EDIBLE AROIDS – NEW INSIGHTS INTO PHYLOGENY

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SUMMARY

The New World *Xanthosoma sagittifolium* (n = 13) and the Old World *Amorphophallus campanulatus* (n = 14) and *Colocasia antiquorum* (n = 14) seem to have a lower base number than previously realized. Evidence for this comes from two heteromorphic bivalent associations recognized at pachytene, intragenomic pairing at metaphase–I and chromosomal counts in pollen of naturally occurring triploid *Colocasia*. Supporting evidence arises from studies of the control of desynapsis in diploids and triploids and from ecogeographical specialization and cytotaxonomic data of related aroid taxa. The value of these findings and the special problems that they create for conventional approaches to phylogenetic study of the aroids are discussed.

RESUME

Xanthosoma sagittifolium (n = 13) du Nouveau Monde et *Amorphophallus campanulatus* (n = 14) du Vieux Monde, de même que *Colocasia antiquorum* (n = 14) ont vraisemblablement un nombre de bases inférieur aux estimations antérieures. Deux associations hérétomorphiques bivalentes reconnues à l'accouplement pachytène et intragénomique à la métaphase–I et le chiffrage des chromosomes dans le pollen de *Colocasia* triploïde naturel en donnent la preuve. Cela se confirme par des études menées pour controler la désynapse dans les diploïdes et les triploïdes et par la spécialisation écogéographique de même que par des données cytotaxonomiques de groupes aroïdes parentés. La valeur de ces découvertes et les problemes particuliers qu'elles posent aux méthodes conventionnelles d'étude phylogénétique d'aroïdes sont en cours de discussion.

RESUMEN

Xanthosoma sagittifolium, del Nuevo Mundo, (n = 13) y *Amorphophallus campanulatus* (n = 14) y *colocasia antiquorum* (n = 14) del Viejo Mundo parecen tener un número básico de cromosomas menor del que había sido determinado. La evidencia de esto se deriva de dos asociaciones heteromórficas bivalentes reconocidas en fase de paquiteno, apareamiento intragenomico en metafase–I y conteos cromosómicos en polen de triploides naturales de *Colocasia*. La evidencia que soporta tal situación resulta de estudios de control de desinapsis en diploides y triploides y de la especialización ecogeográfica y datos citotaxonómicos de formas aráceas relacionadas. Se discute el valor de estos descubrimientos y los problemas especiales que crean a los enfoques convencionales sobre el estudio filogenético de las aráceas.

INTRODUCTION

Knowledge of the phylogeny of crop plants by throwing light on past evolution may provide a useful insight into the prospects for future genetic transformation and assist the formulation of breeding programmes.

Aroid genera of economic importance such as *Colocasia*, *Xanthosoma*, *Alocasia*, *Amorphophallus* and *Cytosperma* have received little attention from students of evolution. The edible aroids are well adapted to a variety of environments and under proper management conditions can give very high yields[1,12,14].

Because of the antiquity of their cultivation, plurality of uses and multiplicity of habitats of cultivation, a large diversity exists among the cultivated forms of *Colocasia*, *Xanthosoma* and other edible aroids. Cytotypes have been reported within the species[14].

The poor flowering of these crops, while of no importance to production of the edible crop, hinders study of phylogeny. It would be helpful if ways could be found to improve this. The existing taxonomic treatment of the edible aroids is controversial, and this also hinders phylogenetic studies. Cytological investigations seem particularly useful in attempts to understand phylogeny and we have therefore concentrated our effort in this direction.

KARYOLOGICAL STUDIES IN *Amorphophallus campanulatus* AND *Xanthosoma saggitifolium*

The chromosomes are readily stainable. We have assessed the relative merits of the three commonest stages for chromosome studies, namely pollen metaphase, mitotic metaphase in root tip cells and pachy-

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