

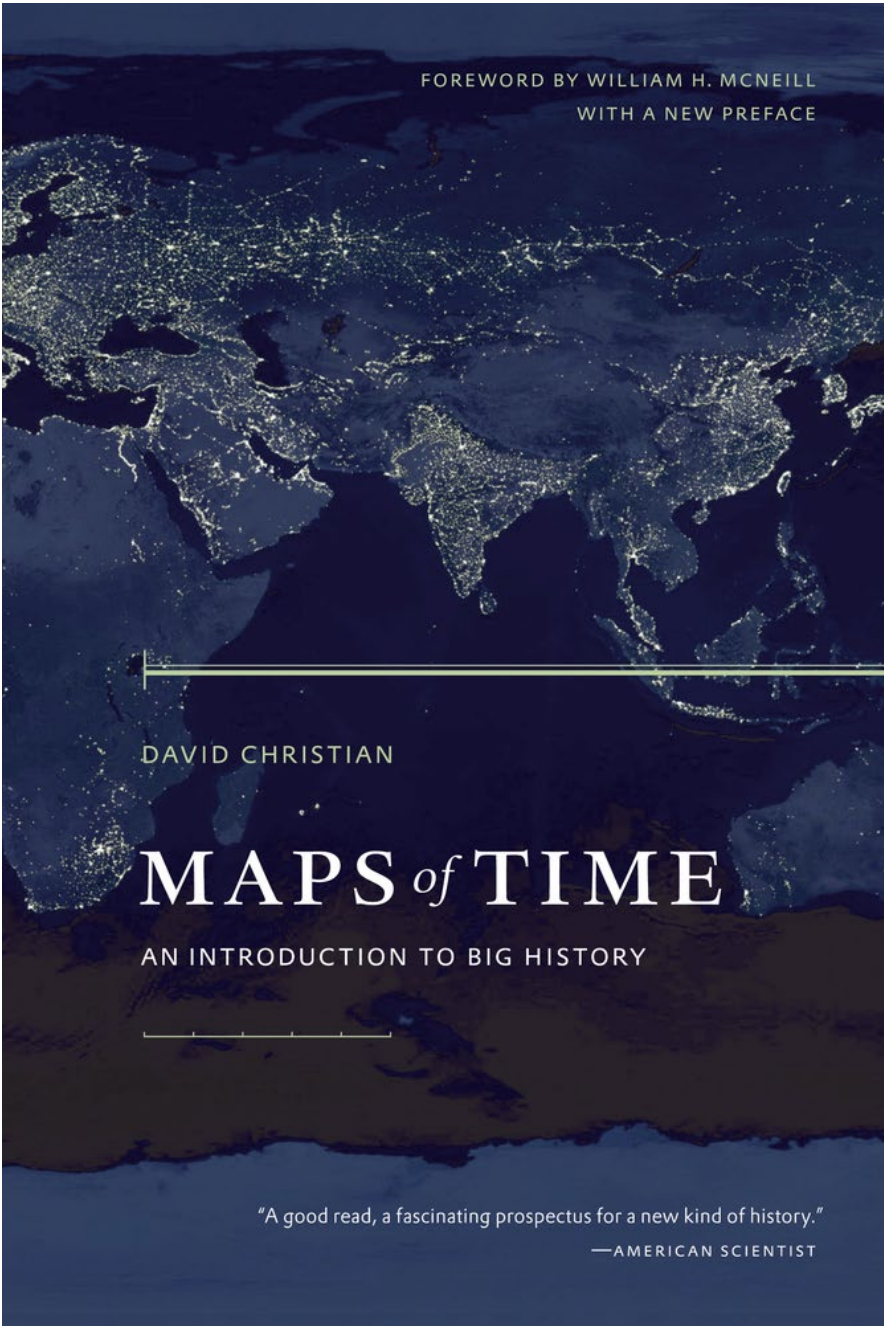
A Century of Insect Resistant Soybeans: Bussin' or Busted ?

Mike Smith

University Distinguished Professor Emeritus



2024 SOYBEAN BREEDERS' WORKSHOP
ENTOMOLOGY AND BREEDING INNOVATION
St. Louis, Missouri



FOREWORD BY WILLIAM H. MCNEILL
WITH A NEW PREFACE

DAVID CHRISTIAN

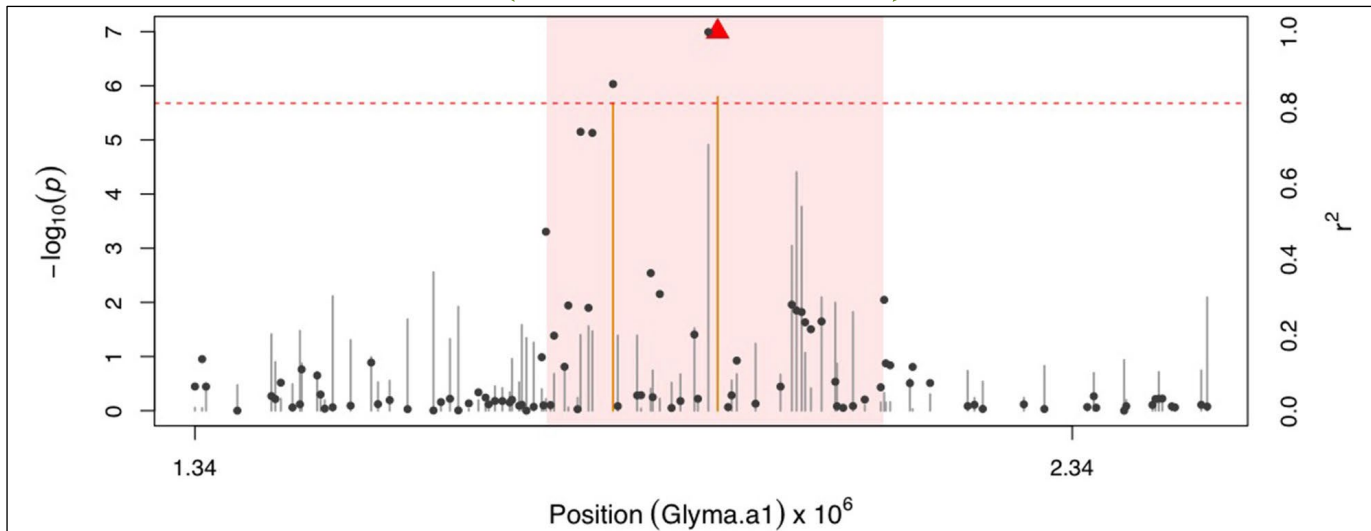
MAPS *of* TIME

AN INTRODUCTION TO BIG HISTORY

"A good read, a fascinating prospectus for a new kind of history."

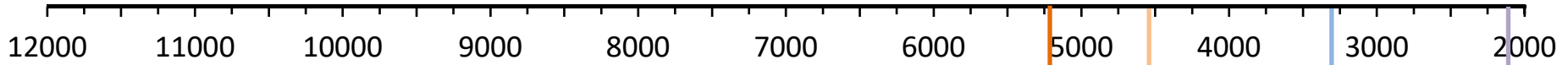
—AMERICAN SCIENTIST

Associative learning

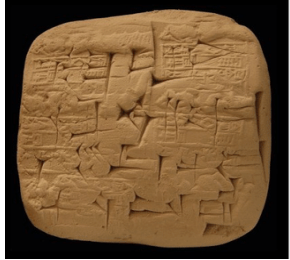


10 Centuries

YBP



Sumeria

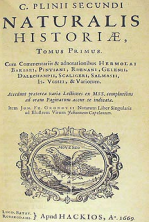


insect = *nu*
plant = *nim*

Egypt

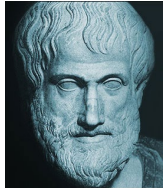


Rome

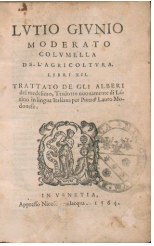


Pliny

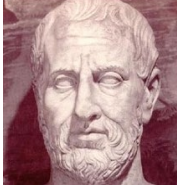
Greece



Aristotle - *éntomon*



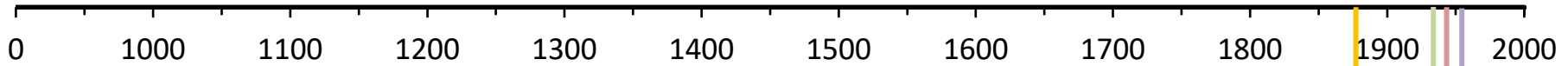
Coumella



Theophrastu- *botanē*

2 Centuries

Common Era



Middle Ages

Dantean Anomaly

Enlightenment

~1000

Alhazeni - human vision
Experimental treatments

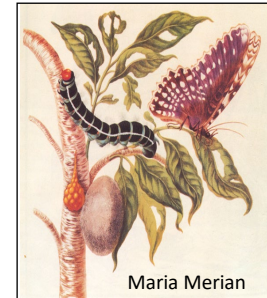
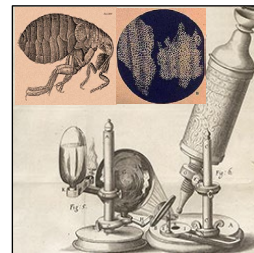


1270

Paper manufacturing



Fuchs De Historia Stirpium



Maria Merian

Knowledge itself is power. Bacon

1880s
Hessian fly - wheat
Phylloxera - grape

1921
Woodworth
soybean genetics

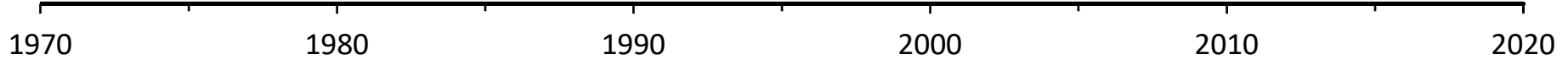
1935
Empoasca - soybean

1953
Chesnokov, Painter
textbooks



5 Decades

Common Era



Earworm - resistance detected → Crockett, Lamar, Lyon released → Benning released → QTLs developed → GBS, GWA → Candidate NBS-LRRs

Southern green stink bug - IAC-100 released in Brazil → IAC-100 breeding lines in Georgia

Soybean aphid - resistance detected → cultivars released → NBS-LRRs

Kudzu bug - resistance in existing cultivars

Dectes stem borer - polygenic resistance

Red-banded stink bug

Resistance Source

Earworm, soybean looper - PI229358, PI171451

Soybean aphid - Dowling, Jackson, PI 243540, PI200538, PI567543C, PI567541B

Southern green stinkbug - PI229358, Hutcheson x IAC-100 (PI229358, PI274454)

Kudzu bug - Camp, Vance, Benning^{EMGH} (PI229358)

Stem borer - PI165676

Known knowns

A full season pest complex attacks soybean – no “one size fits all” solution.

At higher temperatures, pest populations increase, yields may decrease.

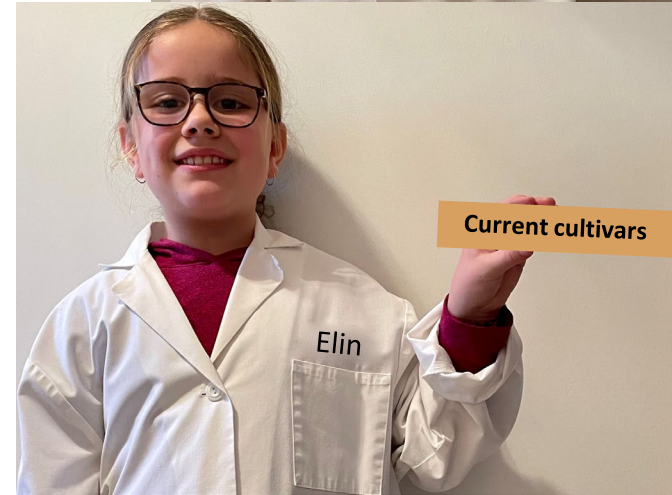
Grower profits and attitudes prevail.



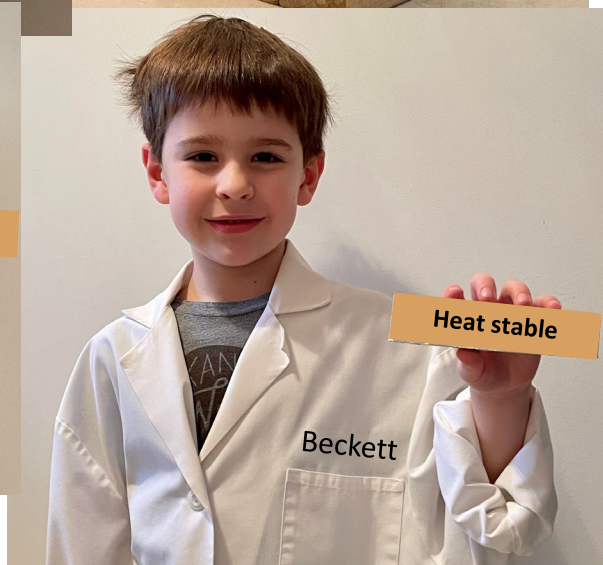
Moderate resistance



NBS-LRRs



Current cultivars



Heat stable



RNAi

My new “lab” thinks soybean insect resistance is bussin’