

### The Origin of Cultivated Tobacco.

THE cytogenetic investigations during the last few years supplied evidences for the origin of *Nicotiana tabacum* L. (cigarette and cigar tobacco) and of *Nicotiana rustica* L. (pipe tobacco, Makhorka). Both species represent allopolyploid hybrids, the former being an amphidiploid of *Nicotiana sylvestris* and *Nicotiana tomentosiformis* (syn. *Rusbyi*) or a form of the tomentosa group, while the latter being an amphidiploid of *N. paniculata* and *N. undulata*. *N. tabacum* and *N. rustica* have 48 chromosomes in the somatic cells, while *N. sylvestris*, *N. tomentosiformis*, *N. paniculata* and *N. undulata* have 24 chromosomes in the somatic cells.

The arguments for the above statements are :

1. *For N. tabacum.*—*N. tabacum* haploids have most frequently 24 univalent chromosomes during the first meiotic division, though one or two bivalents also occur. The same chromosome behaviour often occurs in the  $F_1$  hybrids *N. sylvestris*  $\times$  *N. tomentosiformis*.<sup>1</sup> In the hybrids *N. tabacum*  $\times$  *N. sylvestris* 12 chromosomes of *N. tabacum* conjugate with the chromosomes of *sylvestris*. The same mode of conjugation was found in the hybrid *N. tabacum*  $\times$  *N. tomentosiformis*, i.e., 12 bivalents and 12 univalents. The production of triple hybrids with 24 bivalents in crossing *N. tabacum* with the  $F_1$  (*sylvestris*  $\times$  *tomentosiformis*), i.e., a fully fertile triple hybrid having all three complete genomes of the component species supplied the evidence that 12 *tabacum* chromosomes are homologous with the chromosomes of *sylvestris* while the other 12 are homologous with those of *tomentosiformis*. The production of the amphidiploid *sylvestris-tomentosiformis*, however, represented the final solution of the problem. The amphidiploid *sylvestris-tomentosiformis* has 48 somatic chromosomes. It produces fully fertile hybrids with *N. tabacum*, and has morphological characters the varieties of *N. tabacum* have.

2. *For N. rustica.*—*N. rustica* haploid has usually 24 univalent chromosomes and rarely bivalents are formed, while in the hybrid *paniculata*  $\times$  *undulata* non, or several bivalents are formed.  $F_1$  hybrids *N. rustica*  $\times$  *N. paniculata* and *N. rustica*  $\times$  *N. undulata* form usually 12 bivalents and 12 univalents during the first meiosis (occasionally trivalents are formed too, but this is in agreement with the former data). Trigenomal triple hybrid *N. rustica*  $\times$  *paniculata*  $\times$  *un-*

*dulata* (having complete genomes from all these three species, i.e., 48 chromosomes) should be fertile as well as the amphidiploid *undulata-paniculata*. The hybrids between *rustica* and the amphidiploid *paniculata-undulata* should be fertile too. This phylogenetic problem has such a direction of development. It is outlined here very roughly and will be given elsewhere in detail.

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### Cleistogamy in Sorghum.

CLEISTOGAMY occurs in many grasses. In wild species of *Hordeum* (Barley) cleistogamic forms have been noted. In cereals the occurrence of cleistogamy is very rare. The economic disabilities attendant on seed production under cleistogamic conditions militate against the common occurrence of cleistogamy in cereals; the more so in the case of sorghum in which the grains are naked and develop beyond the glume. In the wide collection of sorghums under study at the Millets Breeding Station, Coimbatore, two races, one Indian and another African, have been met with in which the flowers are cleistogamous. These races belong to the botanical group *Sorghum papyrascens*, Stapf., the very group in which erratic flowering,<sup>1</sup> vivipary,<sup>2</sup> and chlorophyll deficiencies<sup>3</sup> have been recorded. The long papery glumes and the degenerate lodicules have already been noted to be responsible for the erratic flowering.<sup>1</sup> In the cleistogamous forms, the earheads never give such evidences of flowering as the presence of stray emerged anthers and odd protruding stigmas. Such pedicelled spikelets as were antheriferous remained unopened. In spite of this the chaffy-looking heads did give a few viable grains. An examination was made of the cleistogamic forms in comparison with chasmogamic ones among the *papyrascens* group of sorghums. The following tabular statement brings out the points of contrast.

The cause of the cleistogamy will be evident from the accompanying table. In the cleistogamic forms the involucreal glumes are big. The lower floral glume is very wide and clasps the upper floral glume (lemma) tightly. This clasp coupled with the degenerated scaly lodicules results in cleistogamy.