Does Genetics Impact Survival?

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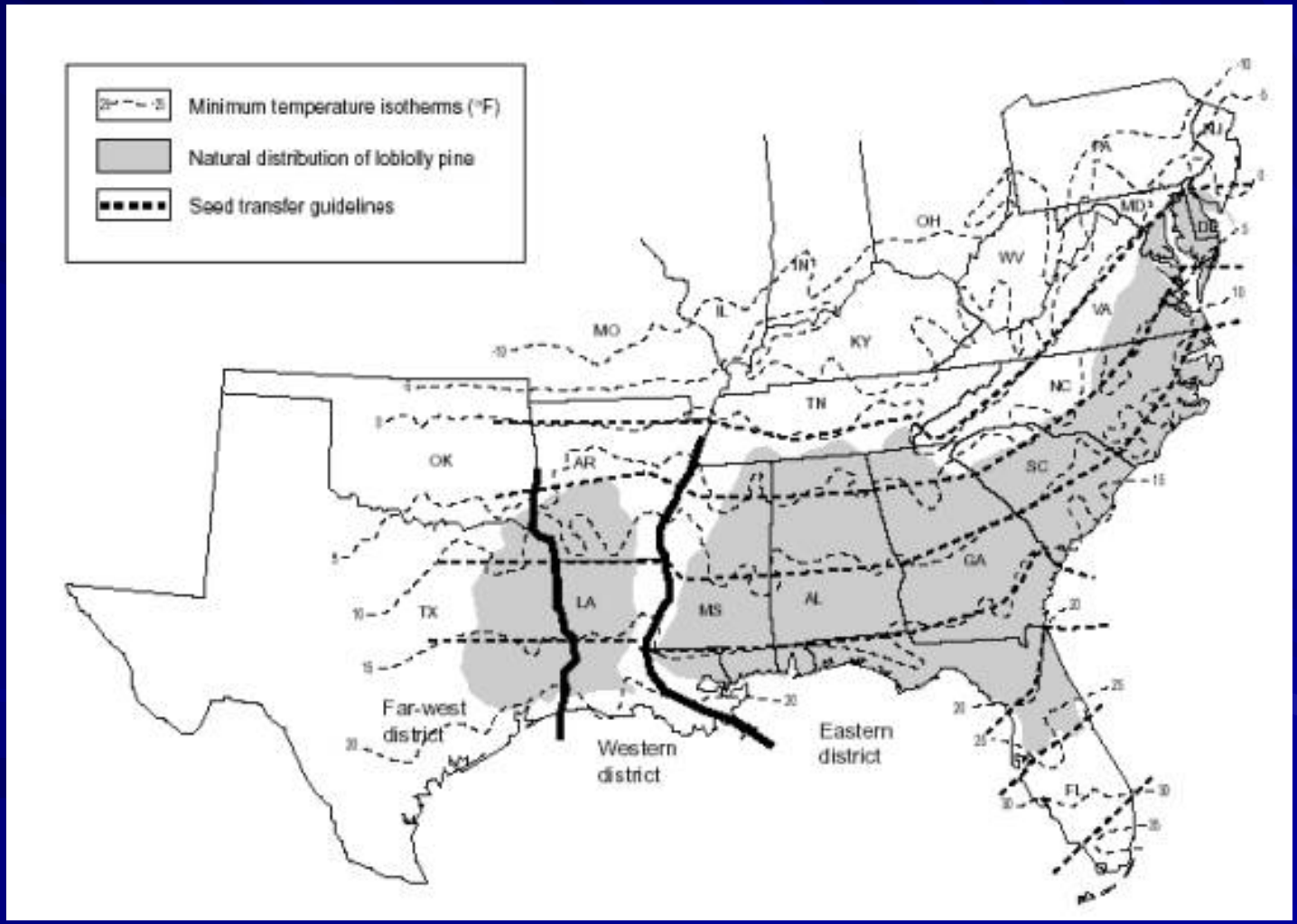
Loblolly Pine Range



AC vs. Local TX Lob
Central Texas

Yes, but ….

- Multiple factors and their complex interactions
  - Seedling quality
  - Lifting and handling
  - Nursery conditions
  - Site preparation
  - Planting
  - Release
  - Weather

The cost of getting it wrong:

- Too many trees
  - Wasted seed
  - $$$ nursery costs
  - $$$ planting costs
  - Lost growth / Pre-commercial thinning
- Too few trees
  - Wasted space with less than optimal growth
  - Lower product value
  - $$$ replants

And the stakes are going up …

- Ultra low planting densities / optimize harvest values
  - Expensive site prep and release treatments
  - Less room for error with the tpa
- Weather cycles
- Family blocks (and varietals) may be less buffered

So do we test for survival?

Well sort of …. but not really.

- Initial
  - Seedling quality, lifting, handling, site preparation, planting, and genetics
- Early
  - First year survival
- Mid-rotation
  - Competition
  - Disease

Progeny test conditions don't reflect operations!

- Containerized seedlings
- Maxed out site preparation


572


TEXAS

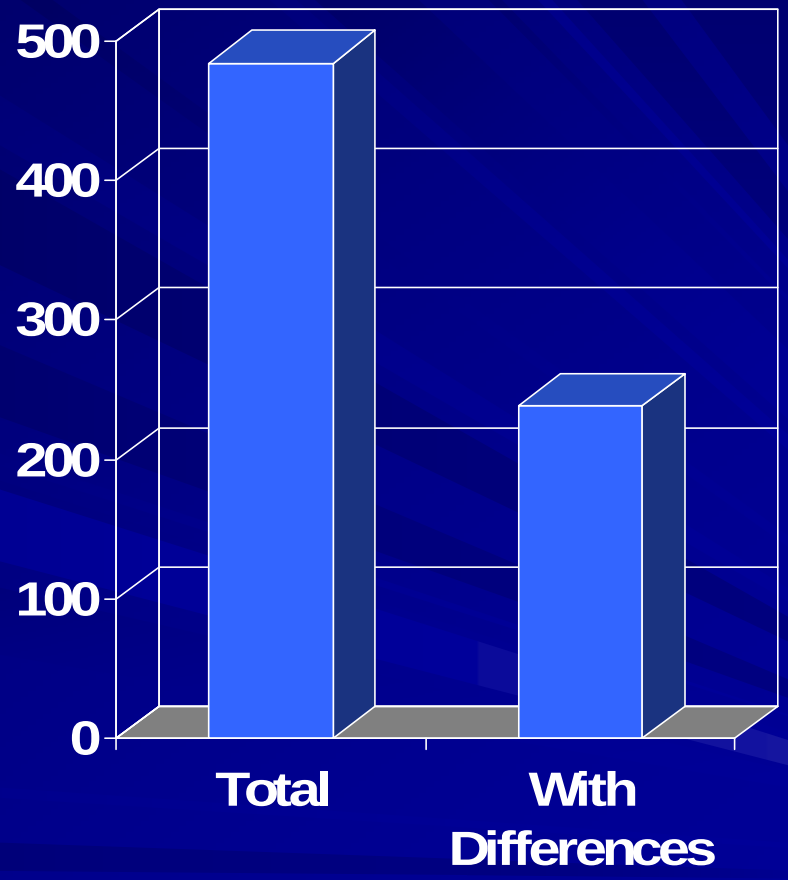
Progeny test conditions don't reflect operations!

- Containerized seedlings
- Maxed out site preparation

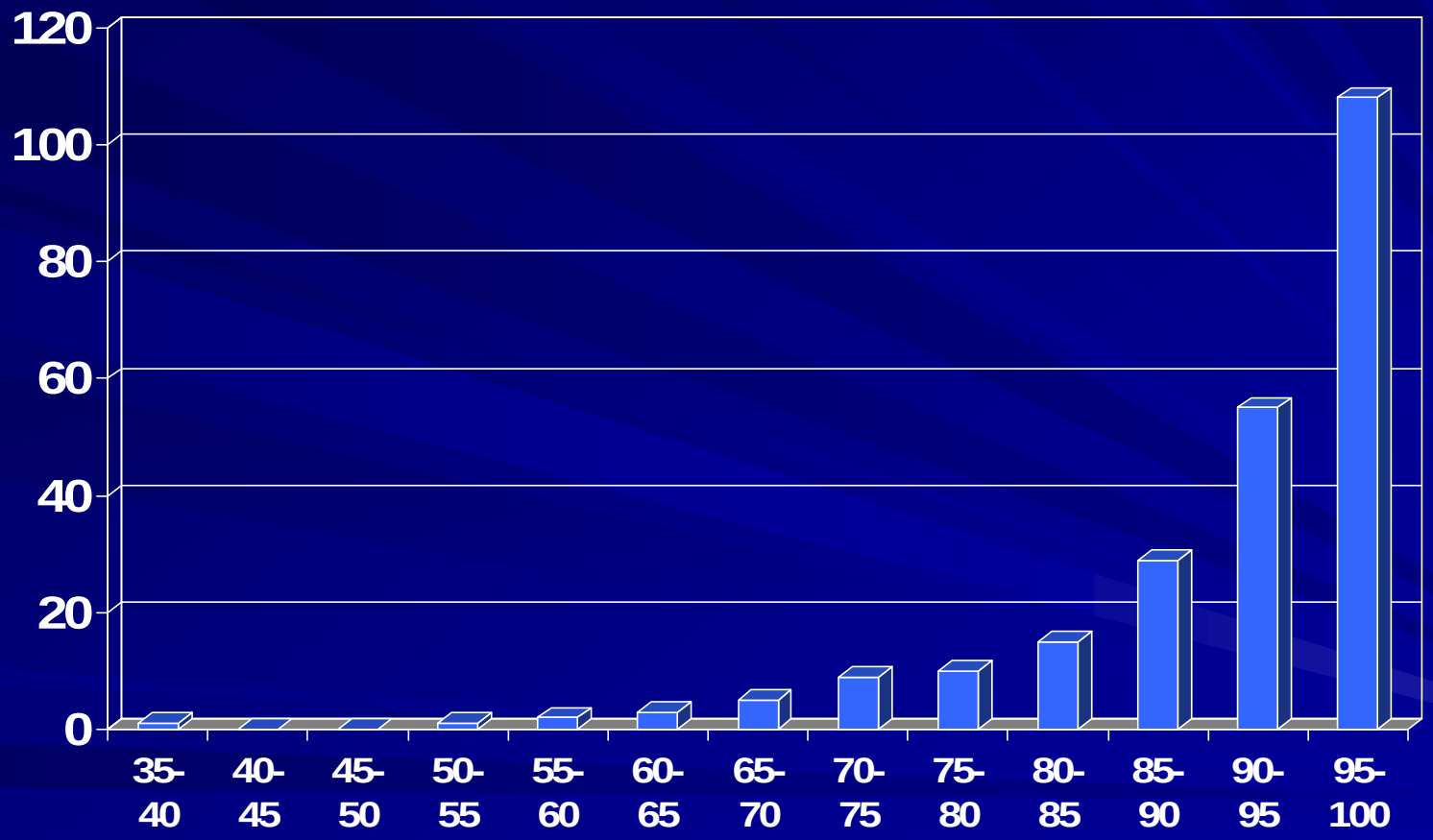
But we still see differences!!!

Loblolly Pine

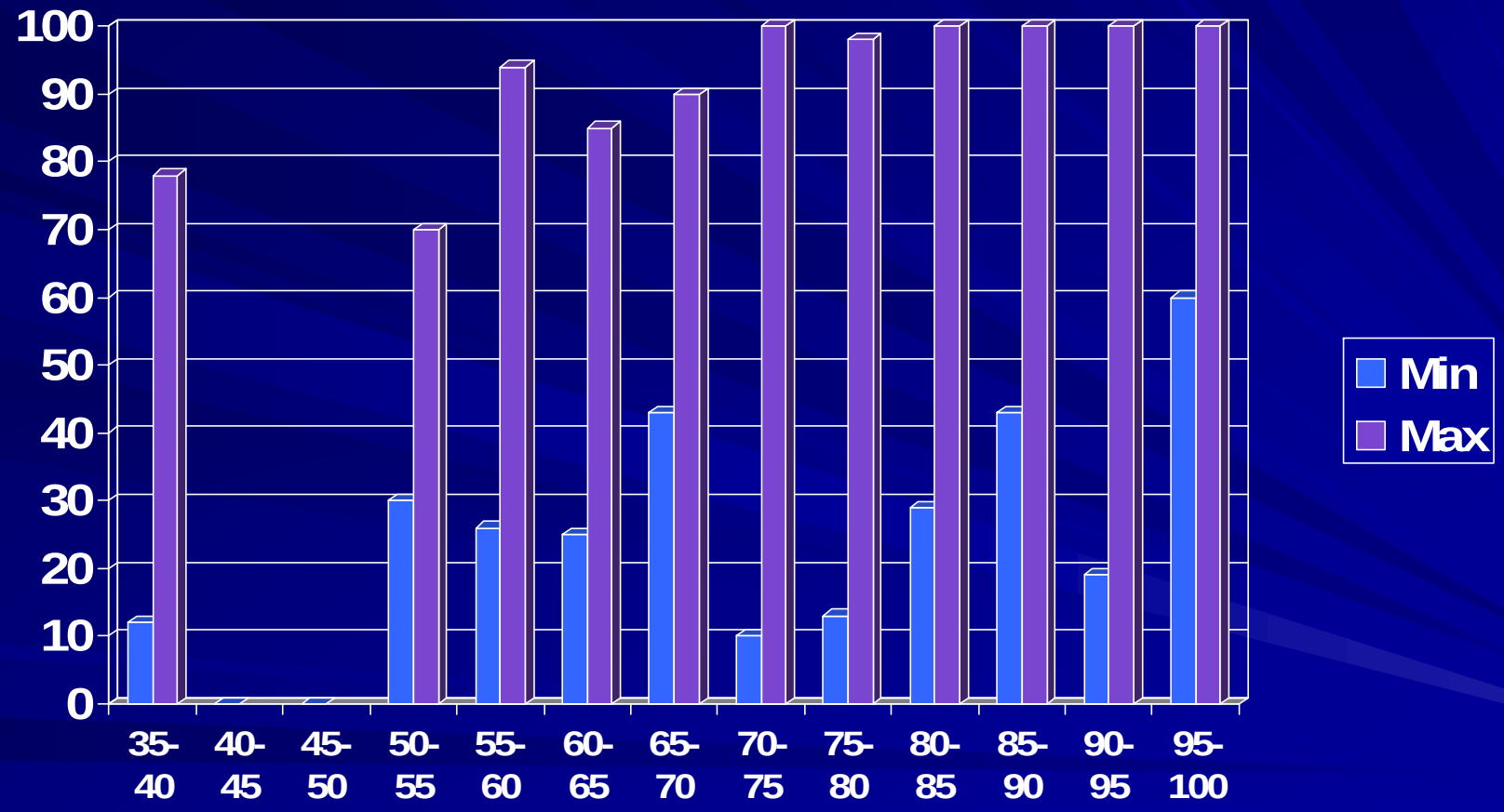
- 17,266 planting by family combinations
- Plantings with significant family differences average 90% survival



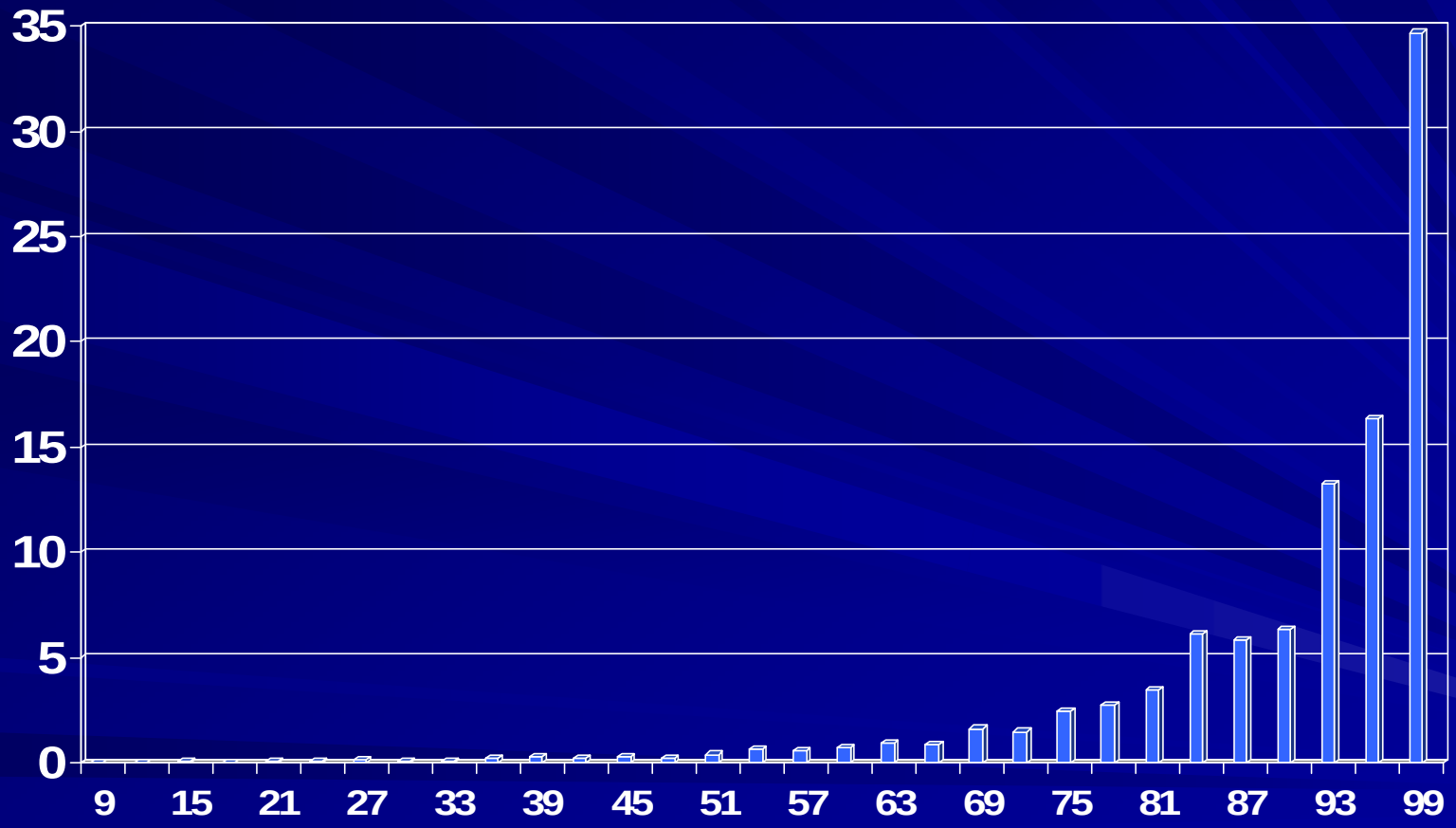
Distribution of tests with differences



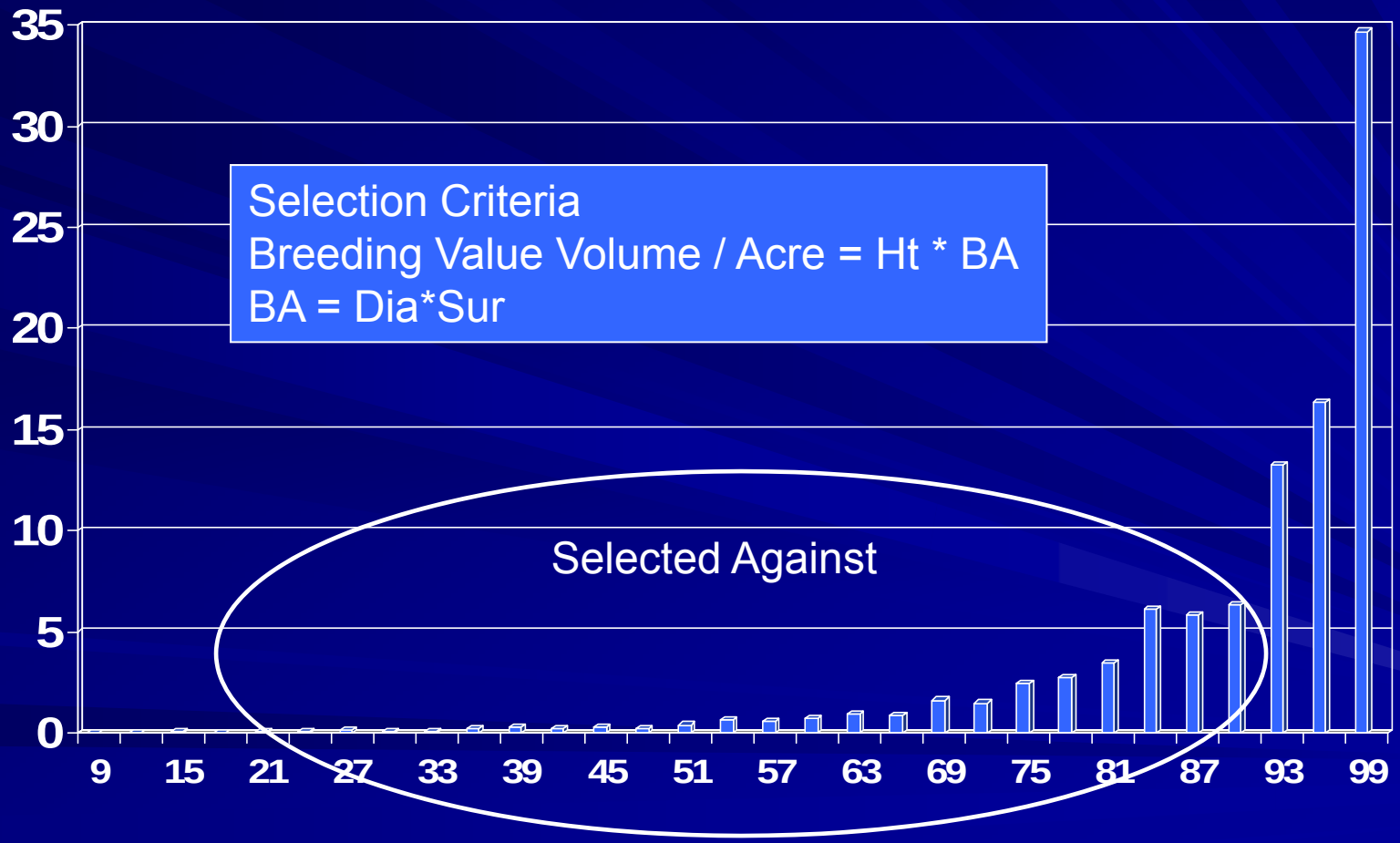
Range of family performances



Distribution of Family Survival



Distribution of Family Survival



Repeatability – Genotype by Environment Interaction

- η^2 - % of total variation explained by pairs of estimates moving together

- 0.59 all tests
- 0.56 tests with > 90% survival
- 0.63 tests with < 90% survival
- 0.76 volume breeding value

Conclusions

- There are differences
- Most of the time they don’t mater
- Poor survival is selected against

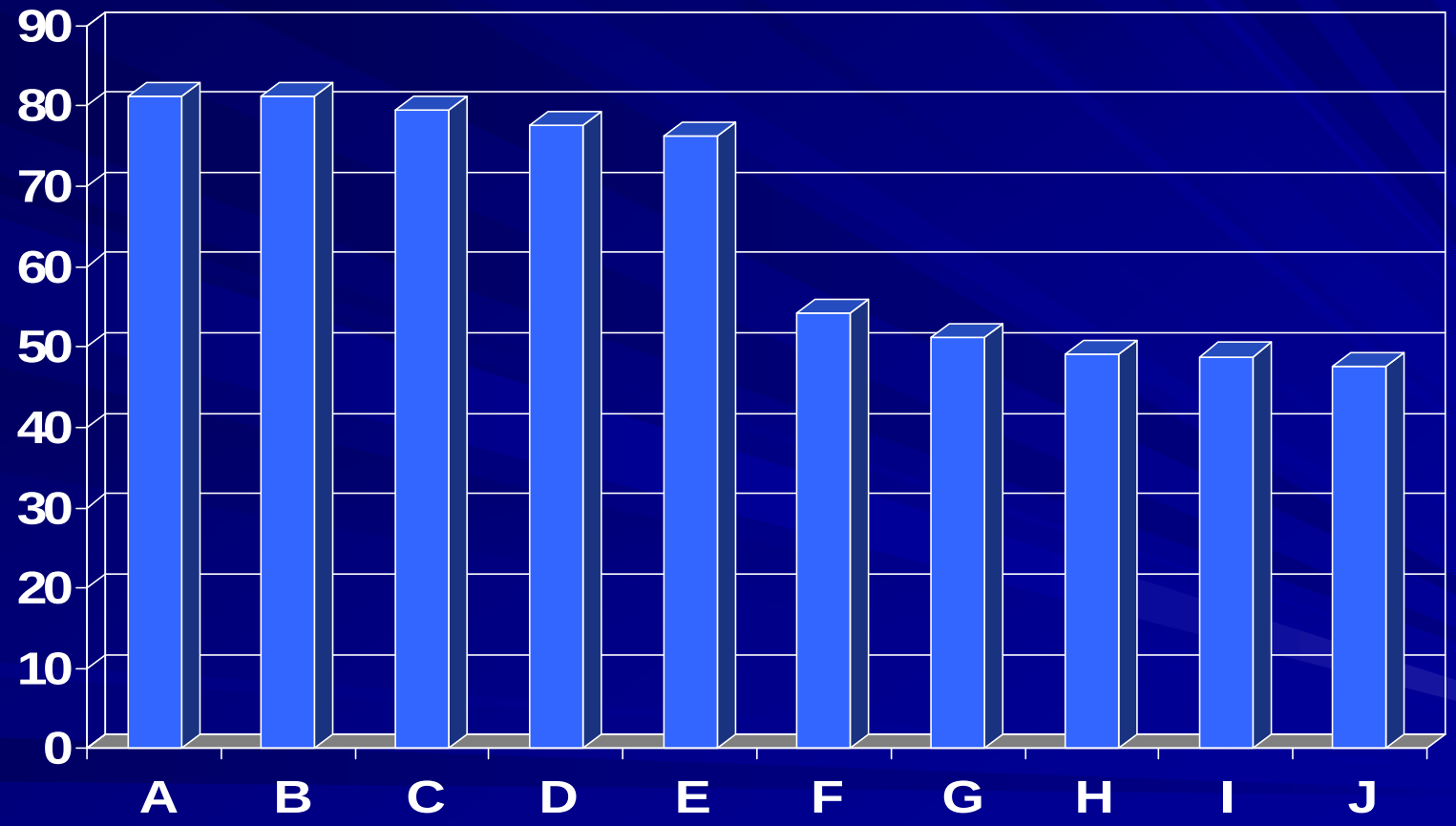
But ….

- Progeny tests aren’t operational
- They are not family blocks

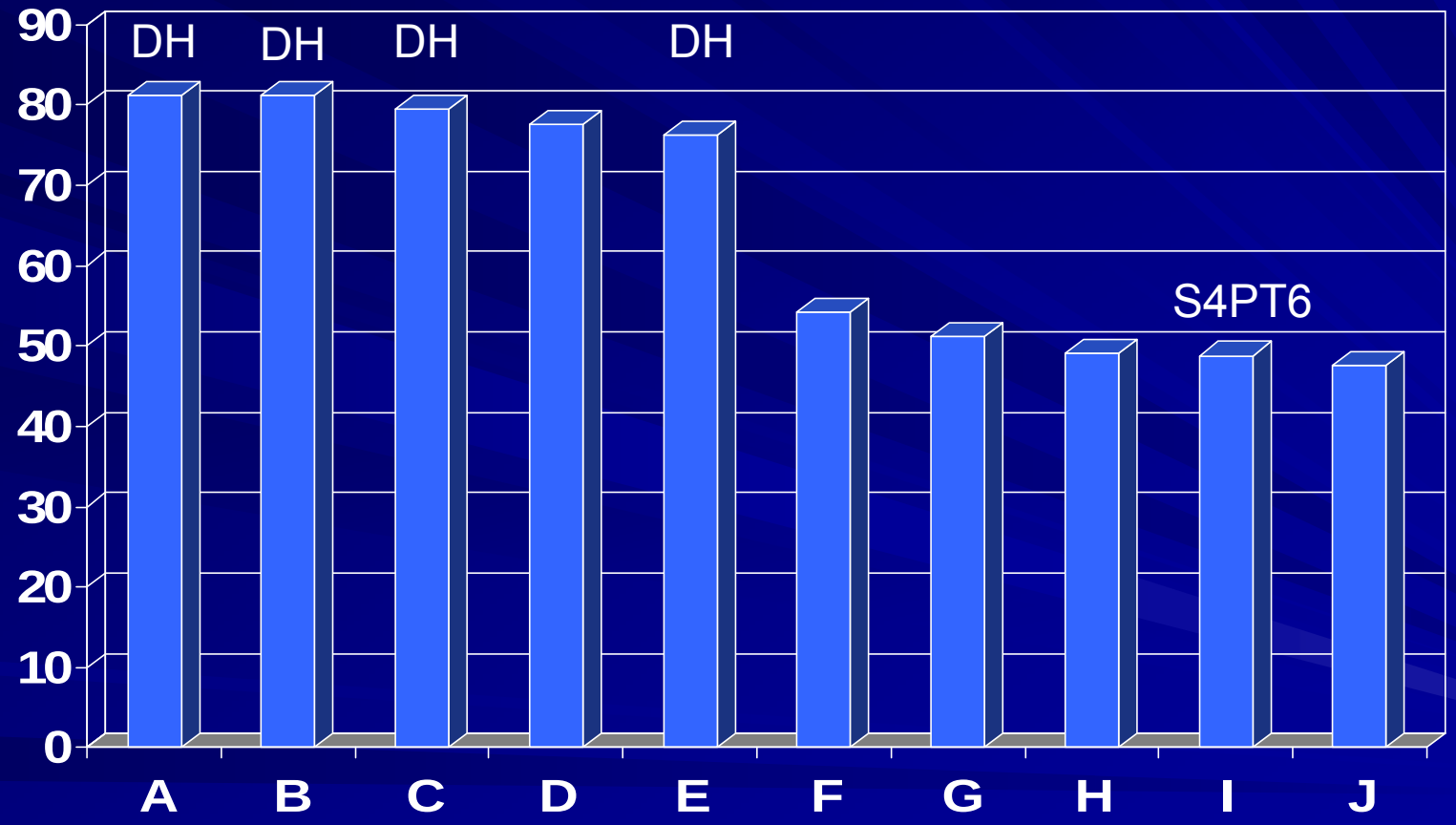
Special Conditions
Testing the Deployment Population

- Wet Sites
- Dry Sites
- Saline Sites

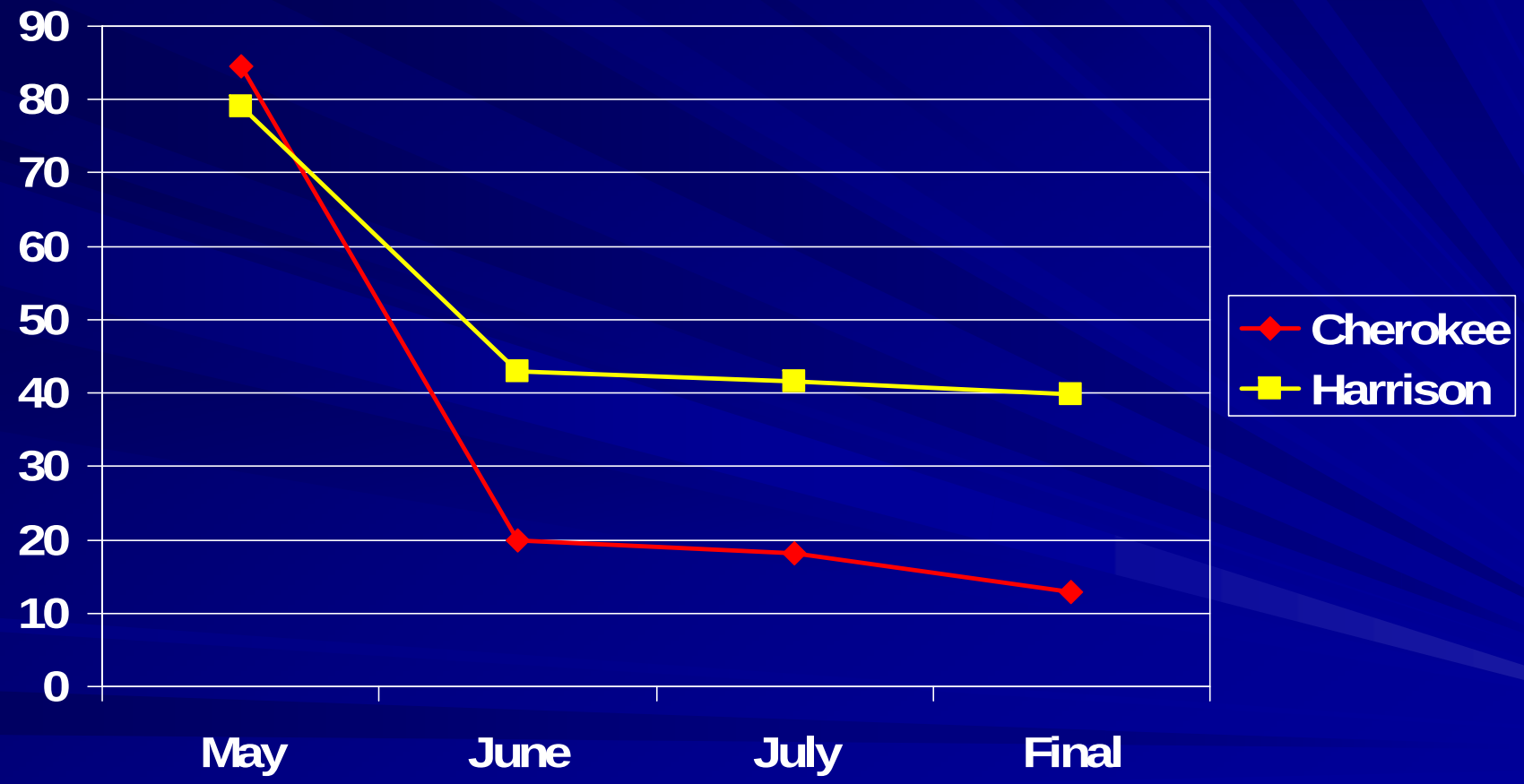
Wet Sites
5 Best and 5 Poorest Families



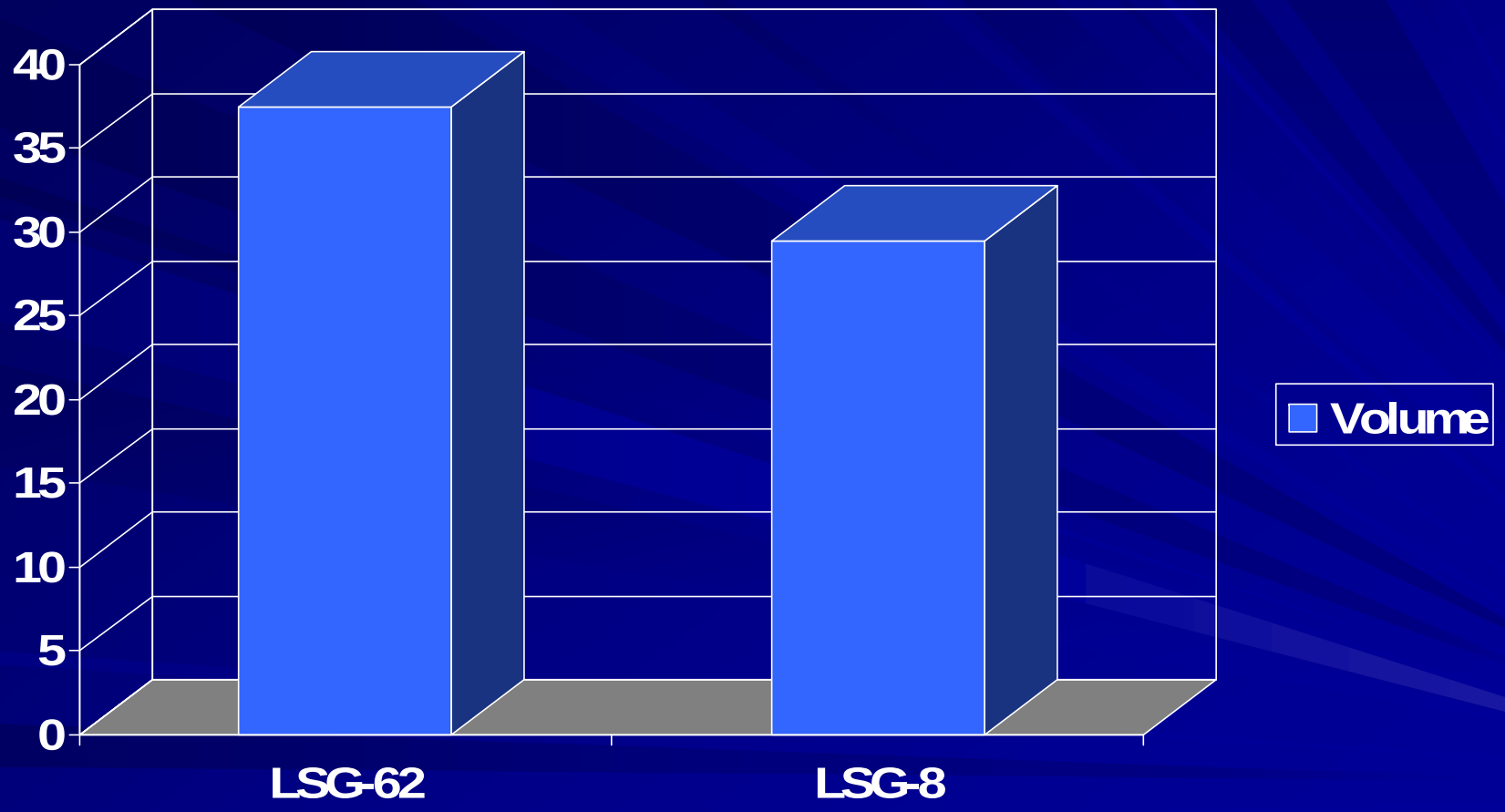
Wet Sites
5 Best and 5 Poorest Families



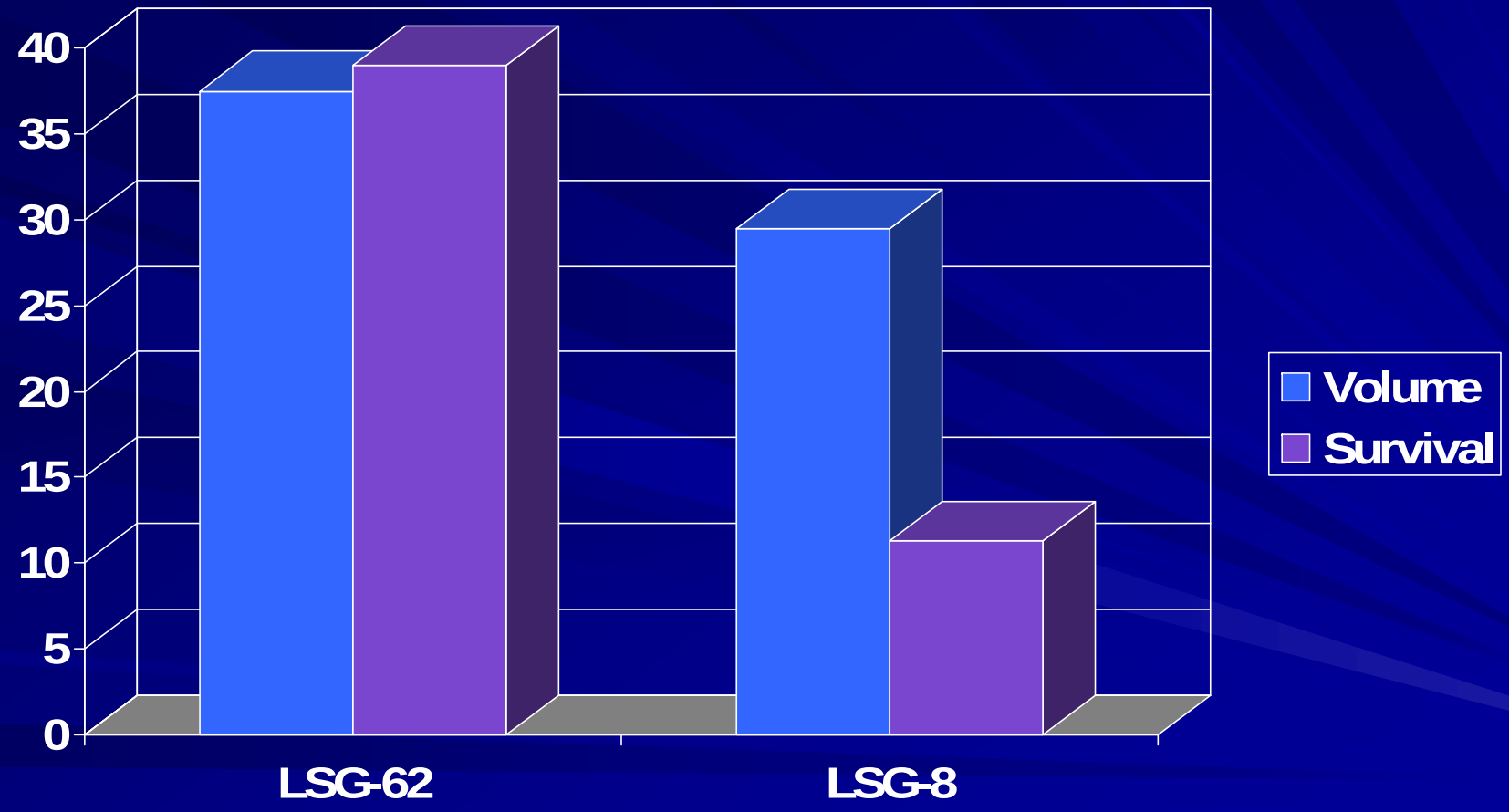
Dry Sites
110 Families



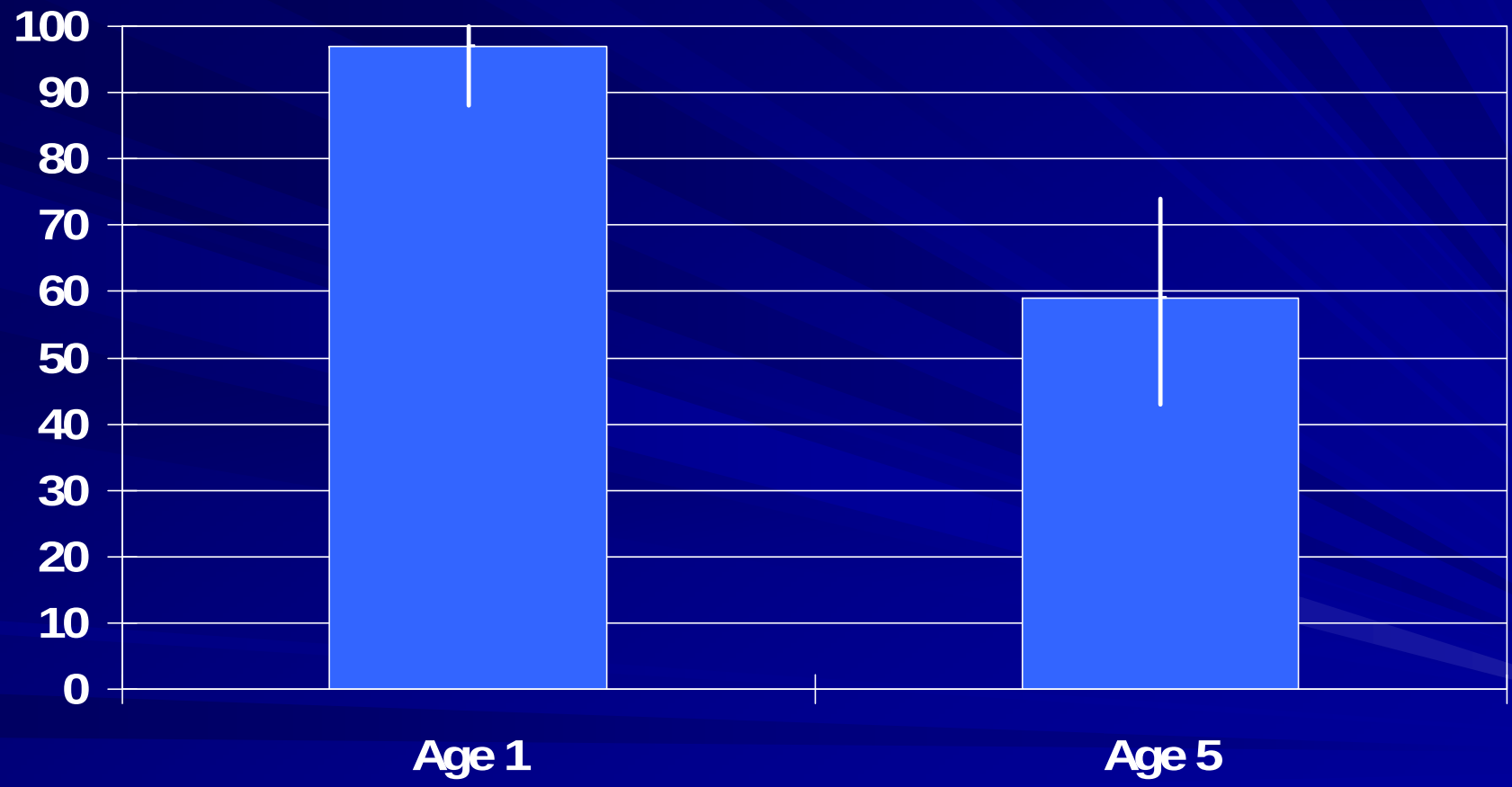
Dry Sites



Dry Sites
How do you use the data?



Diboll-Colita Saline Soils



Conclusions

- Survival doesn’t always work the way we would expect
- Performance on good sites can be misleading
- First year survival may not be enough

More Conclusions

- Can we ignore survival?
  - Low planting densities
  - Block plantings
  - Weather cycles
- What do we do about it?
  - Select for good survival
  - Monitor operational plantings
  - Test for specific sites