Appendix

Structural models in rice

Leaf blade length models

The *j*th leaf blade length on main stem on *i*th d after emergence (in cm), $LL_j(i)$, can be calculated as follows:

$$LL_j(i) = DWLB_j(i) \times RLW_j(i)$$
$$DWLB_j(i) = CPLB_j(i) \times DW_{SP}(i)$$
$$DW_{SP}(i) = X, \quad MDW_{SP}(i) - MDW_{SP}(i) \le X \le MDW_{SP}(i) + MDW_{SP}(i)$$
$$MDW_{SP}(i) = DW_{CP}(i)/DES$$
$$RLW_j(i) = 4026.103 - 2162.051\ LP_{ji} + 504.183\ LP_{ji}^{\ 2} - 41.241\ LP_{ji}^{\ 3}, 1 \le j \le 6$$
$$CPLB_j(i) = e^{(CP1+CP2/LP_{ji})}, 1 \le j \le 6$$

Where $DWLB_j(i)$, $RLW_j(i)$, and $CPLB_j(i)$ are the *j*th leaf blade dry weight (in g), the ratio of the *j*th leaf blade length to blade dry weight (in cm g^{-1}), and the ratio of the *j*th leaf blade dry weight to whole single aboveground plant (in g g^{-1}) on *i*th d after emergence, respectively. $DW_{SP}(i)$ is the dry weight per plant on *i*th d after emergence (in g $plant^{-1}$), $MDW_{SP}(i)$ is the mean dry weight per plant on *i*th d after emergence (in g $plant^{-1}$), $SDW_{SP}(i)$ is the standard error of dry weight per plant on *i*th d after emergence (determined by experiment) (in g $plant^{-1}$), $DW_{CP}(i)$ is the dry weight in canopy per area on *i*th d after emergence (in g m^{-2}), DES represents the plant number per area (in plant m^{-2}) (as one parameter of cultivation practices), and LP_{ji} is the leaf position on main stem on *i*th d after emergence.

Maximum leaf blade width model

The *j*th maximum leaf blade width on *i*th d after emergence (in cm), $LW_j(i)$, could be represented by a growth function as in EQN (8)

$$LW_j(i) = e^{-1.591+0.085\ LL_j(i)}, \ 1 \le j \le 6$$

Where the symbols are the same as above.

Leaf sheath length model

The *j*th leaf sheath length of fully grown leaves on *i*th d after emergence (in cm), $LS_j(i)$, of different cultivars with the leaf blade length on main stem could be represented by a power function.

$$LS_j(i) = 1.846\ LL_{ji}^{0.452},\ 1 \le j \le (6-1)$$

Where the symbols are the same as above.

Leaf blade bowstring length model

The *j*th leaf blade bowstring length on *i*th d after emergence (in cm), $LBBL_j(i)$, is a property of leaf blade bend degree (the maximum $LBBL_j(i) = LL_j(i)$), and it can be expressed as

$$LBBL_j(i) = 0.040 + 0.957\ LL_j(i),\ 1 \le j \le 6$$

Where the symbols are the same as above.

Leaf blade angles models

The blade tangent angle (TA_j) (°), ∠O'OB, and blade bowstring angle (BA_j) (°), ∠O'OA (Fig. 19) are

$$TA_j(i) = DWLB_j(i) \times RTW_j(i)$$
$$BA_j(i) = DWLB_j(i) \times RBW_j(i)$$
$$RTW_j(i) = 72942.326\ LP_{ji}^{-3.225},\ 1 \le j \le (6-1)$$
$$RBW_j(i) = 76830.636\ LP_{ji}^{-2.906},\ 1 \le j \le (6-1)$$

Where $RTW_j(i)$ and $RBW_j(i)$ are the ratio of the blade tangent angle, and the blade bowstring angle to the *j*th leaf blade dry weight on main stem on *i*th day after emergence (° g^{-1}), respectively, and the other symbols are the same as above.

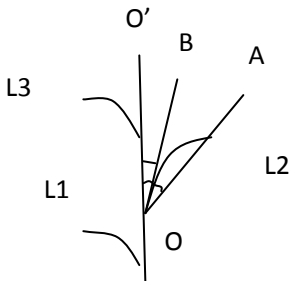

Fig. Chart of leaf blade angles.