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Abdurakhmonov et al.

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(54) **COTTON *PHYA1* RNAI IMPROVES FIBER QUALITY, ROOT ELONGATION, FLOWERING, MATURITY AND YIELD POTENTIAL IN *GOSYPIUM HIRSUTUM* L.**

(58) **Field of Classification Search**
None
See application file for complete search history.

(75) **Inventors:** **Ibroklim Y. Abdurakhmonov, Tashkent (UZ); Zabardast T. Buriev, Tashkent (UZ); Abdusattor Abdukarimov, Tashkent (UZ); Sukumar Saha, Starkville, MS (US); Johnie N. Jenkins, Starkville, MS (US); Alan E. Pepper, College Station, TX (US)**

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Primary Examiner — Jason Deveau Rosen

(74) *Attorney, Agent, or Firm* — John D. Fado; Gail Poulos

(73) **Assignees:** **The United States of America, as represented by the Secretary of Agriculture, Washington, DC (US); Agriculture Center of Genomics and Bioinformatics, Academy of Sciences Of Uzbekistan, Tashkent (UZ); The Texas A & M University System, College Station, TX (US)**

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(57) **ABSTRACT**

Improvement of fiber quality of Upland cultivars (*Gossypium hirsutum*), while maintaining early maturity and productivity, is a fundamental problem in conventional cotton breeding. Phytochromes play a fundamental role in plant development, flowering and cotton fiber length. Targeted RNAi of *PHYA1* genes in cotton suppressed expression of *PHYA1* and/or *PHYB*, resulting in over-expression of the remaining *PHYA2/B/C/E* genes. This altered expression induced a number of phytochrome-associated phenotypes, including increased root length and mass, increased anthocyanin-pigment, vigorous shoot development and vegetative growth, early flowering, early boll maturity, increased fiber length and increased seed cotton yield compared to control plants. These RNAi phenotypes were stably inherited and expressed through four generations ($T_{n,3}$) and were transferable from RNAi Coker-312 plants to Upland cultivars via conventional hybridization.

19 Claims, 9 Drawing Sheets
(7 of 9 Drawing Sheet(s) Filed in Color)