Ildiz tizimini chuqur tahlil qilish o'simlik seleksiyasida muhim ahamiyatga ega

Seleksiyada genetik yondashuvlar keng tarqalgan ekin turlarini takomillashtirish uchun eng tejamkor va samarali vosita hisoblanadi. Ildiz tizimining taraqqiy etishi paxta ko'chatlarini muvaffaqiyatli yetishtirish, undan keyingi rivojlanishi, hosil samaradorligi va barqarorligi uchun juda muhimdir. Paxta ildiz tizimlarini genetik jihatdan yaxshilashga qaratilgan birinchi qadam sifatida muhim irsiy fenotipik o'zgarishlarni aniqlash yoki yaratish kerak. O'zR FA Genomika va bioinformatika markazi olimlari tomonidan mazkur yo'nalishda ham ilmiy tadqiqotlar olib borilmoqda.

Ushbu Markaz va AQSh olimlari tomonidan olib borilgan va yuqori impaktli Euphytica jurnalida chop etilgan “Ildiz va poya morfologiyalarini o'zaro o'rta tolali g'o'za xromosomalari yoki xromosomalar segment juftlarini o'zaro almashtirish yo'li bilan o'zgartirish” mavzusidagi tadqiqotning umumiy maqsadi donor tetraploid turlari Gossypium barbadense, G.mustelinum, va G. tomentosum dan olingan xromosomalar yoki xromosoma segmentlari almashingan liniyalaridagi (XAL) poyaning, bargning va ayniqsa ildizning tanlangan xususiyatlariga ta'sirini o'rganishdan iborat edi.

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Alteration of root and shoot morphologies by interspecific replacement of individual Upland cotton chromosome or chromosome segment pairs

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Abstract Genetic approaches often lead to the most cost-effective and efficient means to improve crops, especially those grown widely. But for most crops, cotton included, genetic improvement efforts have focused far more on above-ground plant attributes than on root systems. Root system establishment is crucial to cotton seedling success, subsequent development, crop performance and sustainability. As a first step toward genetic enhancement of cotton root systems, significant heritable phenotypic variation must be found or created. The overall objective of this research was to study the effect of substituted chromosomes or chromosome segments from the donor tetraploid species *Gossypium barbadense*, *G. mustelinum*, and *G. tomentosum* on the selected traits of the stem, leaf, and especially root in CS lines. Twenty-seven chromosome substitution (CS) lines, containing different pairs or short segments of chromosomes from *G. barbadense* (CS-B lines), *G. mustelinum* (CS-M lines), and *G. tomentosum* (CS-T lines) and two parents, TM-1, parent quasi-isogenic to the CS lines and *G. barbadense* 3-79, the donor parent to all CS-B lines, were analyzed. Goals were to determine if CS lines significantly affect any of 17 morphological shoot and root traits. Indeed, significant line-based variation occurred for several root and shoot phenotypes. Comparisons of means and two-way hierarchical cluster analysis revealed several CS lines simultaneously affected multiple shoot and/or root traits, positively or negatively. Pairwise correlations of traits and the cluster analysis showed strong relationships among certain traits. The high correlation among several root traits suggests that easier-to-screen traits might be leveraged strategically to devise breeding-friendly methods for phenotypically evaluating root system morphology. Most importantly, this research identifies CS lines with prospectively novel individual trait effects and others with multi-trait effects that can be further dissected and used to improve our knowledge of cotton root systems, their development, genetic control and genetic improvement.

Keywords Chromosome substitution lines · *Gossypium* species · Breeding · Interspecific · WinRHIZO software

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Bunda TM-1 barcha xromosomasi almashingan liniyalar uchun kvasi-izogen ota nazorat o'simligi bo'lsa,

3-79 liniyasi (G. barbadense), barcha CS-B liniyalari uchun nazorat ona o'simligi hisoblanadi. Shuningdek turli xil juftlik yoki xromosomalarning qisqa segmentlarini o'z ichiga olgan yigirma yettita xromosomasi almashingan liniyalari G. barbadense, G.mustelinum, va G. tomentosum xromosomasi almashingan liniyalari ham tadqiqot ob'ekti sifatida olingan. Maqsad xromosomasi almashingan liniyalarining 17 ta morfologik poya va ildiz belgilaridan birortasiga sezilarli darajada ta'sir yetadimi-yo'qligini aniqlashdan iborat edi. Darhaqiqat, bir nechta ildiz va poya fenotiplari uchun muhim liniyalarga asoslangan o'zgarish yuz berdi. Vositalarni taqqoslash va ikki tomonlama iyerarxik klasterni tahlil qilish bir vaqtning o'zida bir nechta xromosomasi almashtirilgan liniyalarni aniqladi va bir nechta poya yoki ildiz xususiyatlariga ijobiy hamda salbiy ta'sir ko'rsatganligi aniqlandi. Eng muhimi, xromosomasi almashingan liniyalardagi yangi individual belgilar va boshqa ko'plab belgilarning samaradorligi g'o'za ildiz tizimi, uning rivojlanishi, genetik nazorat va takomillashish bilan bog'liq bilimlarimizni oshirishga xizmat qiladi.