

Fig. 4. Scales with blue color on the *Papilio* wing. (A) Brightest scales present blue color. Bar: 200 μm . (B) Two scales on black paper present blue color. Bar: 200 μm .

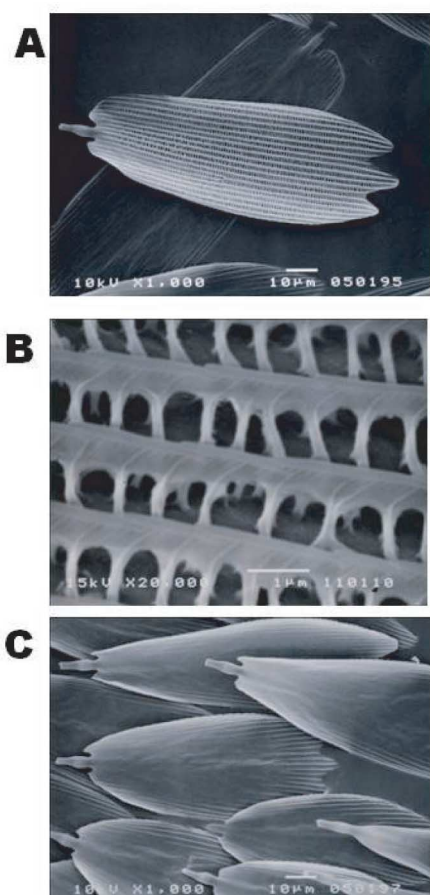


Fig. 5. Scanning electron micrograph of the scale surfaces of *Pieris* (female) (Yoshida, 2002). (A) Upper surface. Bar: 10 μm . (B) Magnified view of the upper surface. Bar: 1 μm . (C) Lower surface. Bar: 10 μm .

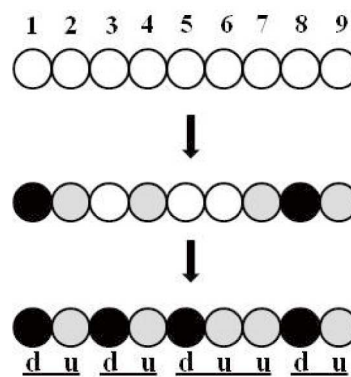


Fig. 6. One-dimensional model of random differentiation of cells under lateral inhibition. Nine cells are arranged within a row. White cells are sensitive both to differentiation signal and to inhibition one. Differentiation and inhibition proceed downward in the figure. Black cells are differentiated, while gray ones are inhibited from differentiation. After the differentiation completion, four alternation units (d-u) and one unalternation unit (d-u-u) are arranged within a row.

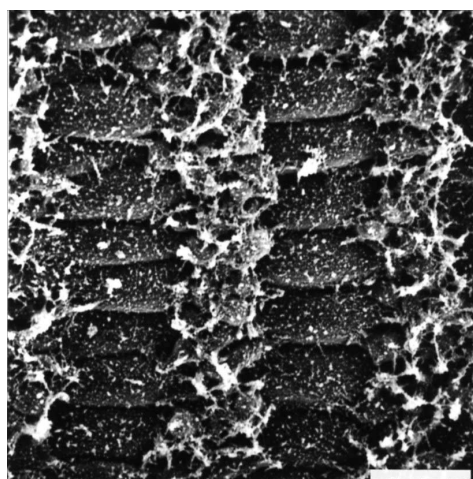


Fig. 7. Scanning electron micrograph of the rows of the scale precursor cells morphologically homogeneous (Yoshida and Aoki, 1989). Bar: 10 μm .

(=lateral inhibition), and consequently unadjacent distribution of differentiated cells is completed (Fig. 6). In the lepidopteran wing epidermis, a single cover or basal scale (cell) is differentiated from a single precursor cell at the pupal stage. Immediately before this scale differentiation, the scale precursor cells morphologically homogeneous are arranged in the anteroposterior direction of the wing (Fig. 7). Thus, the pattern that the two kinds of cells are not adjacent is formed from the likely homogeneous cell population of precursor cells arranged anteroposteriorly in the pupal wing epidermis. This system is closely similar to the one-dimensional model described by Tanemura *et al.* (1991), in which the one-dimensional pattern that differentiated cells are not adjacent is formed from the homogeneous cell population arranged linearly. In the resultant pattern in the model, differentiated cells are not adjacent while undifferentiated elements are occasionally adjacent, and the ratio of the differentiated cell number to the undifferentiated one is about 1:1.3; this ratio is about the same as that of