario Narváez and Breno Leite – UF

NFREC Funding Sources

- NCSRP – epidemiology & control
- USDA/RMA Nat. Legume Risk Management Project – sentinel plots
- USDA Biosecurity – spore dispersal
- NPDN – kudzu monitoring
- Southern Soybean Fungicide Tests
- State Soybean Check-off Funds