

**A STUDY OF  
DIVERSITY IN  
EGYPTIAN COTTON**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649349975

A study of diversity in Egyptian cotton by O. F. Cook & Argyle McLachlan & Rowland M. Meade

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**O. F. COOK & ARGYLE MCLACHLAN & ROWLAND M. MEADE**

# **A STUDY OF DIVERSITY IN EGYPTIAN COTTON**



U. S. DEPARTMENT OF AGRICULTURE. 41

BUREAU OF PLANT INDUSTRY—BULLETIN NO. 156.

B. T. GALLOWAY, *Chief of Bureau.*

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# A STUDY OF DIVERSITY IN EGYPTIAN COTTON.

BY

O. F. COOK, ARGYLE McLACHLAN, AND  
ROWLAND M. MEADE.

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ISSUED JULY 24, 1909.



WASHINGTON:  
GOVERNMENT PRINTING OFFICE.

1909.

## BUREAU OF PLANT INDUSTRY.

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*Assistant Chief of Bureau, ALBERT F. WOODS.*  
*Editor, J. E. ROCKWELL.*  
*Chief Clerk, JAMES E. JONES.*

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### BIONOMIC INVESTIGATIONS OF TROPICAL AND SUBTROPICAL PLANTS.

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## LETTER OF TRANSMITTAL

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U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF PLANT INDUSTRY,  
OFFICE OF THE CHIEF,  
*Washington, D. C., May 8, 1909.*

SIR: I have the honor to transmit herewith a paper entitled "A Study of Diversity in Egyptian Cotton," by Messrs. O. F. Cook, Argyle McLachlan, and Rowland M. Meade, of this Bureau, and recommend its publication as Bulletin No. 156 of the Bureau series.

This Bureau has conducted experiments with Egyptian cotton at Yuma, Ariz., for several years past, under the direction of Mr. T. H. Kearney. The results have been increasingly favorable. In the season of 1907 the cotton was so good, both in yield and in quality, as to justify our calling attention to this crop in Bulletin No. 128 of this Bureau as likely to prove suited to cultivation in the irrigated districts of Arizona and adjacent States.

In the season of 1908 the results were somewhat less favorable, though by no means discouraging. The planting of the cotton in other localities in Arizona and southern California showed that the acclimatization, which appeared to be well advanced at Yuma last year, is not sufficiently complete to insure normal behavior of the plants in other places. And even at Yuma the cotton of this season showed an appreciable deterioration, affecting the yield as well as the length and uniformity of the fiber.

As soon as these unfavorable tendencies became apparent Mr. Kearney asked that they be made the subject of special study to ascertain their nature and causes. Mr. Cook and his assistants were assigned to this work because they had become familiar with the behavior of cotton during the period of acclimatization, in connection with the weevil-resistant Central American cottons recently introduced into Texas. The present report contains the results of their investigations. It shows that the deterioration can be traced to the existence of several forms of diversity among the plants, and that cultural practices as well as factors of breeding and acclimatization must be taken into account in order to secure the necessary uniformity of the product.

Respectfully,

B. T. GALLOWAY,  
*Chief of Bureau.*

HON. JAMES WILSON,  
*Secretary of Agriculture.*

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## A STUDY OF DIVERSITY IN EGYPTIAN COTTON.

### INTRODUCTION.

The diversity found in the Egyptian cotton in Arizona appears to be of four different kinds, evidently arising from different physiological factors. Precautions which may tend to avoid one kind of diversity will not be fully effective unless other factors are taken into account at the same time. Methods of acclimatization, breeding, and culture have all to be adapted to the special needs of the case if the full possibilities of the new crop are to be definitely ascertained.

The first and most striking kind of diversity is due to hybridization. The cross-fertilizing insects are much more abundant and active in our Southwestern States than in any other cotton-growing region thus far investigated. This will render it impossible to maintain a culture of pure Egyptian or other high-grade cotton unless all other kinds of cotton are excluded from the localities in which superior stocks are planted. Though the lint of the hybrid plants is often superior to that of the pure Egyptian plants, it is sufficiently different to interfere with the commercial uniformity of the product.

The second kind of diversity that affects the Egyptian cotton is evidently due to incomplete acclimatization. As with other types of cotton, transfer to new conditions induces great variation, not only in the habits of growth and other vegetative characters of the plants, but also in fertility and in the abundance and length of the lint. This form of diversity is to be eliminated by the selection each year of the plants that approach most nearly to the normal form of the variety, are the most fertile, and have the best lint.

The third kind of diversity is more directly connected with differences in the physical environment which cause or call forth differences in the individual plants. It is shown most strikingly in comparing the behavior of the plants in the different localities, but includes also some of the differences that occur in the same locality or in different parts of the same field. This form of diversity is familiar in all branches of agriculture, but is greater with a newly introduced variety, and may be expected to decrease as a better adjustment to the new conditions is attained. The second kind of diversity represents incomplete acclimatization, while the third kind is more closely connected with the phenomenon of accommodation.