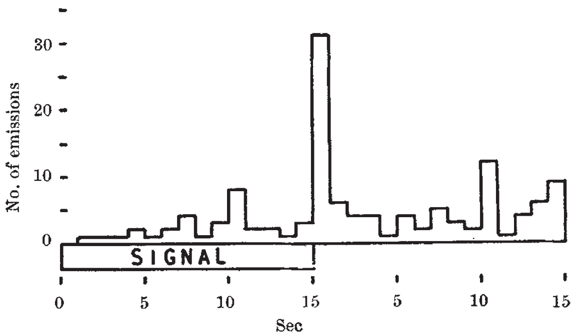

Fig. 2. Distribution of chirps during a 24-min trial using alternate periods of 15 sec and a sound of 15 kc/s, 85 db. 48 consecutive results are thus added together

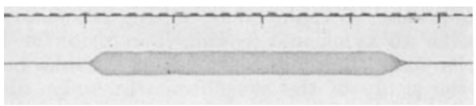

Fig. 3. Oscillogram of a 15 kc/s 85 db signal released and stifled by moving a cushion over the loudspeaker. Time marker 1 per sec

stridulate directly after the end of the signal may be due solely to the removal of the inhibition, or there may be, in addition, a direct response to some characteristic of the signal. Further work is being carried out to investigate these possibilities.

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CYTOLOGY

Corrected Chromosome Numbers for *Spartina* × *townsendii* and its Parent Species

Intensive cytological investigation of *Spartina*, carried out in the Department of Botany, University of Southampton, has revealed chromosome numbers which are not in agreement with those of Huskins[1] and Church[2,3].

In the classical case of *S.* × *townsendii* and its putative parents it will be recalled that chromosome numbers were previously given by Huskins as $2n = 56$ for *S. maritima* (Curt.) Fernald (formerly *S. stricta* (Ait.) Roth.) and $2n = 70$ for *S. alterniflora* Lois., the summation of these numbers, namely, $2n = 126$, being reported for the amphidiploid, then identified as *S.* × *townsendii*. Although these observations numerically accord well with each other in constituting the hybrid origin of *S.* × *townsendii* they nevertheless create an anomalous situation in the cytology of the Gramineae as a whole. The chromosomes of *Spartina* are very small and it is an established fact that small chromosomes and a basic number of 7 are not coincidental in the family[4,5]; small chromosomes are usually associated with $x = 9$, 10 or 12. In addition, the base of 7 is unusual in the tribe Chlorideae, in which *Spartina* is often included, where most genera have $x = 10$. This apparently paradoxical situation is resolved by the present results.

Counts of *S. maritima* from 6 localities on the south and east coasts of Britain show it to be a species with $2n = 60$. *S. alterniflora* Lois. plants, surviving as relics of a one-time much more extensive distribution of this species last century[6] in Southampton Water, have $2n = 62$ $(60 + 2)$. *S.* × *townsendii*, the sterile natural F_1 hybrid between these species, has been generally overlooked until recent years but still survives in large quantity at Hythe in Southampton Water. It has $2n = 62$. Some of the amphidiploid plants (previously known as *S.* × *townsendii*, but at present officially nameless) have $2n = 124$. Other plants of the amphidiploid type have $2n = 120$ and 122, respectively. Plants which appear by their morphology and chromosome number to be natural back-cross derivatives are found growing in the vicinity of the F_1 hybrid in Southampton Water, thus adding significantly to the evidence for hybridity. *Spartina glabra* Muhl. (another form of *S. alterniflora* sometimes known as *S. alterniflora* var. *glabra* (Muhl.) Fern.), introduced to Britain from the United States by F. W. Oliver in 1924, also has $2n = 60 + 2$ ($2n = 56$ according to Church[3]) and a regular meiosis.

Chromosome investigations have been extended to include the North American species of *Spartina* and the existence of a basic number of 10 is substantiated by counts of *S. pectinata*, which proves to have $2n = 40$ in two introductions from North America at Kew. *S. alterniflora*, received from Quebec, Canada (coll. Hamel), has $2n = 62$, similar to both the introduced forms of this species already in Britain. Other species are now being investigated. Gould's[7] count of $2n = 40$ in *Spartina spartinae* from Texas is further evidence in support of the base of 10.

It is clear that these data do not deny the hybrid nature of *S.* × *townsendii* or its precise parentage, although they make the cytological support for its origin slightly less acute than hitherto. *Spartina* × *townsendii* thus remains a plant of outstanding evolutionary significance by virtue of its natural origin by hybridization and chromosome doubling, resulting in a highly successful new 'species'. It is perhaps the most well-known and now substantiated example of natural species formation of this type and one of the few cases of its kind which has actually been observed to occur in a known locality rather than inferred entirely by indirect observations.

Spartina is certainly not unique in having wrong chromosome numbers reported for it. The *Chromosome Atlas*[8] reveals many genera in which numbers are uncertain, and doubtless many more anomalies exist but are as yet undetected. Perhaps the most well-known case of error in chromosome number is that of man, formerly thought to have $2n = 48$ chromosomes and, afterwards, from more intensive study and greater familiarity with the karyotype, shown clearly to have $2n = 46$ (ref. 9).

Because of its former chromosome numbers and supposed base number of 7, *Spartina* has not accorded satisfactorily with other genera of the Chlorideae and, indeed, its separation from the tribe has been proposed by various authorities[10]. This uncertain situation is now resolved by the new numbers, which bring *Spartina* into line cytologically with other members of the Chlorideae.

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