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Dear Dr Joshi

As per your suggestion, I am herewith  
sending a copy of the article in which the  
authors have ~~also~~ tried various functions  
for studying the growth <sup>during</sup> of a particular  
part of a crop. As I request you earlier  
we are interested in the calculation part.

I shall be highly obliged if  
you could at your convenience, do me the  
needed <sup>(clean sheet)</sup> ~~work~~ <sup>help</sup>.

Thanking you

With kin regards

To  
Dr Joshi  
CES, IISc.

Yours sincerely  
Srinivasarajana

Rice mutants and their mother cultivars differed in yield potential (see table). IR6, IR8, Bas 370, Jajai 77, Sada Gulab, Sonahri Sugdasi, Pokkali, Lateefy, and DR82 yielded more straw and grain than their mutants. N and P were higher in the parents than in the mutants; K content was variable.

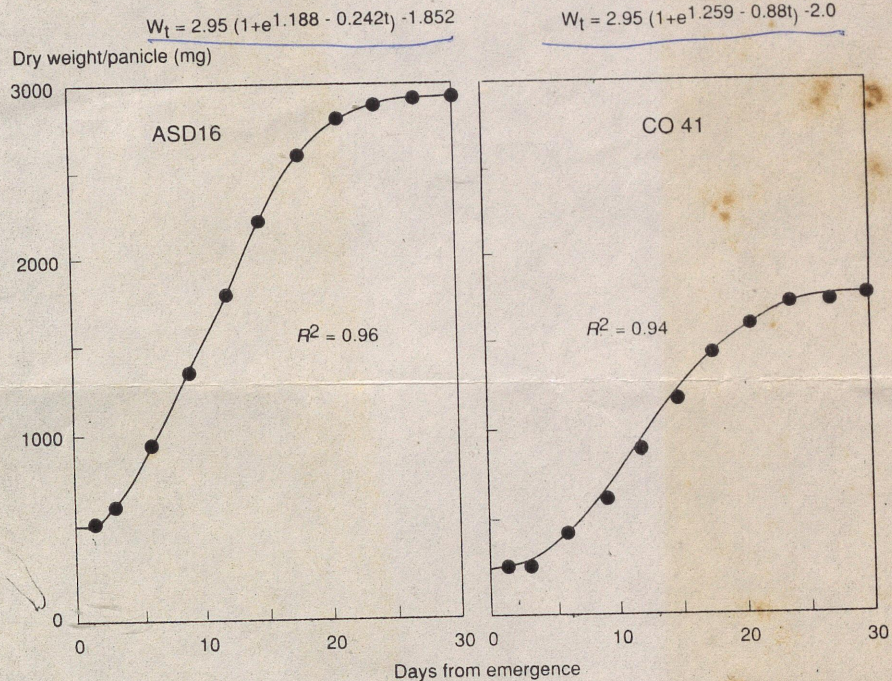
The higher N and P content in parent genotypes contributed to increased yield. ■

## Developing a functional model of rice panicle growth

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We grew short-duration rice cultivars ASD16 and CO 41 under field conditions using a randomized complete block design with 12 replications during 1988 wet season. The pattern of panicle growth on 60 panicles/plot that emerged on the same day was studied from emergence to maturity. Five panicles per plot were removed 12 times to 30 d after emergence and dry weight recorded.

Panicle development followed a sigmoidal pattern (see figure). Two distinct lag phases, one at the beginning and one at the end of panicle growth, were evident. These two lag phases were separated by rapid linear growth between 3 and 21 d after emergence. We tried



Panicle growth in rice cultivars, Coimbatore, India, 1988 wet season.

several growth equations: Richard's function, logistic function, nonlinear function, and negative exponential function.

Type of function	Functional form	R <sup>2</sup> value	
		ASD16	CO 41
Richard's function	$W_t = (1 + e^{b-kt})^{-1/a}$	0.960	0.945
Logistic function	$W_t = (1 + e^{b-kt})^{-1}$	0.863	0.810
Nonlinear function	$W_t = (a+bt)^{-1}$	0.780	0.693
Negative exponential function	$W_t = ae^{-bt}$	0.632	0.542

Richard's function gave the best fit to describe panicle growth in short-duration

rice cultivars. The Richard's equations of panicle growth follow:

$$\begin{aligned} \text{ASD16 } W_t &= 2.95 (1 + e^{1.188 - 0.242t})^{-1.852} \quad (R^2 = 0.960) \\ \text{CO 41 } W_t &= 1.79 (1 + e^{1.259 - 0.228t})^{-2.0} \quad (R^2 = 0.945) \end{aligned}$$

ASD16 had a mean relative growth rate ( $\bar{R}$ ) of 157 mg/panicle per day, compared with 151 mg in CO 41.

Mean relative growth rate was calculated as

$$\bar{R} = \frac{K}{(n+1)}$$

(Suggested by D R Causton and J C Venus [1981])

The biochemistry of plant growth. Edward Arnold, London. p. 92.) ■

## Herbage potential of rice cultivars

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Rice herbage can be an important animal feedstuff: it has high nutritive value, it is readily available in most ruminant production areas, and rice grain yield is not sacrificed by herbage removal. We studied the herbage potential of 20 deepwater and 4 lowland rice cultivars under irrigation at IRRI in the 1989 wet season.

The experimental field was plowed twice. Fertilizer was incorporated basally at 60-40-40 kg NPK/ha 1 d before transplanting. Twenty-day-old seedlings were transplanted at 20 × 20-cm spacing with two seedlings/hill. Herbage was cut at the collar level of the last fully developed leaf 40 d after transplanting (DT) and from different plots at 60 DT. Treatments were repeated three times.

Differences in growth and herbage yield were observed at 40 and 60 DT (Table 1). There was a positive relationship between herbage yield at 40 and 60 DT ( $R = 0.595^{**}$ ). Deepwater cultivars Khao Mali, Pan Tawng, Khao Lod

Chong, and Khao Praguad gave high herbage yields, similar to lowland cultivars; Khao Puang Nak, Pin Gaew 56, Ban Daeng, Plai Ngahm, and Sai Bua gave poor herbage yields.

Herbage yields from one cutting were more than 1 t/ha at 40 DT and about 2 t/ha at 60 DT, suggesting the potential production of rice herbage as animal feed.

Simple linear correlation analysis showed highly significant positive relationships between herbage yield and growth parameters (Table 2). The relationship of herbage yield with sheath and culm weight was high at 40 DT, but

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