Crop productivity and Wright's adaptive landscape: Is cotton near an adaptive peak? (C08-paterson182605-Oral)

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Abstract:

Sewall Wrights adaptive landscape is a useful framework to conceptualize crop improvement progress. In one crop, cotton, the cultivated gene pool shows many indications of being near an adaptive peak. These indications include slowing progress from plant breeding, a growing level of field genetic vulnerability, and monomorphism at about half of DNA marker loci examined in a diverse sampling of hundreds of cultivated cottons representing the major US gene pools. The possibility that some unfavorable alleles have become inadvertantly fixed in the cultivated gene pool is suggested by the behavior of a sampling of loci in interspecific crosses. Further, numerous opportunities appear to exist to identify favorable transgressive alleles in exotic germplasm. The identification, testing, and implementation of desirable alleles from exotic germplasm, even with the advantage of a detailed genetic map and molecular markers, involves many challenges and will require a sustained effort of a scope similar to that of present mainstream breeding programs. Nonetheless, the rewards accruing to this investment promise to be substantial. Early progress will be discussed.

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