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Introduction

- Cotton (*Gossypium spp.*) is an important natural fibre whose conventional production is responsible for environmental degradations¹.
- One of the main concern of organic cotton production is the availability of GMO-free varieties adapted to the organic production systems^{2,3}.
- One approach to develop a portfolio of suitable varieties is Participatory Plant Breeding (PPB), i.e., breeding involving farmers⁴.

Objectives

- Identify cultivar traits farmers have when selecting cotton species *G. hirsutum* and traditional *G. arboreum*
- Rate criteria of farmers in selecting cotton cultivars
- Improve the participatory plant breeding methodology used

Methods

- Interviews with male and female farmers or farmer groups in India in 2019
- 53 open ended interviews with farmers on their criteria in varietal selection
- Categorizing the mentions
- 126 structured interview where farmers rated a set of pre-selected criteria for varietal selection

Results

Male and female farmers' selection criteria for *G. hirsutum* and *G. arboreum*

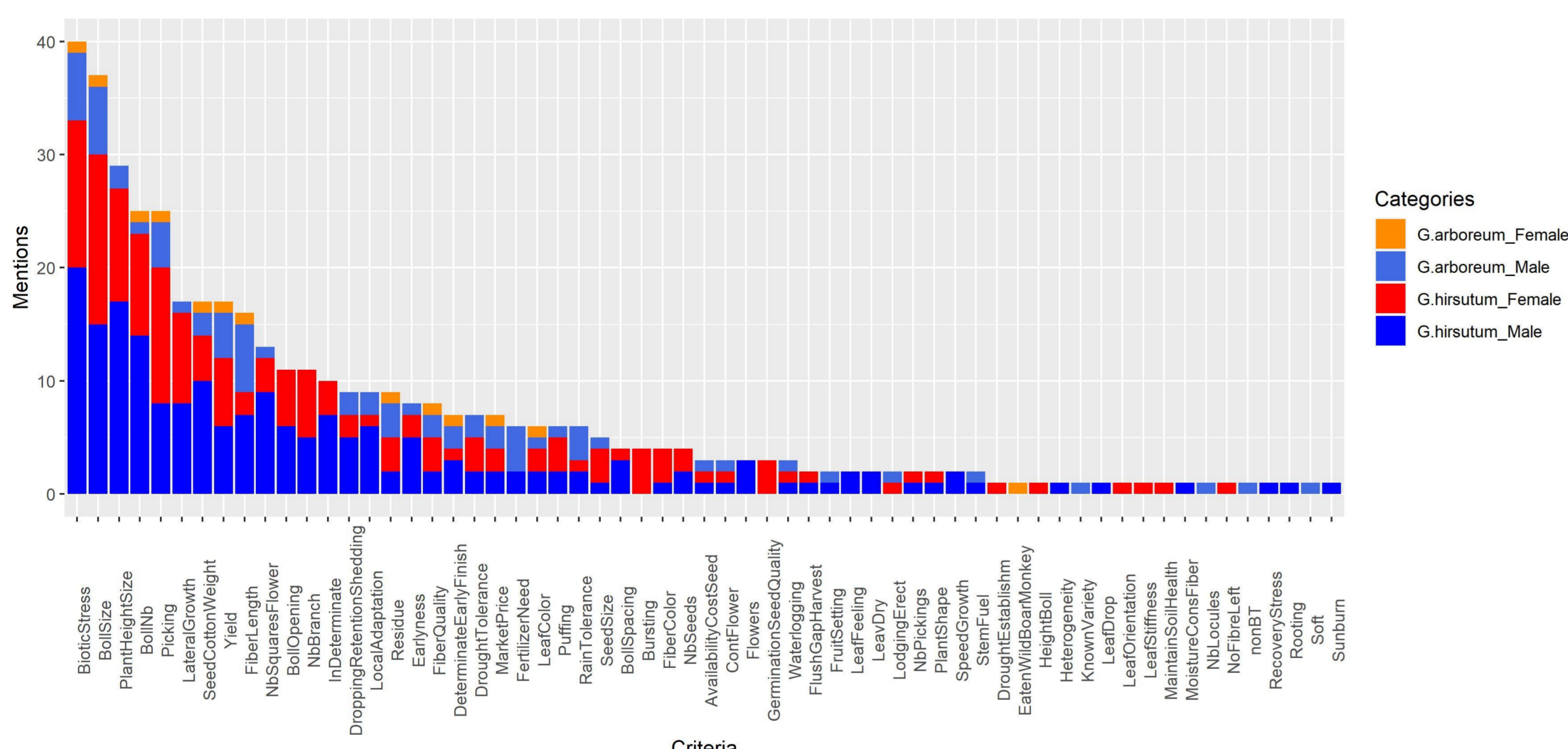


Figure 1: Cotton variety selection criteria spontaneously mentioned with female and male farmers indicated by red and blue tones respectively, and *Gossypium arboreum* and *G. hirsutum* indicated by lighter and darker color respectively

- A broad range of criteria, including new, appear
- The criteria mentioned must be categorized for analysis

References

1 Wakelyn PJ, Chauhry MR, 2007. Organic Cotton. In: Gordon S, Hsieh Y-I (eds.). Cotton. Science and technology. Woodhead, Cambridge, p. 130-174
 2 Louis Bolk Institute, 2015. Seed availability for non-GM cotton production - an explorative study, unpublished. Seed & soil task force, OCRT, Textile Exchange.
 3 Messmer M, Riar A, Vonzun S, Shrivastava Y, Mandloi L, Birla M, Patidar I, Sana R, Mahapatra G, Ambatipudi A, 2017. Participatory non-GM cotton breeding to safeguard organic cotton production in India. In: Rahmann G, Andres C, Yadav AK, (Ardakani), Babalad HB, Devakumar N, Goel SL, Olowe V, Ravisankar N, Saini JP, (others) (eds.). Innovative Research for Organic 3.0-Proceedings of the Scientific Track at the organic world congress, 9-11 November, p. 503-506.
 4 Ceccarelli S, 2012a. Plant breeding with farmers. A technical manual. ICARDA, Aleppo, Syria, 139 p.

Categorized mentions of criteria for *G. hirsutum* and *G. arboreum* for female and male farmers

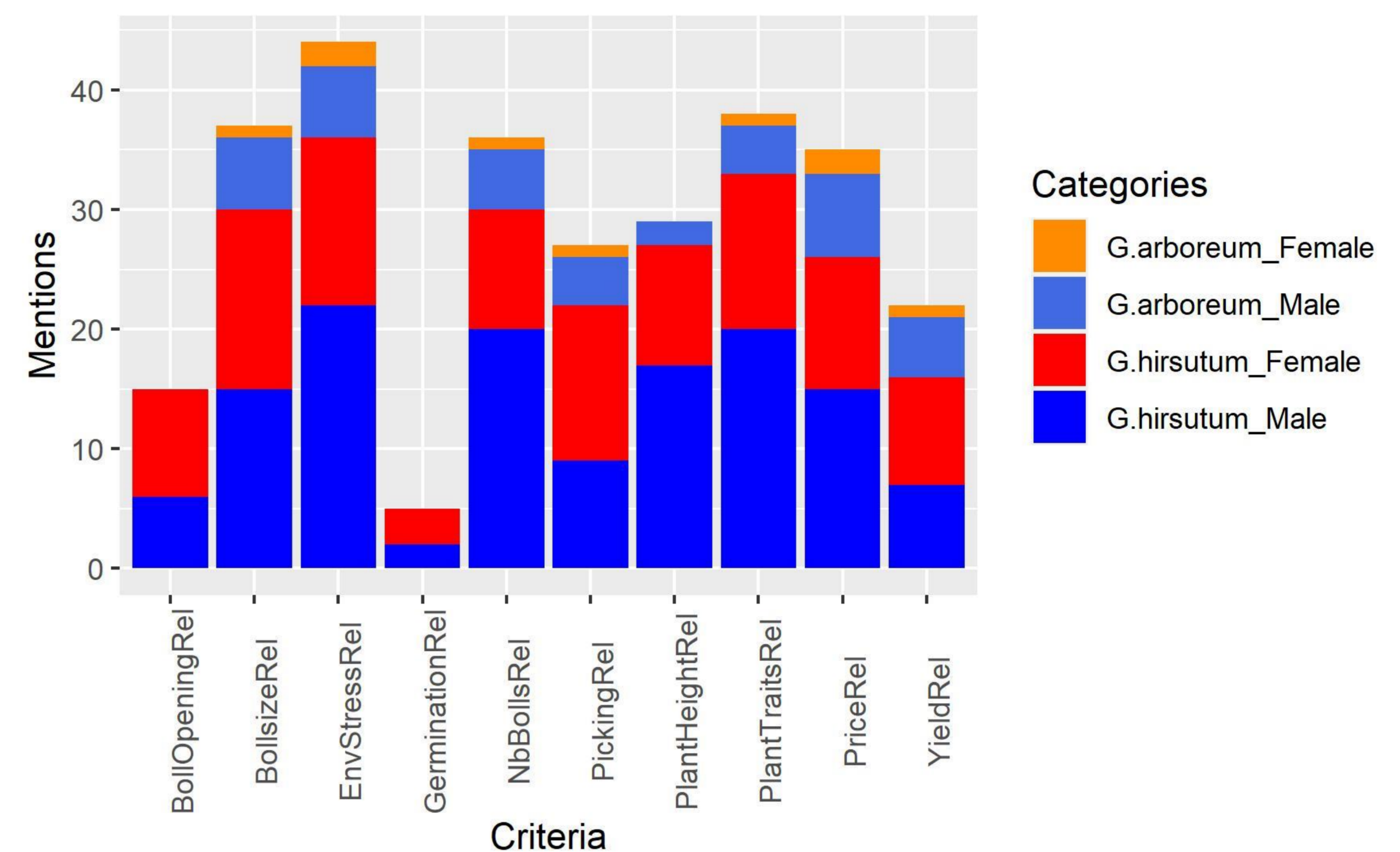


Figure 2: Categorized criteria mentioned for the selection of cotton varieties spontaneously mentioned by farmers. The different colors are for *Gossypium arboreum* by female (n=2) and male (n=8) farmers, as well as for *G. hirsutum* by female (n=18) and male (n=25) farmers. Group interviews were counted as n=1. The criteria were categorized related to: Boll opening, Boll size, Environmental stress tolerance, Germination, Lint dropping, Boll number, Picking, Plant height, Plant traits or morphology, Price, and Yield respectively

Traits related to environmental stresses are the most mentioned

Importance of a pre-selected range of criteria for *G. hirsutum*

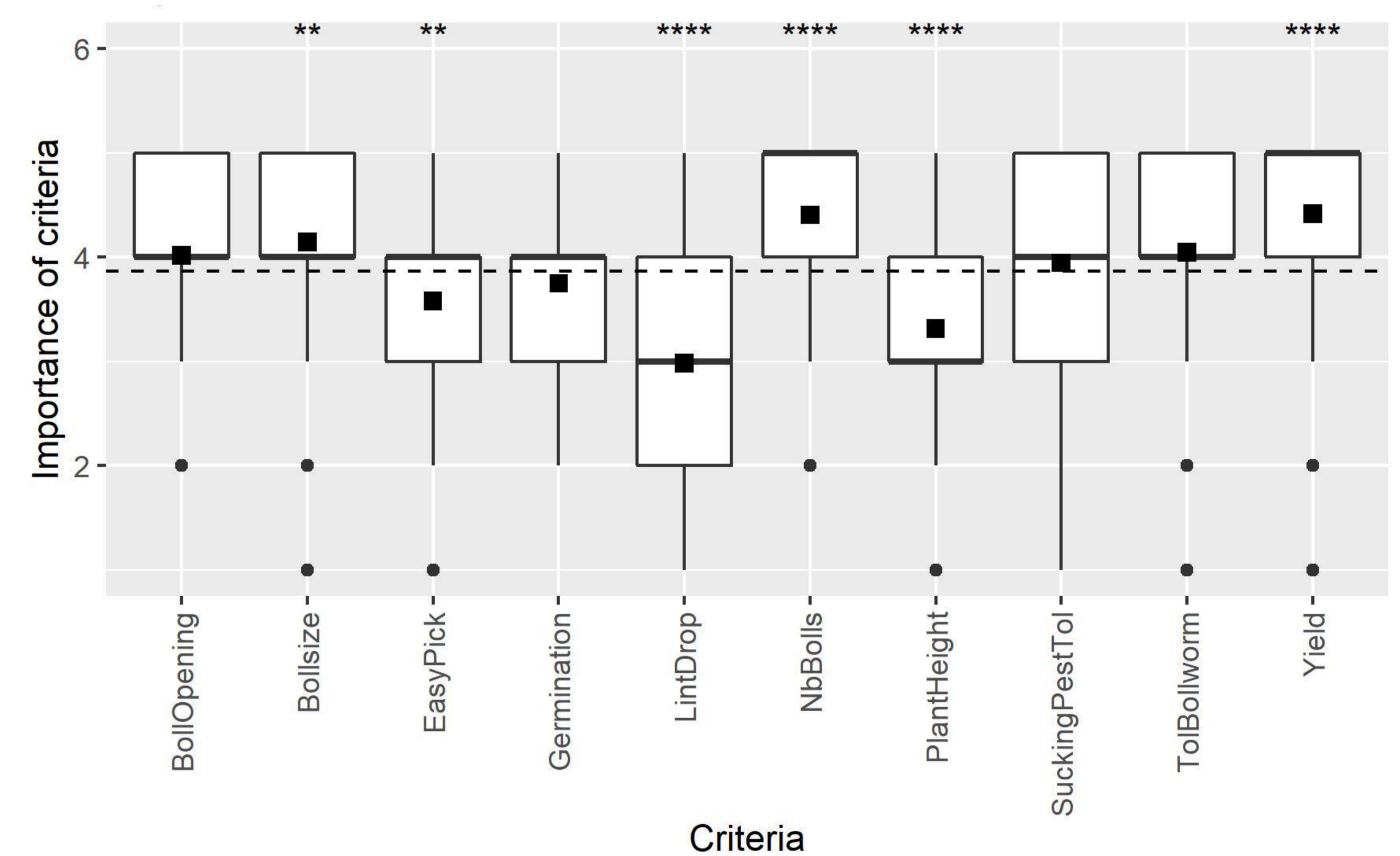


Figure 3: Importance of criteria from high, 6, to low, 1, for the selection of *Gossypium hirsutum* cultivars (female farmers n=39; male farmers n=72). Significance level against the overall mean are indicated with asterisks according to the t-test (* p ≤ 0.05; ** p ≤ 0.01; *** p ≤ 0.001; **** p ≤ 0.0001)

Yield and yield-related traits are said to be the most important

Conclusions

- New criteria for cultivar selection were mentioned by farmers
- Closed question give quantitative information, but only on a small set of criteria
- Open questions allow to quantify the importance of criteria by counting mentions
- Open questions allow to quickly integrate new criteria farmers have, when adapting to changing conditions
- Open questions allow a feedback on exposure to novel germplasm

