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INTRODUCTION

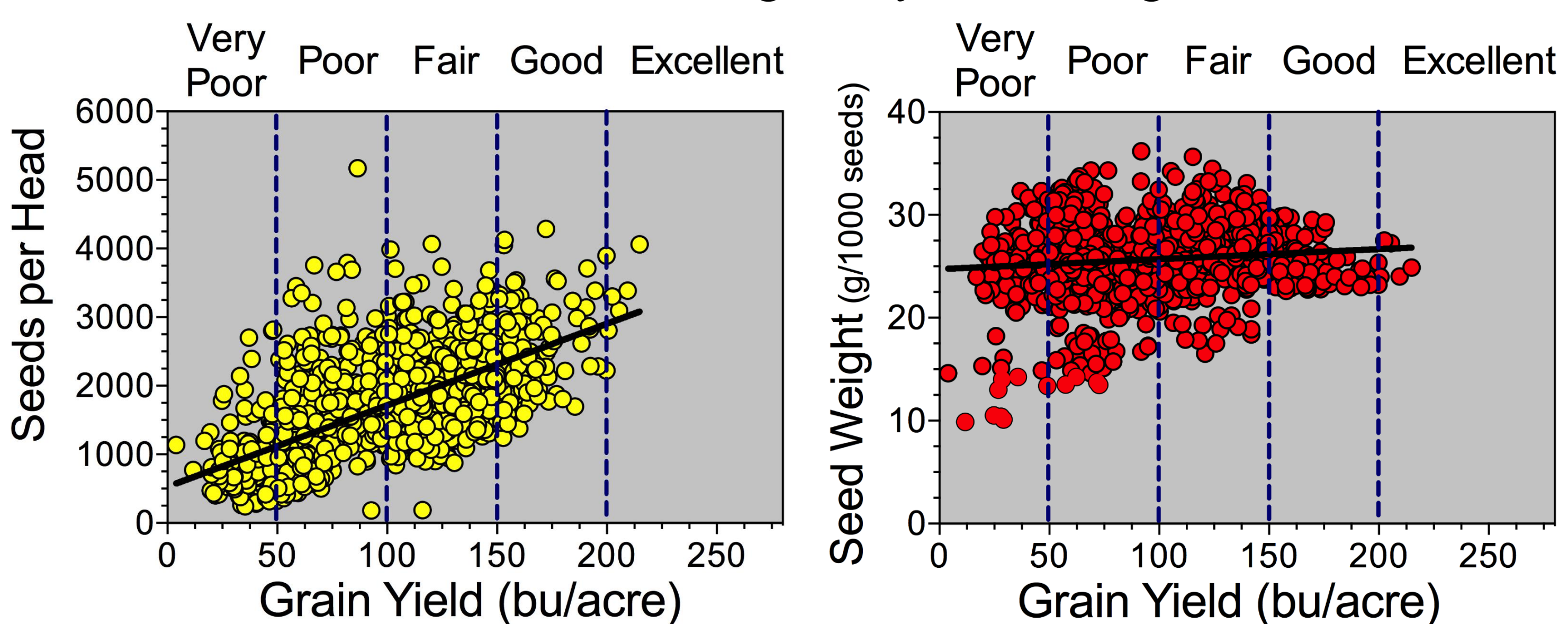
The estimation of crop yields before harvest can be erratic, but producers often like to know about the potential yield of their crops.

OBJECTIVE

The goal of this research project was to get simple but fairly good estimates of sorghum yield before harvest.

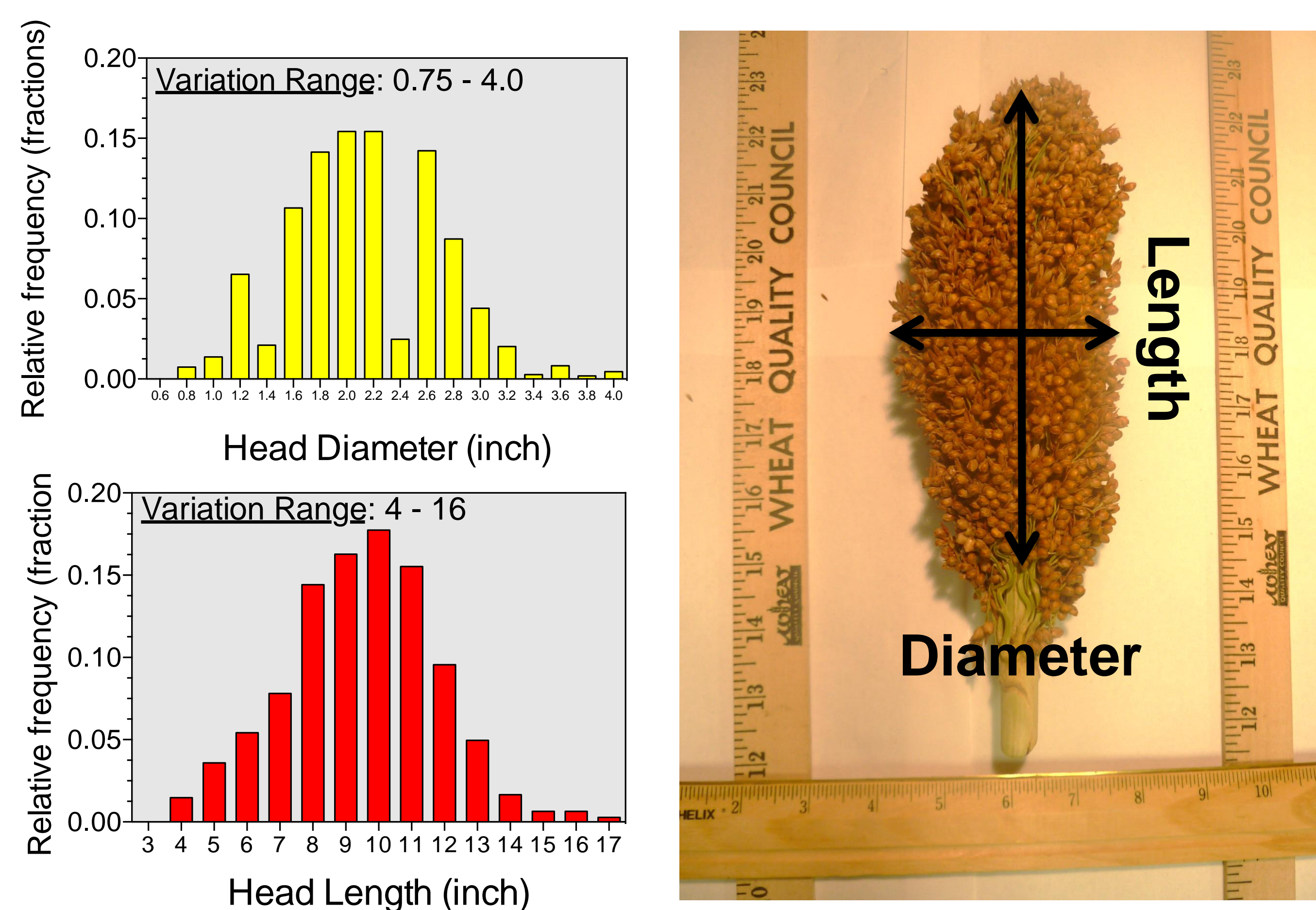
MATERIAL AND METHODS

The foundation for the yield estimation project is based on the association between final grain yield and grain number.

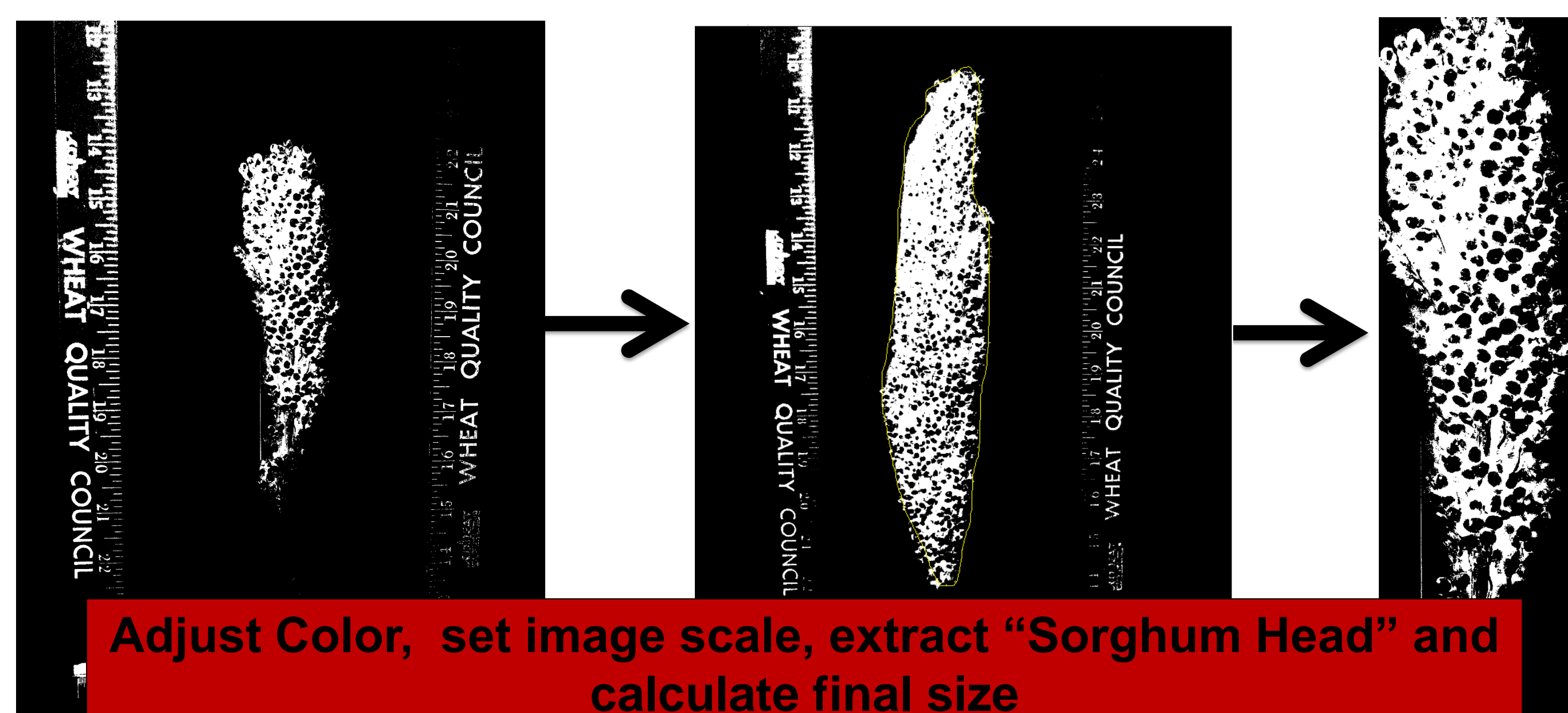


Two approaches were investigated for quantifying the final grain number for the sorghum plants.

1) Allometric Determination: Estimation of final head size was derived via determination of head length and diameter.
 $HEAD\ VOLUME = \pi \times (HEAD\ DIAMETER/2) \times HEAD\ LENGTH$



2) Imagery: Determination of head size via head imagery.



RESULTS

Allometric Approach: The head volume presented a relationship with the grain number per head for sorghum hybrids (Fig. 1A), but the slope for the association was not unique when inbreds were also evaluated (Fig. 1B).

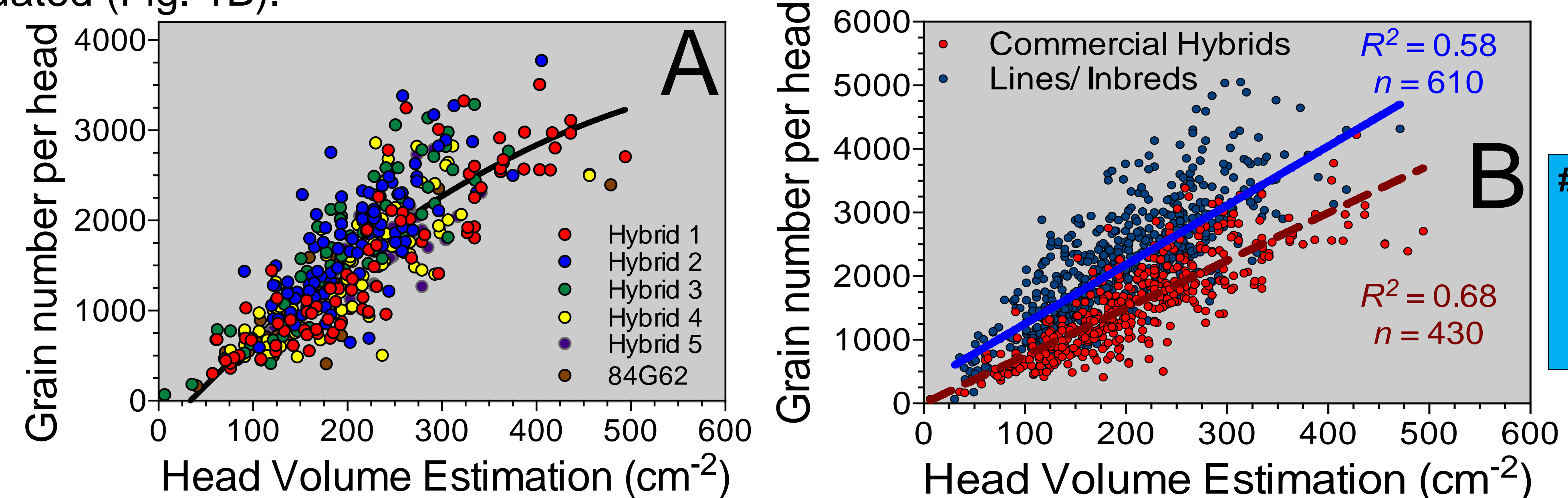


Figure 1. Relationship between grain number per head and head volume estimation in sorghum, for hybrids only (A) and for both hybrids and inbreds (B).

Imagery Approach: Both hybrids and inbreds showed an equivalent slope for the relationship between final grain number per head and the head imagery.

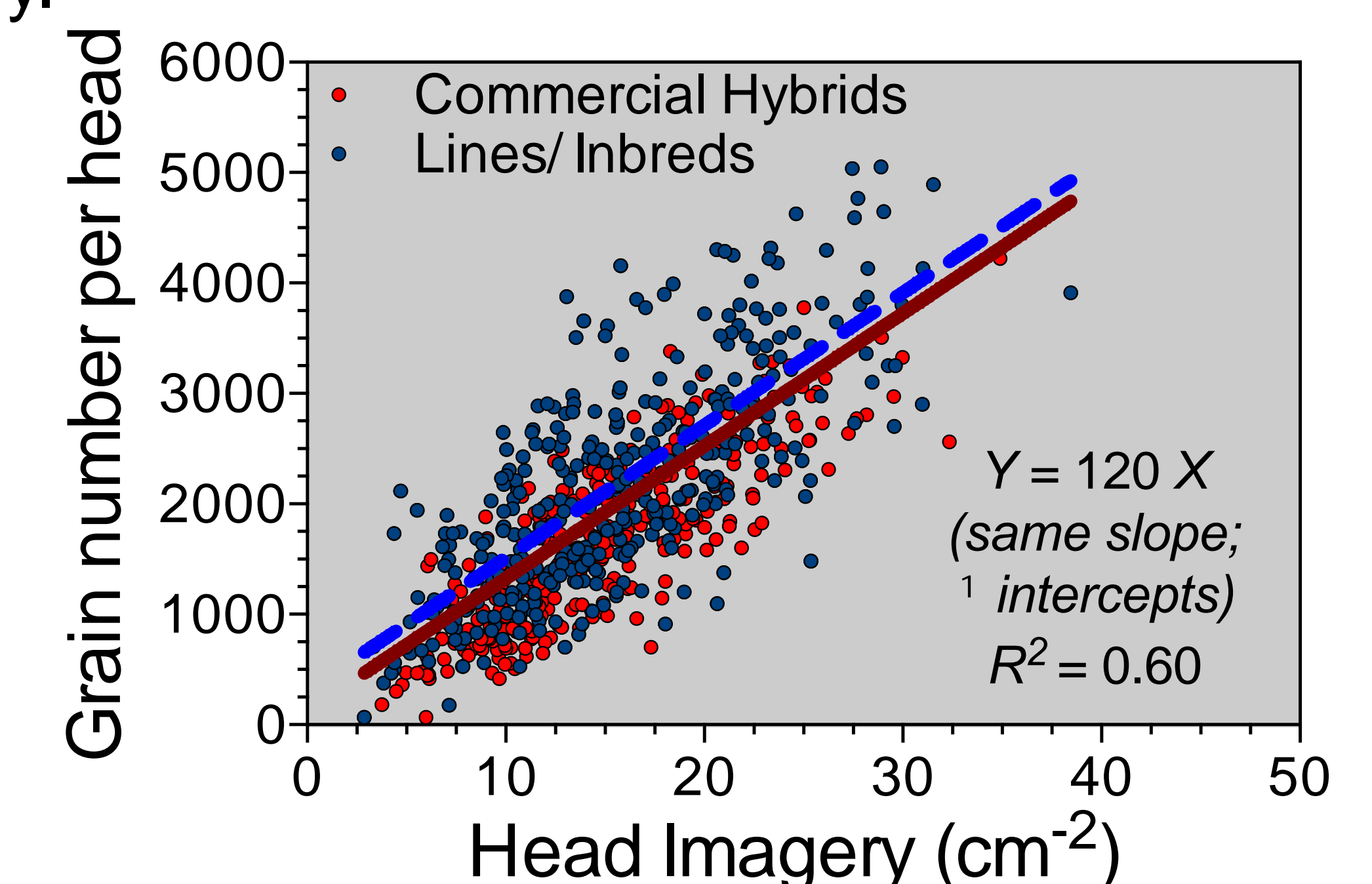


Figure 2. Relationship between grain number per head and head imagery.

Imagery vs. Head Volume: Under low head sizes both techniques estimated head size in a similar manner, but as head size increases the head volume approach overestimated final grain number.

Imagery vs. Head Estimation

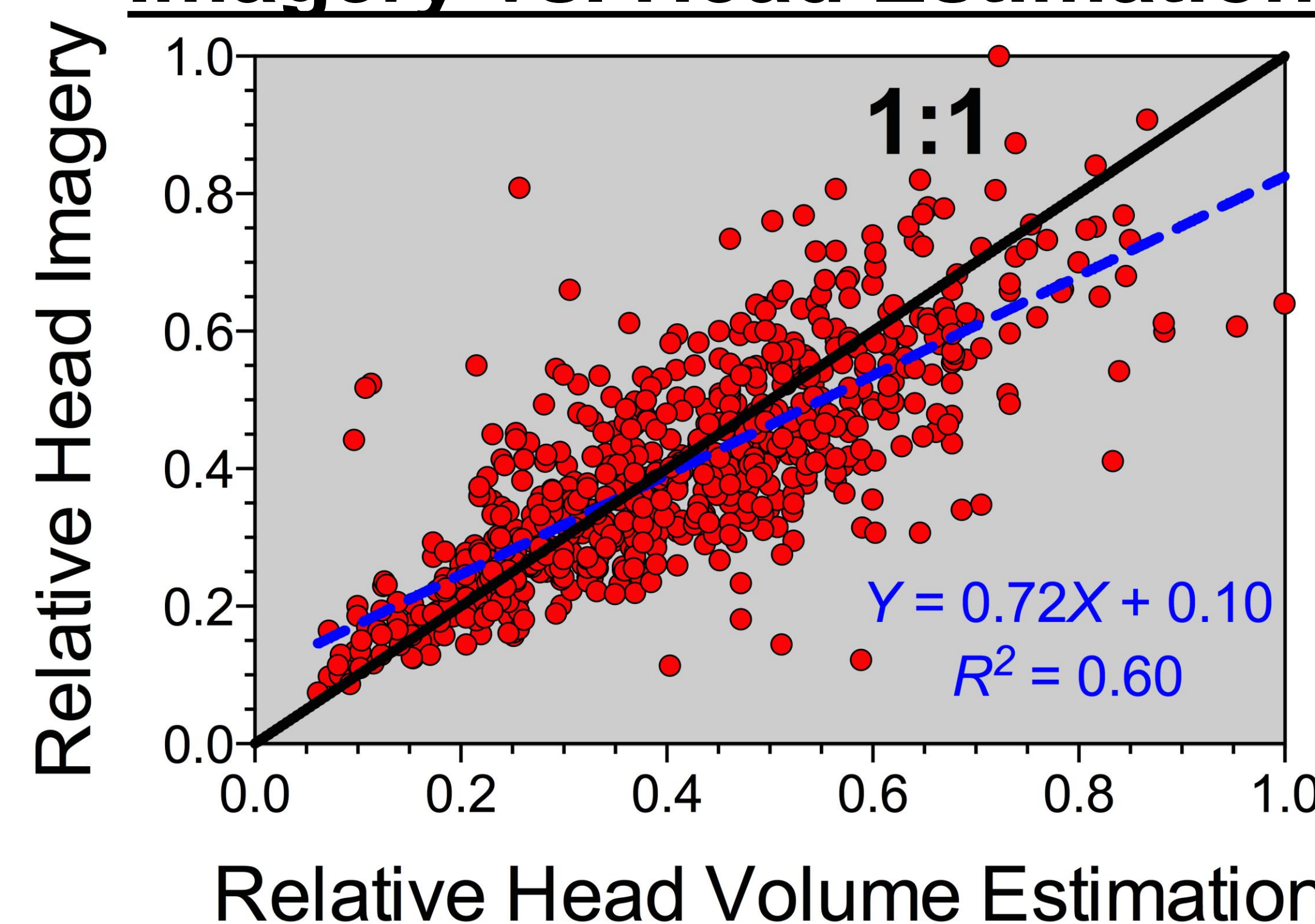
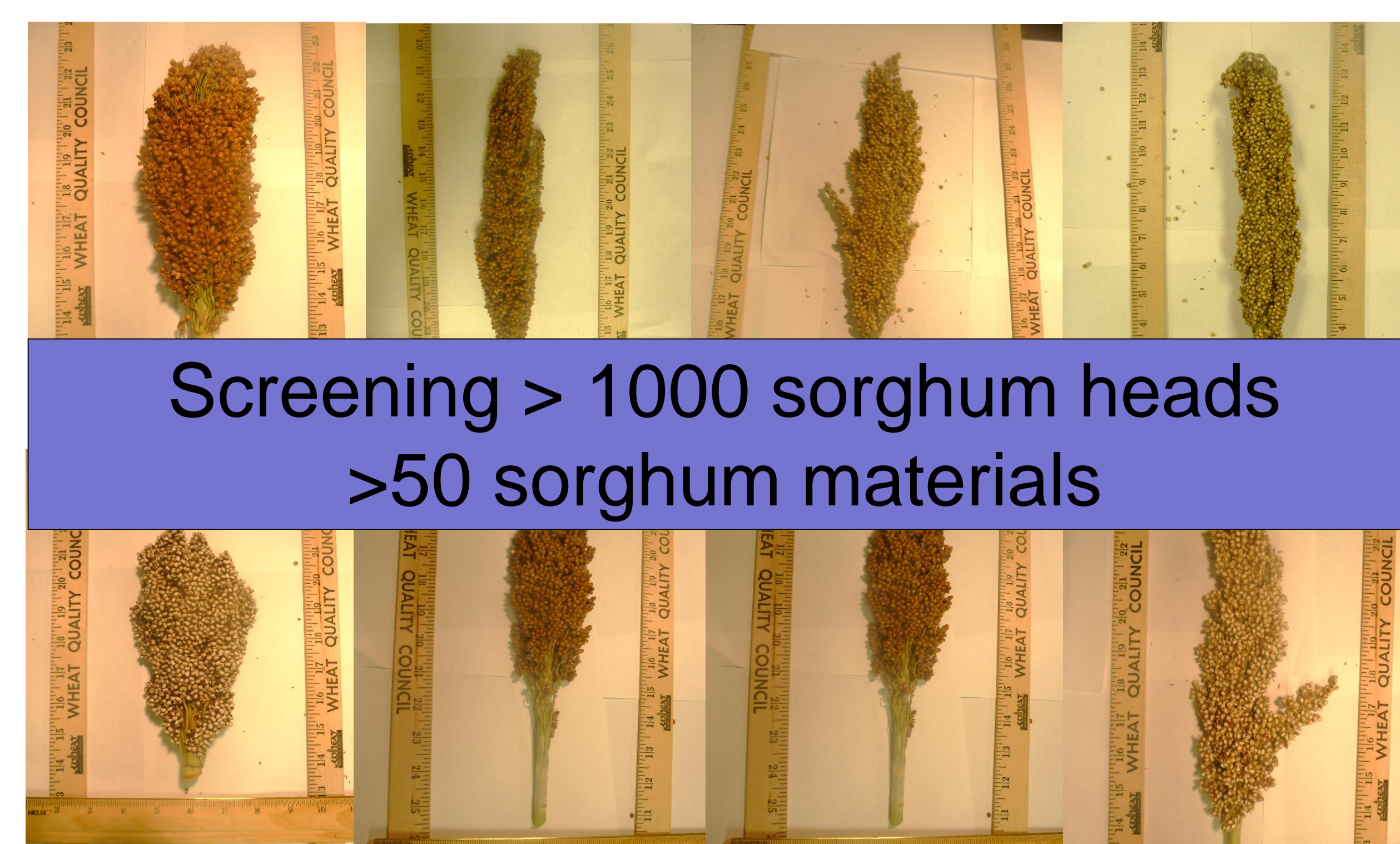


Figure 3. Relationship between relative head imagery and relative head volume estimation.



CONCLUSIONS

- Grain number was highly related to head volume estimation and head imagery.
- Optimum collection "timing" needs to be further investigated for defining "earliest" yield estimation.
- More locations and hybrids need to be screening before this support tool can be released.
- Automatization of imagery collection process is currently explored for introducing these steps into a mechanistic model.
- Development of an App for collecting imagery at field-scale is feasible and a logical step.