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(*Panicum antidotale*)

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*Panicum antidotale*

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Mean residence time of nitrogen

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Pulse  
Relative Growth Rate (RGR)  
Phonology

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*(Panicum*

*antidotale)*

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cm )

( cm

( )

SPSS

S-PLUS

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asymmetric

old *Panicum*

young *Panicum*

Target neighbour design

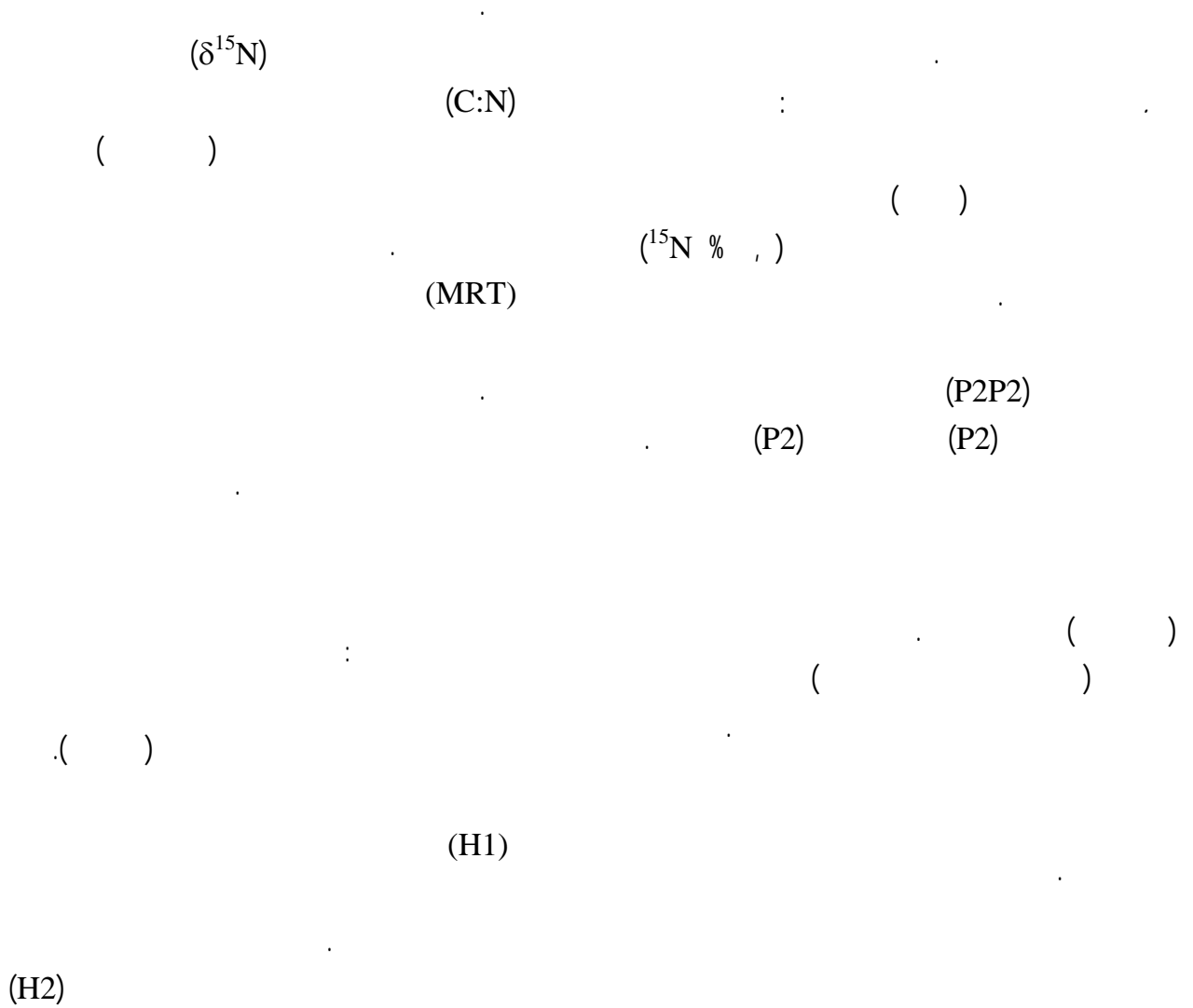
ScanJet 5300C, Hewlett-Packard Co

Jasc Software, Paint Shop Pro7

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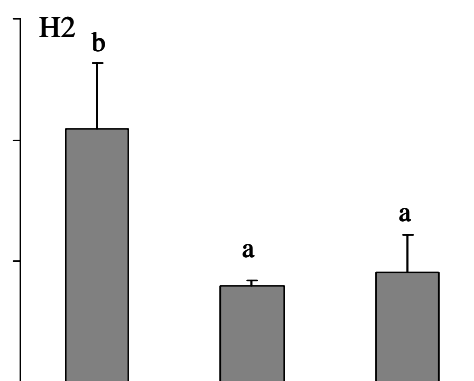
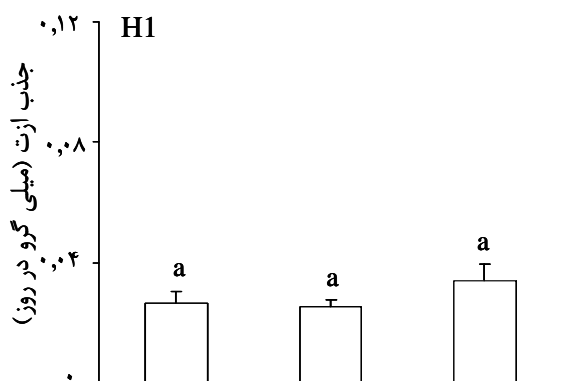
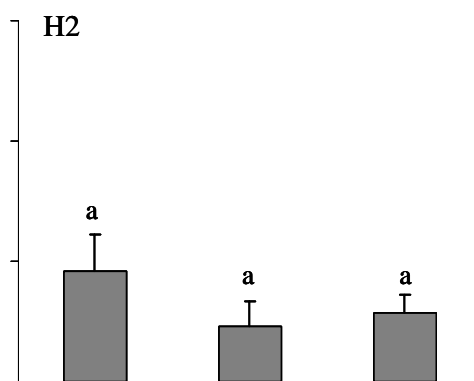
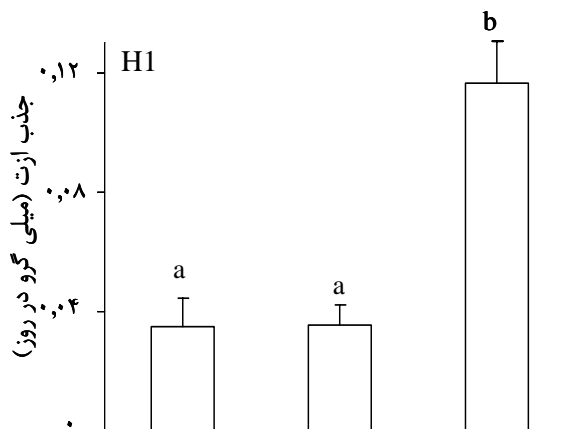
Long-Ashton

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ارزن جوان

ارزن مسن



Con NP NWP  
تیمارهای دسترسی به منابع

Con NP NWP  
تیمارهای دسترسی به منابع

:CON

(H2) (H1) ( )

:NWP

:NP

( )

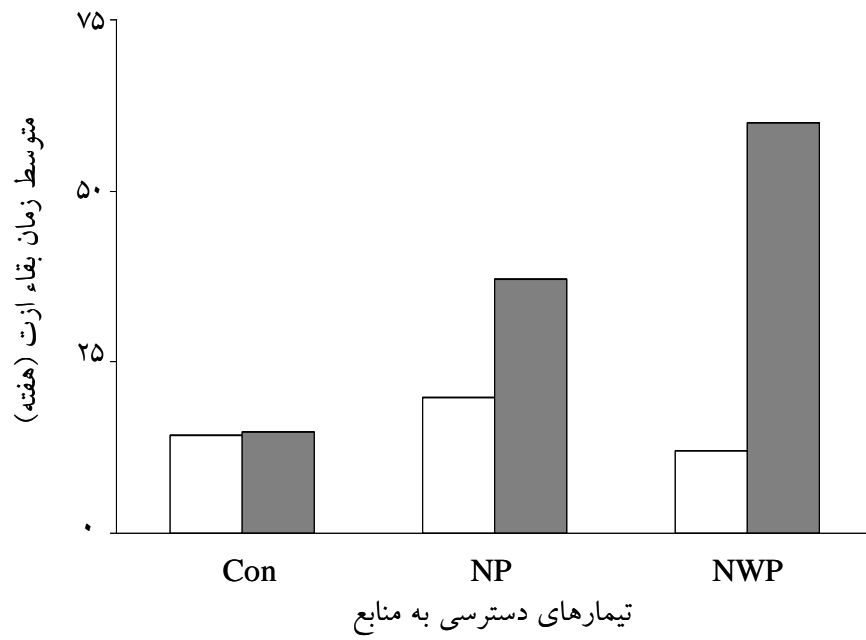
MRT

(MRT)

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MRT

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:( ) ( )

$F = , )$  (RLD) (P = , ) (RTD)

( , < ) (SRL) (P < , )

(F = P < , )

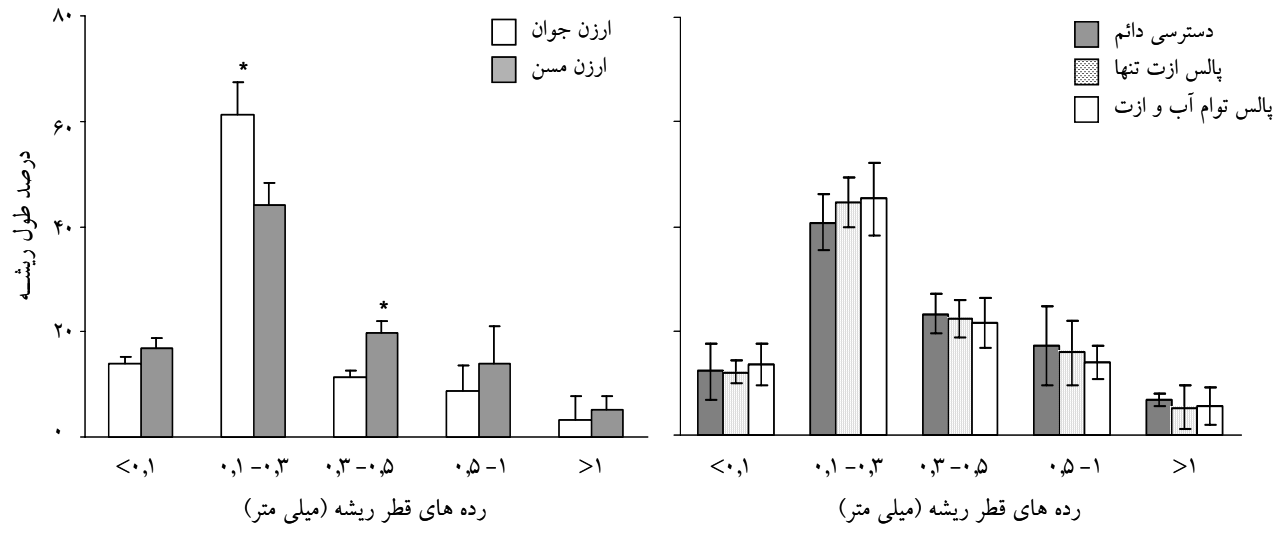
( )

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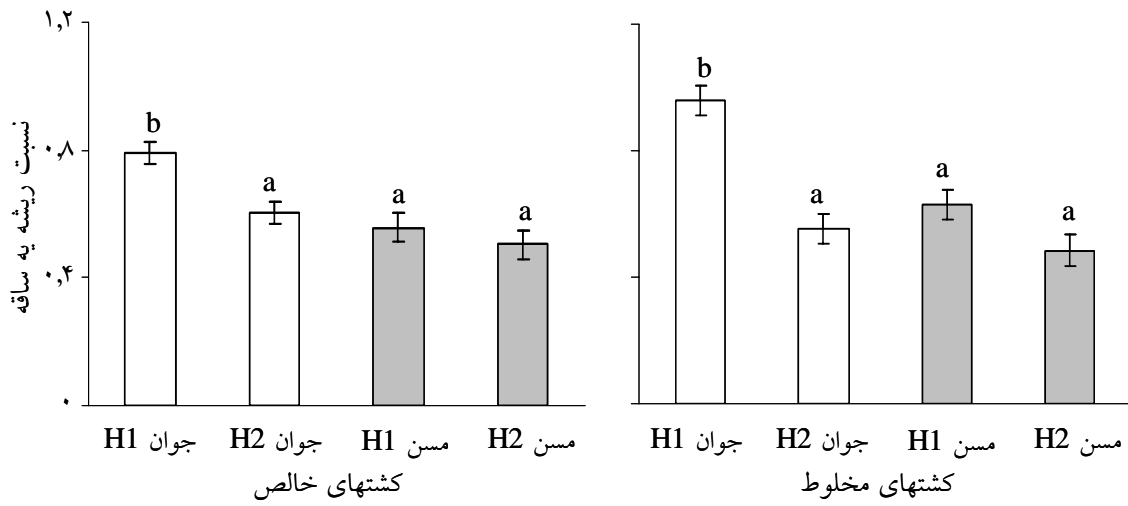
Root length density  
 Root tissue density  
 Specific root length

RTD	SRL	RLD	(mm)	(cm <sup>3</sup> )	(cm <sup>2</sup> )	(m)	
b	a	b	a	b	b	b	
a	b	a	a	b	a	a	

) SRL ( / ) RLD  
( / ) RTD ( / )



( )



(H2) (H1)

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( ) ( )

$$\text{Log}(W^{-1}) = \mu + \alpha D$$

$\mu$  ( ) W ( )

$\alpha$

( ) D ( )

( $\alpha$ )

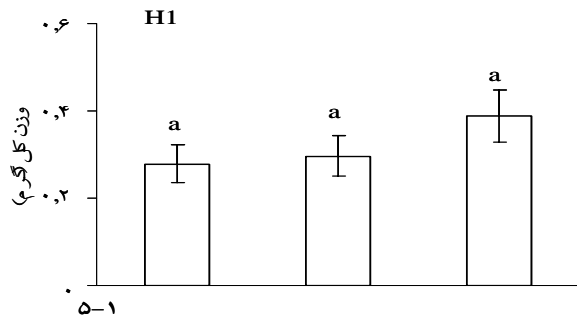
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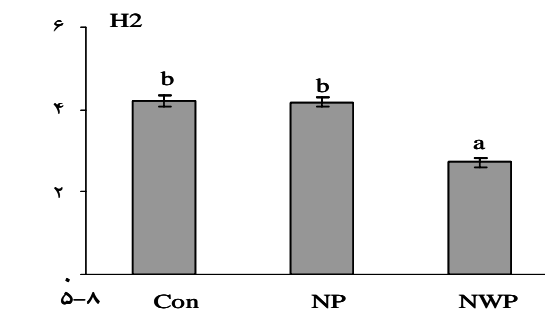
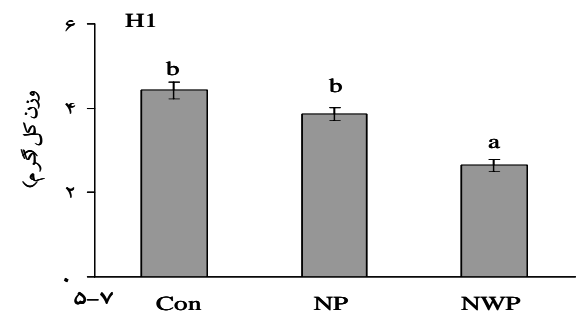
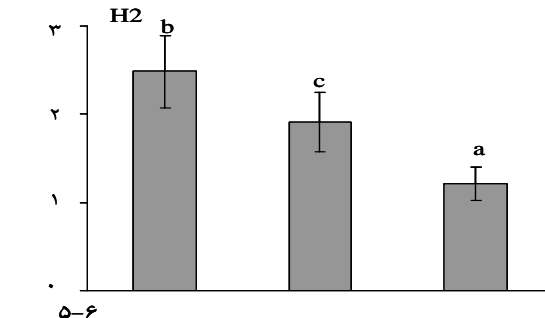
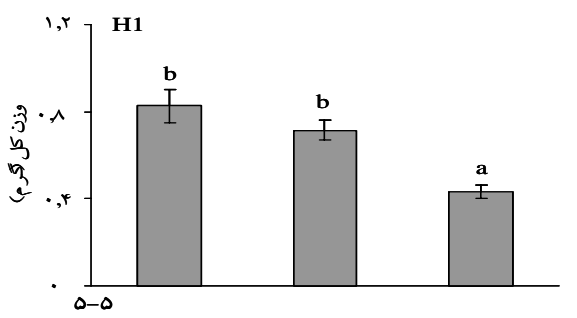
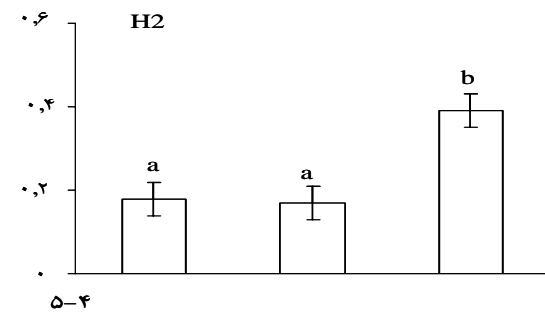
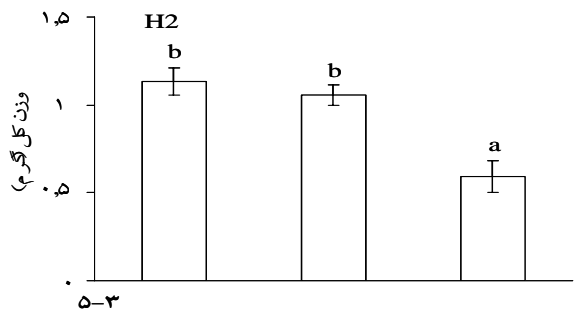
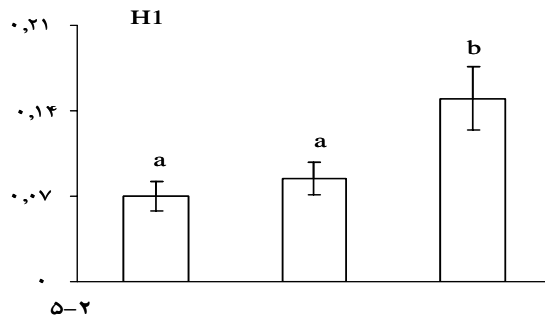
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کشت خالص



کشت مخلوط



(H2 H1)  
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NWP

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NP Con

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(SRL)

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SRL )  
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SRL ( ) ( )

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MRT (NUE)  
(MRT)

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(MRT)

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MRT

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MRT

(NWP)

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MRT

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Nitrogen use efficiency (NUE)

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## Adaptation of *Panicum antidotale* into Pulse and Inter-pulse Conditions of Arid Areas

M. Jangjou Borzolabad<sup>1</sup>

### Abstract:

In arid environments, episodically pulsed resources are important components of annual water and nutrient supply for plants. However, plant capabilities for using pulsed resources may vary based on the phenological stages. This experiment was aimed at testing whether higher adaptation of young seedling, for using pulsed resources, leads to a higher establishment under competitive effects from older individuals. The second aim was to see if there is a coexistence or trade-off in plant strategies during pulses and in inter-pulse periods. A glasshouse experiment was conducted in a target-neighbour design of a size-asymmetric competition. Stable isotopes of nitrogen were used for measuring plant resource uptake from pulses, and tolerance to the inter-pulse conditions. A greater root/shoot ratio and finer root system enhanced capability of young seedling of *Panicum antidotale* (blue panicgrass) for using resources as pulsed rather than continuously supplied. Higher resource uptake during pulse periods improved establishment of young *Panicum* in mixed cultures with older individuals. Nevertheless, a trade-off was observed in plant strategies, higher capability of young seedlings for using pulsed resources was corresponded with a lower mean residence time of nitrogen, which indicates lower tolerance to resource deficit during inter-pulse periods. Therefore it is supposed that under field conditions, higher utilization of pulsed resources leads to the improved seedlings establishment by *Panicum*, only when inter-pulse periods are short enough that plants do not lose the absorbed resources.

**Keywords:** Size asymmetric competition, Isotopes of nitrogen, Root morphology, Two phase resource dynamics theory, Seedling establishment

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