



# Effect of high temperature stress during booting on dry matter partitioning and yield formation in rice

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## Introduction

Extreme climate events are becoming more common as a result of global warming, causing a great risk on rice production. Rice at booting stage is relatively sensitive to high temperature, yield decline or even no yield can be detected if high temperature occurs at this stage. Present researches are mostly focus on the impact of high temperature on yield during grain filling stage, few researches concerned the effects of high temperature on yield formation during booting stage. Even less researches focus on the quantification of yield loss caused by heat stress during this stage.

To estimate the effect of heat stress on the yield formation of rice during booting stage, the pot experiments were carried out in phytotrons with different temperature levels and durations. The mechanism of yield formation under heat stress were analyzed and the declines in yield were precisely quantified.

## Materials & Methods

## Results

### ➤ Environment-controlled phytotron experiments

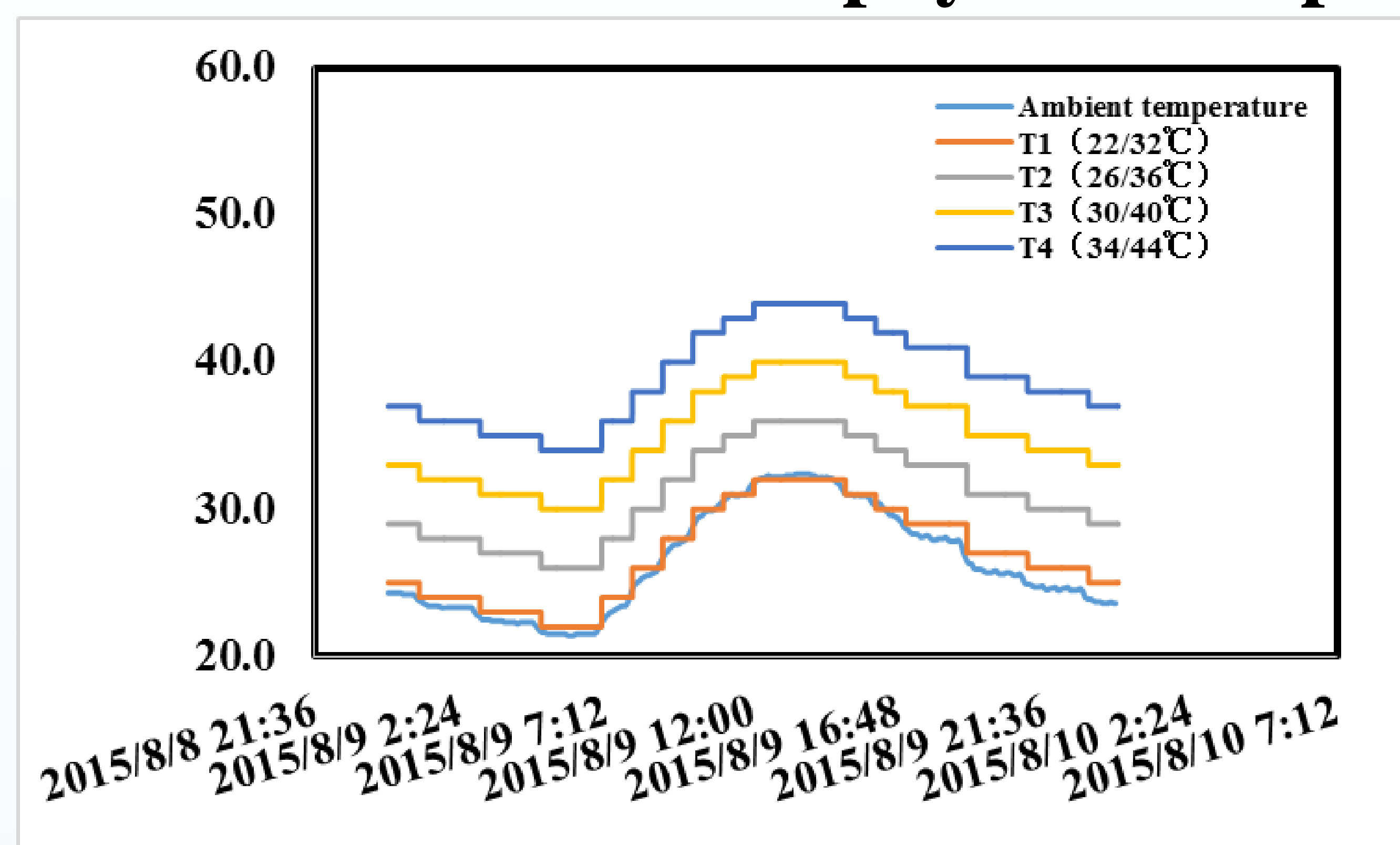


Fig 1. Temperature dynamics in the phytotron rooms during treatment and ambient temperature during heat stress treatments in 2015.

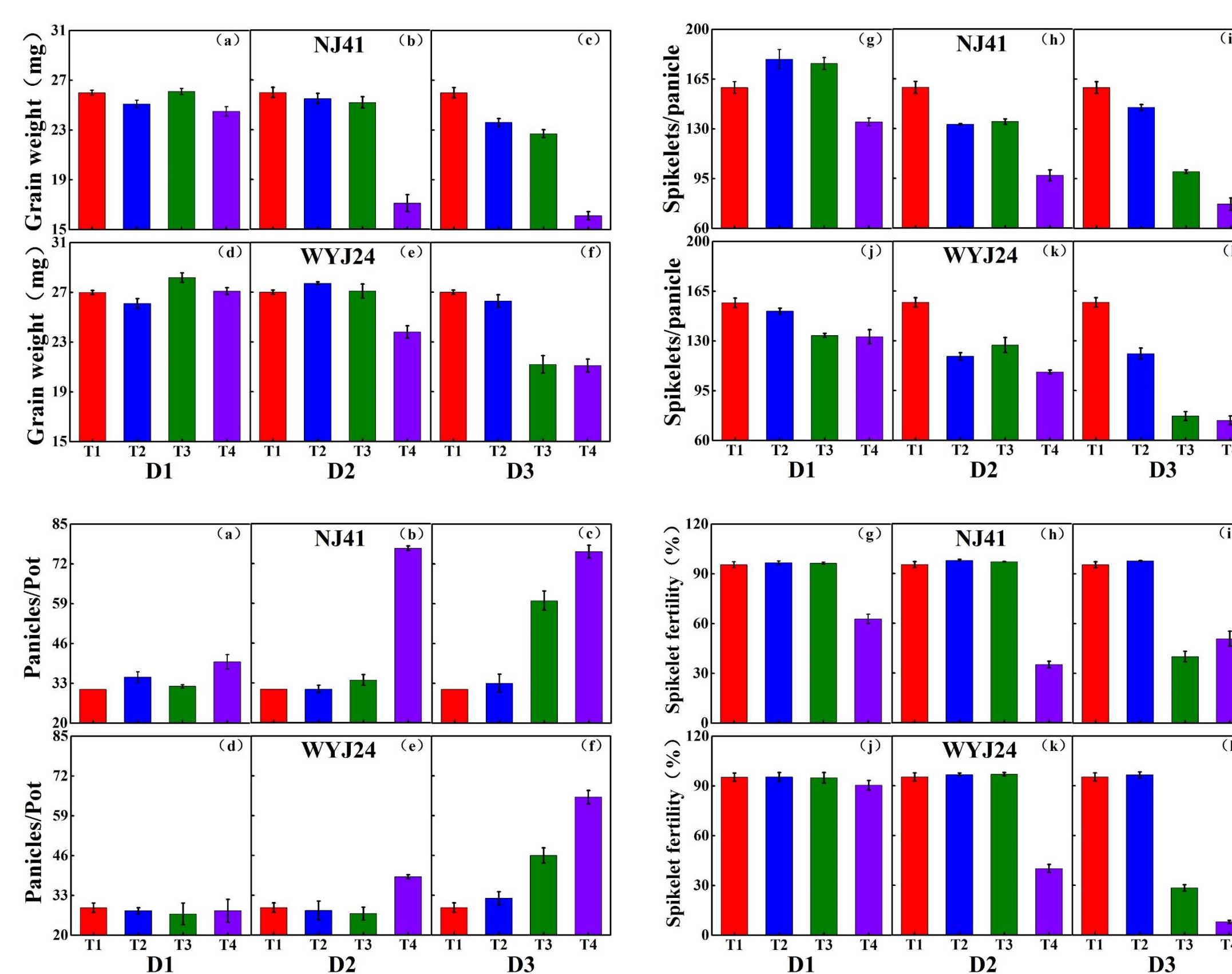


Fig 2. Effects of heat stress on yield components.



Fig 3. Conditions in the phytotrons.

- ✓ Cultivars: Nanjing41 (NJ41)  
Wuyunjing24 (WYJ24)
- ✓ Temperature levels: 22/32°C (T1), 26/36°C (T2),  
30/40°C (T3), 34/44°C (T4)
- ✓ Heat stress durations: 2 days (D1), 4 days  
(D2), 6 days (D3)
- ✓ Heat stress stages: booting

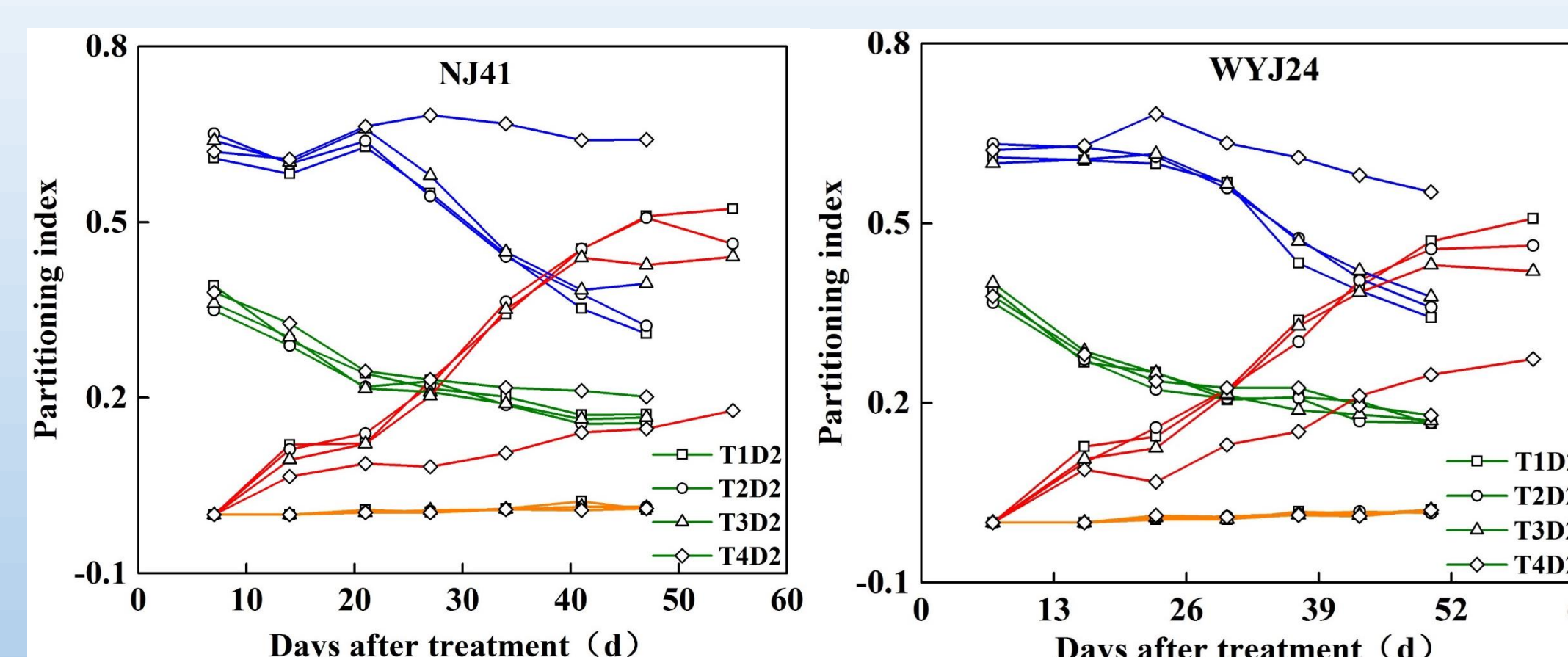


Fig 4. Effects of heat stress on dry matter partitioning index of different organs



Fig 5. ear of rice after treatment

## Conclusions

High temperatures reduced dry matter partitioning index of panicles and inhibiting the translocation of carbon and nitrogen from vegetative organs to panicles. In addition, the high temperature reduced seed setting and grain number, but increased the number of panicles. The effect of heat stress varied among different yield components, but the heat stress reduced rice yield mainly by reducing seed setting rate.