

## Hybridization studies in the planthopper genus *Ribautodelphax* (Homoptera, Delphacidae)

C. F. M. den Bieman

Laboratory of Entomology, Agricultural University of Wageningen, P.O. Box 8301, 6700 EH Wageningen, The Netherlands

Received 10.3.1987 Accepted in revised form 15.6.1987

### Abstract

Seven known *Ribautodelphax* species and four recently discovered taxa were crossed. Forty-three percent of the interspecific crosses were successful. Interspecific crosses generally resulted in low numbers of hybrids. In some combinations prolonged larval development of the hybrid males was observed. Backcrosses showed that both male and female hybrids were fertile. Reproductive isolation was mainly maintained by premating barriers. Insemination tests revealed that prolonged confinement of males and females lowered mating thresholds. The taxonomic status of the known species and new taxa was shown to be in need of revision. No indications for a hybrid origin of the pseudogamous triploid *Ribautodelphax* females were found.

### Introduction

Several planthoppers (Delphacidae) of the *Ribautodelphax collinus* complex show slight and to some extent variable morphological differences raising doubt as to their taxonomic status. In Europe nine *Ribautodelphax* species occur (Nast, 1972; Asche *et al.*, 1986) of which five belong to the *R. collinus* complex. Recently, several new populations of this complex were discovered; they are provisionally indicated as 'Taxon 1 to 4'. Studies on host-plant relations and acoustic signals have shown differences among the seven *Ribautodelphax* species and the four new taxa studied (den Bieman, 1986, 1987a, b).

Hybridization studies may be helpful to clear the taxonomic status of the known species and of the new taxa. However, the limited value of hybridization studies for the solution of taxonomic problems has been generally recognized (e.g. Rosen, 1979; Ross, 1974; Wiley, 1981), because the results may be strongly dependent on experimental conditions. Nevertheless, crossing experiments and mate-choice tests may reveal the existence and efficiency of be-

havioral barriers to mating. Moreover, hybridization-experiments offer the only possible way to investigate post-mating barriers. Post-mating barriers were strongly developed in the planthopper genera *Javesella* (Strübing & Hasse, 1975; de Vrijer, 1981), and *Muellerianella* (Booij, 1982a; Drosopoulos, 1977), while hybrids in *Nilaparvata* were fully fertile (Claridge *et al.*, 1985). Experiments revealed pre-mating barriers in all three genera.

There is, however, an additional reason to study hybridization in *Ribautodelphax*. In populations of *R. pungens* (Ribaut) and of Taxon 4, pseudogamous triploid females occur. These triploid females depend on the bisexual diploid species, because their triploid eggs need to be activated by sperm, though their all-female triploid offspring receive maternal genes only. Hybridization tests are needed to infer the mode of origin of these triploids. A hybrid origin is suggested for many polyploid populations (Bullini, 1985; White, 1973, 1978) including the triploid forms in populations of the planthopper *Muellerianella fairmairei* (Perris) (Drosopoulos, 1976).