

Short communication

Variation in fruit shape in three pear hybrid progenies

A. G. WHITE

The Horticulture and Food Research
Institute of New Zealand
Private Bag 1401
Havelock North, New Zealand

P. A. ALSPACH

The Horticulture and Food Research
Institute of New Zealand
P. O. Box 220
Motueka, New Zealand

Abstract Digitised video images of fruits from three seedling families of pear were taken and eight height and width measurements calculated. Ratios between height and maximum width, height of maximum width and height, widths at 10% and 90% heights, and widths at 25% and 75% heights were calculated from the data and used as descriptions of fruit shape. The progenies segregated for each ratio about a continuous uni-modal distribution, which was Normal or nearly so. This would be expected if the characters of height and width are under polygenic control and inherited additively. The progenies showed a tendency away from pyriform towards round shape.

Keywords pear; breeding; fruit shape; digital imaging

INTRODUCTION

Fruit shape in wild and domestic pears of both European (*Pyrus communis* L.) and Asian (*P. bretschneideri*, *P. pyrifolia* (Burm.) Nakai.) types shows considerable variation (Williams 1953; Kajiura & Suzuki 1980). Fruit shape in pears is

reported to be under polygenic control (Crane & Lewis 1949; Zielinski et al. 1965). Round-obovate shapes occur at a higher frequency than pyriform and turbinate shapes (Zielinski et al. 1965); however, Rosati et al. (1979) considered round (flat) shape to be recessive. Kajiura & Suzuki (1980) found in a historical survey of cultivars in Japan from 1700 to the present day, that mean fruit shape had shown a progression towards a round-oblate shape over the generations. Before the discovery of the modern cultivars, 'Nijisseiki' and 'Chojuro' and subsequent controlled breeding programmes, selection preference for round-oblate shape was not apparent.

Fruit shape is generally measured subjectively by comparison with silhouettes of standard cultivars and objectively using height to width ratios (Thibault et al. 1983). Some authors have measured several parameters to give a more accurate comparison of shape (Heijden & Vossepel 1994), particularly at the extremities of the fruit (Kajiura & Suzuki 1980; White & Bailey 1995). The use of ratios allows a direct comparison of shape between fruits of differing size.

In this study, digitised video images of fruits from three seedling families were taken. A range of four height and width ratios descriptive of aspects of fruit shape were calculated and their relationships analysed. The aim was to understand better the segregation for fruit shape of the measured progenies, particularly in crosses between cultivars of *P. communis* and *P. pyrifolia*.

MATERIALS AND METHODS

Plant material and experimental design

Fruits were harvested from each of the selected trees in three hybrid seedling families growing on HortResearch stations in the Hawkes Bay (Havelock North) and Nelson (Riwaka) regions in New Zealand at fruit maturity during the 1995 season.

The first population, 345 'Max Red Bartlett' (*P. communis*) × 'Nijisseiki' (*Pyrus pyrifolia*) seedlings of which 278 were fruiting, was located at

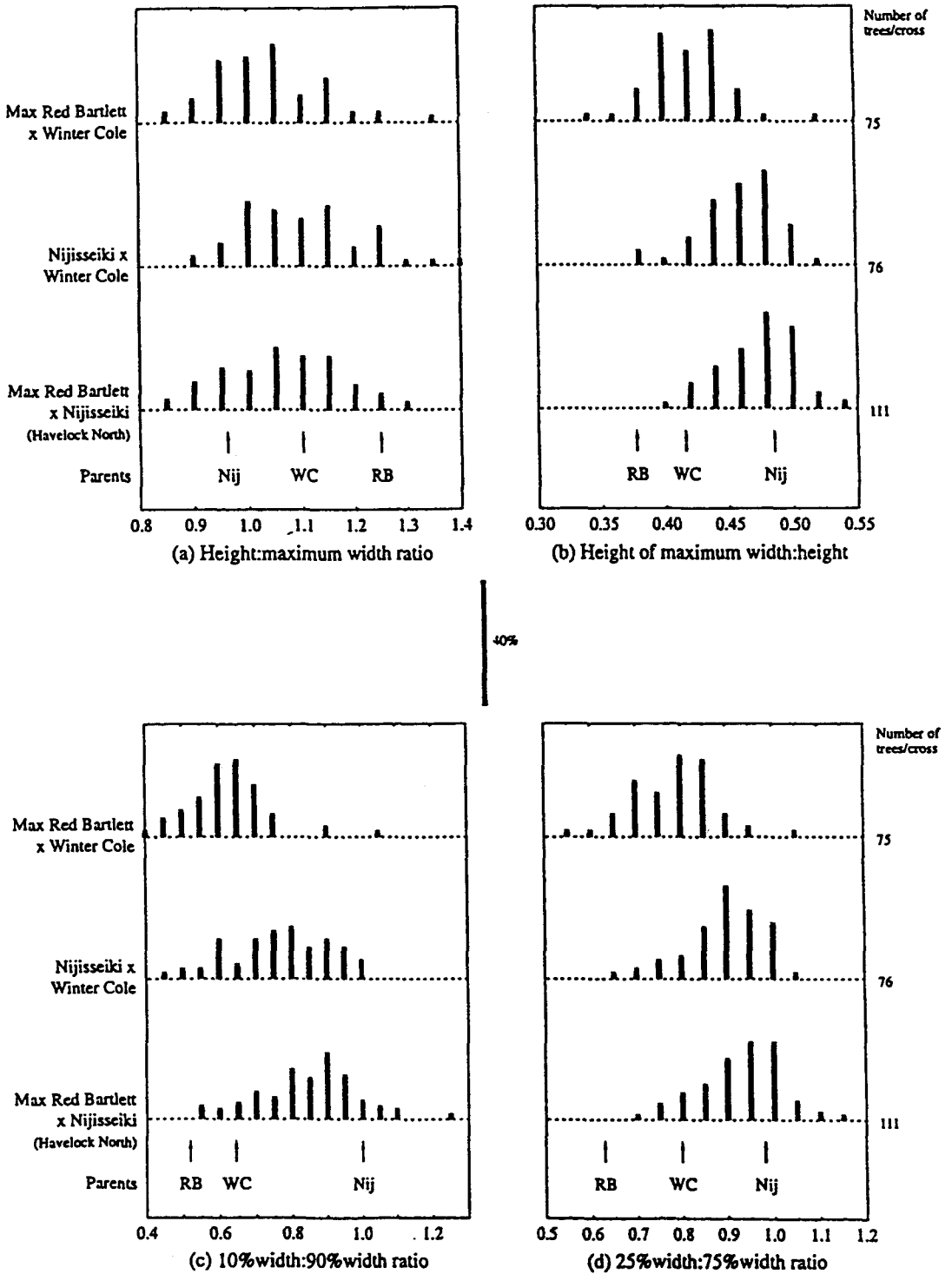


Fig. 2 Distribution of fruit in four height to width ratio class for crosses between the pear (*Pyrus*) cultivars 'Max Red Bartlett', 'Winter Cole', and 'Nijisseiki'.

