Phyllochron of lowland rice does not depend on temperature alone

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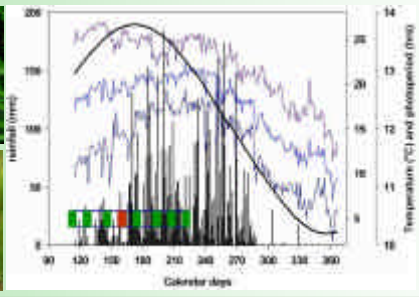
BACKGROUND

In Nepals high altitude rice-wheat rotation systems, rice cultivation follows established recommended planting dates. Changing the planting date to accommodate a transition period crop will change the duration of the rice crop. Crop duration is a function of the speed of crop establishment after sowing (source build-up), the genotypic thermal time needed to accumulate during the vegetative period and the photoperiod sensitivity of that genotype. Crop establishment depends on the time interval between the emergence of one leaf and the next (phyllochron). The length of the phyllochron is assumed to be depending on temperature. Source build-up depends on the phyllochron and on the longevity of the individual leaves (senescence rate). This study focused on the relationship between temperature depending phyllochron and source-sink depending leaf duration.

CONCLUSIONS

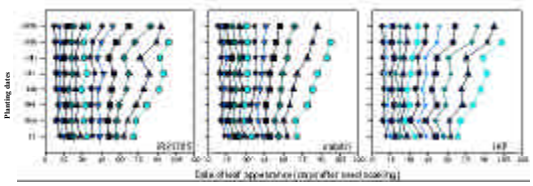
- Phyllochron of leaves 1-4 depended on the thermal environment.
- Phyllochron of later leaves was independed of temperature.
- Initiation of leaves > 6 depended on overall tiller senescence.
- Senescence rate of leaves > 7 decreased with increasing planting dates.
- Further studies are needed on total crop duration and yield responses for cultivar selection for modified planting dates

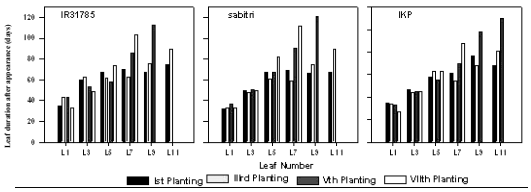
RICE GARDEN



- 32 genotypes were planted in a rice garden in Lumle, Nepal
- Eight planting dates staggered at 15-day intervals
- Appearance and development of individual leaves were observed
- Temperature was recorded in the field with a TinyTag
- Leaf development was calculated from total leaf duration

Phyllochron and leaf duration

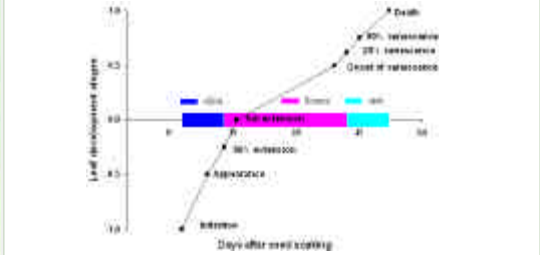


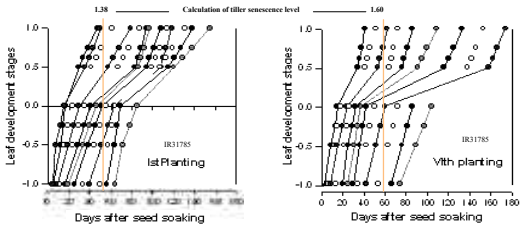


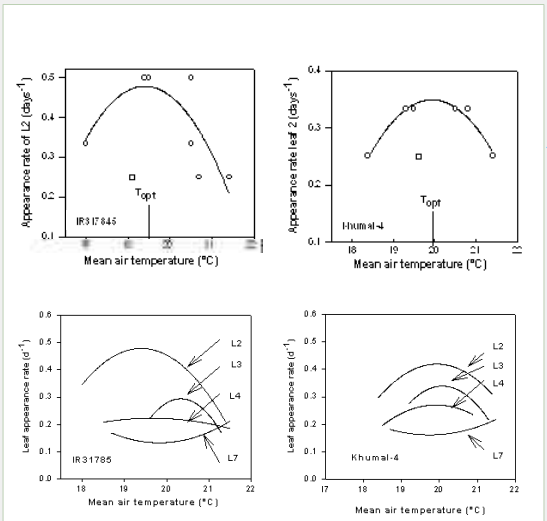
Phyllochron and leaf longevity increased with planting dates. Responses varied with Genotype.

Senesecence rate of leaves > 5 decreased particularly at later planting dates by increasing the source period.

Leaf development and senescence

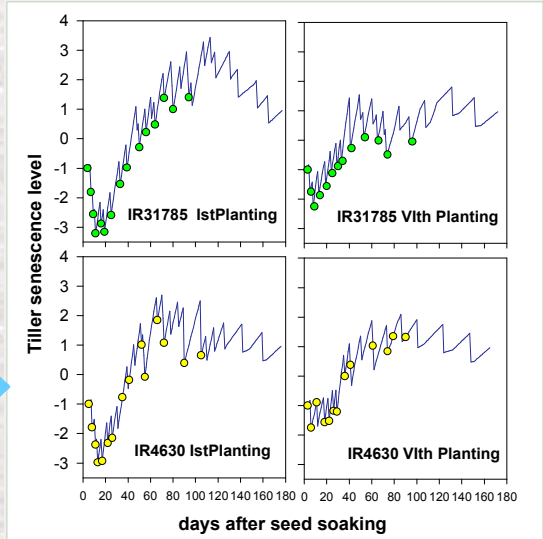






Temperature dependency of the phyllochron decreased with each succesive leaf position in most genotypes

Tiller senescence levels were balanced after leaf 7. Thereafter leaf appearance was possibly a function of source-sink relationships within the tiller independent of temperature.



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