Table 1 *Diagnostic characters of species of Halophila*

H. ovalis	*H. ovata*	*H. decipiens*	*H. stipulacea*	*H. beccarii*
Dioecious Leaves 2, oblong-elliptic, surface glabrous, 1–7 cm long: 1/2–2 cm wide: margin entire: intramarginal cross veins 10–12 pairs	Dioecious Leaves 2, oblong-elliptic, glabrous; 7–14 mm long: 3–5 mm wide, margin entire, intramarginal cross veins 3–11 pairs	Monoecious Leaves 2, oblong-elliptic, surface rough with stiff unicellular hairs: margin finely serrulate, cross veins 4–9 pairs: 20–30 mm long and 6–10 mm wide	Dioecious Leaves 2, linear to oblong, glabrous, papillose or slightly hairy 3–6 cm long: 2½–8 mm wide, margin serrulate	Dioecious Leaves 6–10 on erect shoot: lanceolate, glabrous margin entire, 6–13 mm long: 1–2 mm wide, cross veins absent
Flowers unisexual	Flowers unisexual	Spathe encloses one male and one female flower	Flowers unisexual	Flowers unisexual

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ALTERATION OF RIBULOSE BISPHOSPHATE CARBOXYLASE/OXYGENASE RATIO BY UREA

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RIBULOSE bisphosphate carboxylase/oxygenase (Rubisco) catalyses carboxylation and oxygenation of RuBP to initiate photosynthesis and photorespiration respectively. Carbon dioxide and oxygen are mutually competitive substrates in these reactions[1]. Modification of enzyme reactivity towards its alternate substrate might enhance plant productivity[2,3]. The question arises whether the activity of Rubisco can be modified. Efforts have been made to seek chemical agents which modify its activity. However, most of the apparent effects were the result of artifacts in the assay procedures used[4,5]. The present study by utilizing a sensitive assay procedure indicates that urea decreases the carboxylase/oxygenase ratio.

RuBP carboxylase/oxygenase was purified from spinach following the method of Jordan and Ogren[4]. Purified enzyme was preincubated with 10 mM $NaHCO_3$, 10 mM $MgCl_2$ with 25 mM tris (pH 8) and 0.25 mM EDTA for 1 h at 20°C. Assays were initiated by adding 70 μg of activated protein in 25 μl to reaction mixtures at 25°C containing varying amounts (0.5, 1, 2, 5, 10 mM) of $NaH^{14}CO_3$, 0.0236 mM H^3RuBP, 10 mM $MgCl_2$, 50 mM Bicine at pH 7.85, with and without 2 M urea in a total volume of 0.5 ml. Reactions were performed in 6 ml scintillation vials which were sealed with serum stoppers. The reaction mixtures were flushed with pure oxygen for 15 min before adding $NaH^{14}CO_3$ and enzyme. Reactions were terminated after 30 min by adding 0.1 ml of a solution containing 0.05 N HCl and 50 mM $ZnSO_4$ and stored at – 15°C.

Carboxylation and oxygenation rates were determined according to Jordan and Ogren[4]. The labelled products of carboxylase reaction [(^{3}H, ^{14}C) glycerate-P] and the oxygenase reaction (^{3}H-glycolate-P) were separated. Glycolate-P phosphatase was used to convert (^{3}H) glycolate-P to (^{3}H) glycolate which was readily separated from labelled organic phosphates by ion exchange chromatography. Radioactivity in these compounds was quantified by scintillation spectroscopy. The ratio of RuBP carboxylase/oxygenase was determined by measuring the two activities simultaneously in the same reaction mixture. This procedure eliminates the possible discrepancy when two activities were measured separately under different conditions particularly at low CO_2 concentration[4,5].

The ratio of carboxylase to oxygenase activity (vc/vo) plotted against the ratio of CO_2 and O_2 concentrations present during assay is shown in figure 1. The ratio increases with increase in the ratio of the CO_2 and O_2 concentrations. However, this ratio was lower when urea was included in the assay medium.

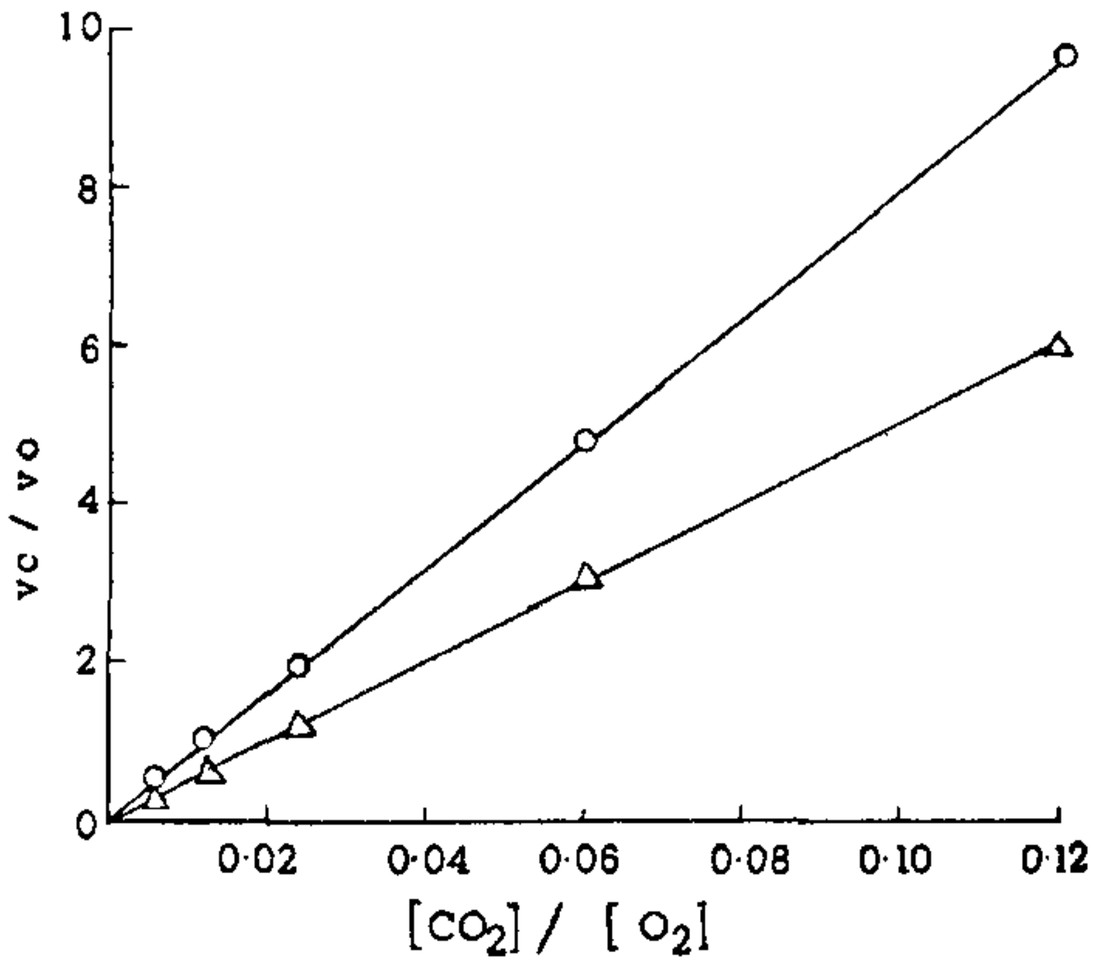

Figure 1. Effect of urea on the ratio of RuBP carboxylase to oxygenase (vc/vo) plotted against the ratio of $(CO_2)/(O_2)$ concentration present during assay. Control ○, with urea △.

The substrate specificity factor, Vc Ko/Vo Kc, determines the relative rates of two reactions at any given CO_2 and O_2 concentrations[1]. A high specificity value indicates a greater specificity for CO_2. Both the enzyme activities assayed simultaneously under several $(CO_2)/(O_2)$ values permit direct determination of the specificity factor. The specificity factor calculated from the slope of this plot was found to be 80. Similar value has been reported for other C_3 plants[5]. Urea treatment decreased the specificity factor to 50.

It has been argued that RuBP carboxylase/oxygenase cannot completely discriminate between CO_2 and O_2, so that photorespiration is unavoidable[6,7]. However, Rubisco enzyme from diverse species showed substantial differences in CO_2/O_2 specificity and that carboxylase/oxygenase ratio increased during the natural evolution of photosynthesis[8]. Furthermore, Mn^{2+} [9], and temperature[1] have been shown to alter the ratio of two activities. The present study indicates that urea also alters the carboxylase/oxygenase ratio.

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INHERITANCE OF PERICARP COLOUR IN RICE, *ORYZA SATIVA* LINN.

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INHERITANCE of pericarp colour in rice has been studied earlier and genetical ratios 3r : 1w[1–6], 12p : 3r : 1w[1], 9p : 6b : 1w[7], 9p : 3b : 4w[8,9] and 15w : 1r[10,11] have been reported. A genic scheme for pericarp colouration has also been proposed[12]. The present study reports the inheritance of purple pericarp.

Inheritance of purple pericarp was studied in Jaya × 7019 and Jaya × 7010 up to F_3 generation. Jaya has white pericarp, 7019 and 7010 and the markers supplied by Dr Nelson E. Jodon of the USDA Louisiana, have purple pericarp.

F_1 showed purple pericarp (dominant) in both crosses and the F_2 population of 274 plants of Jaya × 7019 segregated into 176 purple : 98 white, giving a good fit to the ratio 162 : 94 with $\chi^2 = 0.11$; the F_2 population of Jaya × 7010 segregated into 438 purple : 148 white, giving a good fit to 3 : 1 with $\chi^2 = 0.02$ (table 1). The ratios were confirmed by the breeding behaviour of families in F_3 generation.

Out of 50 F_3 families of Jaya × 7019 studied, 1 bred true for purple, 11 segregated for 3 : 1, 11 for 9 : 7, 2 for 15 : 1, 1 for 27 : 37, 2 for 45 : 19, 2 for 54 : 10, 4 for 162 : 94 and 16 bred true for white pericarp, giving a good fit to the expected ratio with $\chi^2 = 11.48$ for 8 d.f., and out of 89 F_3 families of