生长素在氮素和黑暗共同介导的矮牵牛不定根形成过程中的动态响应与调控

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美好生活从美化生活开始



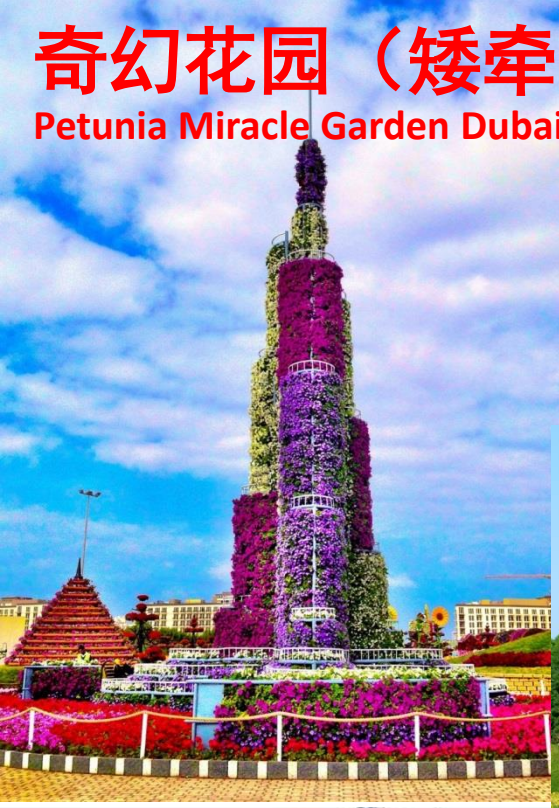






奇幻花园（矮牵牛）

Petunia Miracle Garden Dubai



The beautiful world starts from a cutting

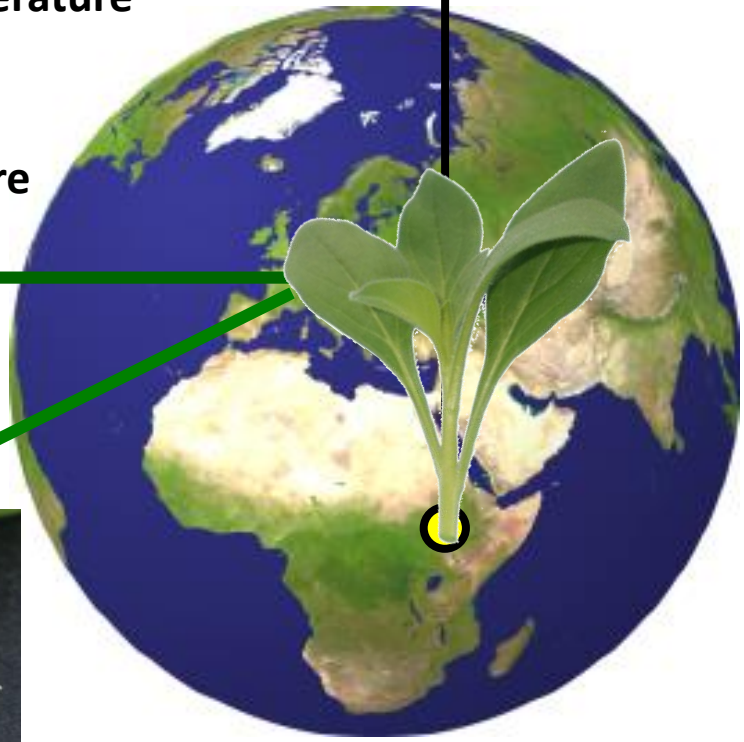
从生产问题到理论研究：黑暗与不定根发育

1. **Cutting production:** low latitude sites

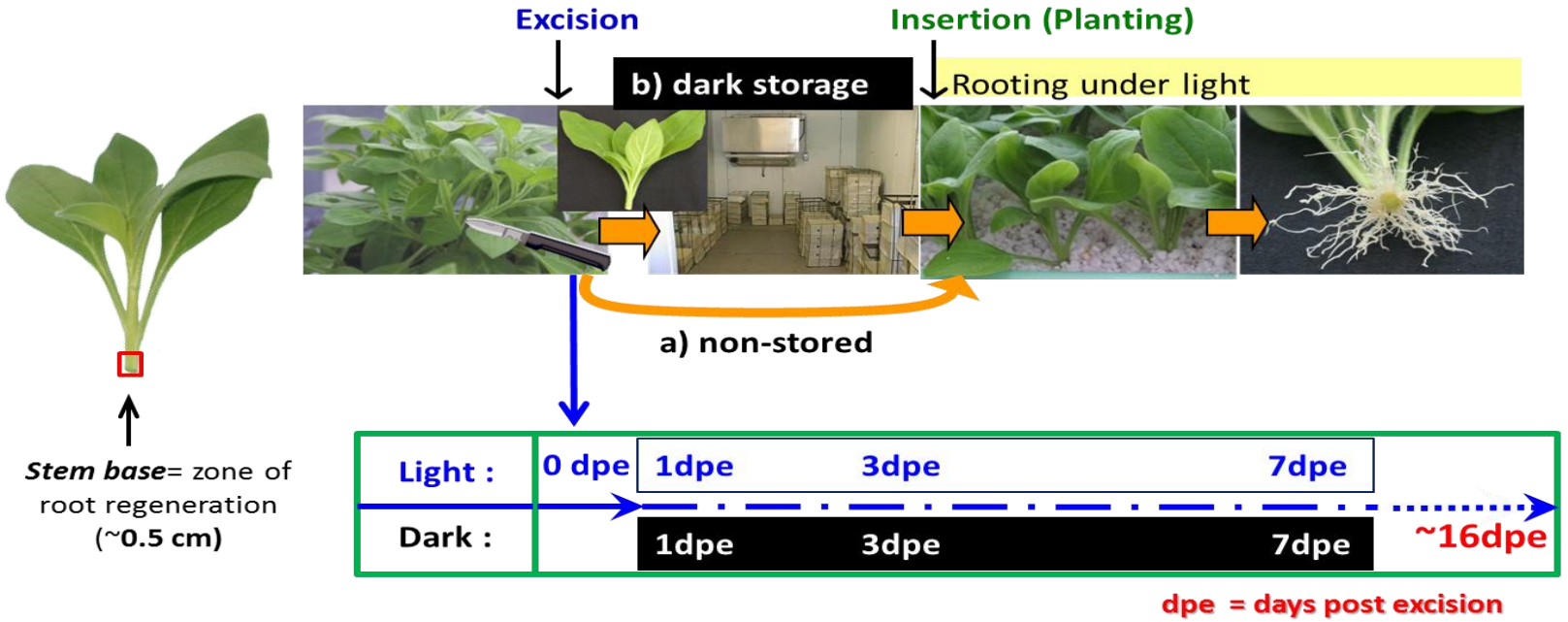
2. **Storage:** cold room,
   darkness, low temperature

3. **Transport: darkness**,
   variable temperature

4. **Rooting** in Central Europe:
   under (low) light



矮牵牛快繁实验流程



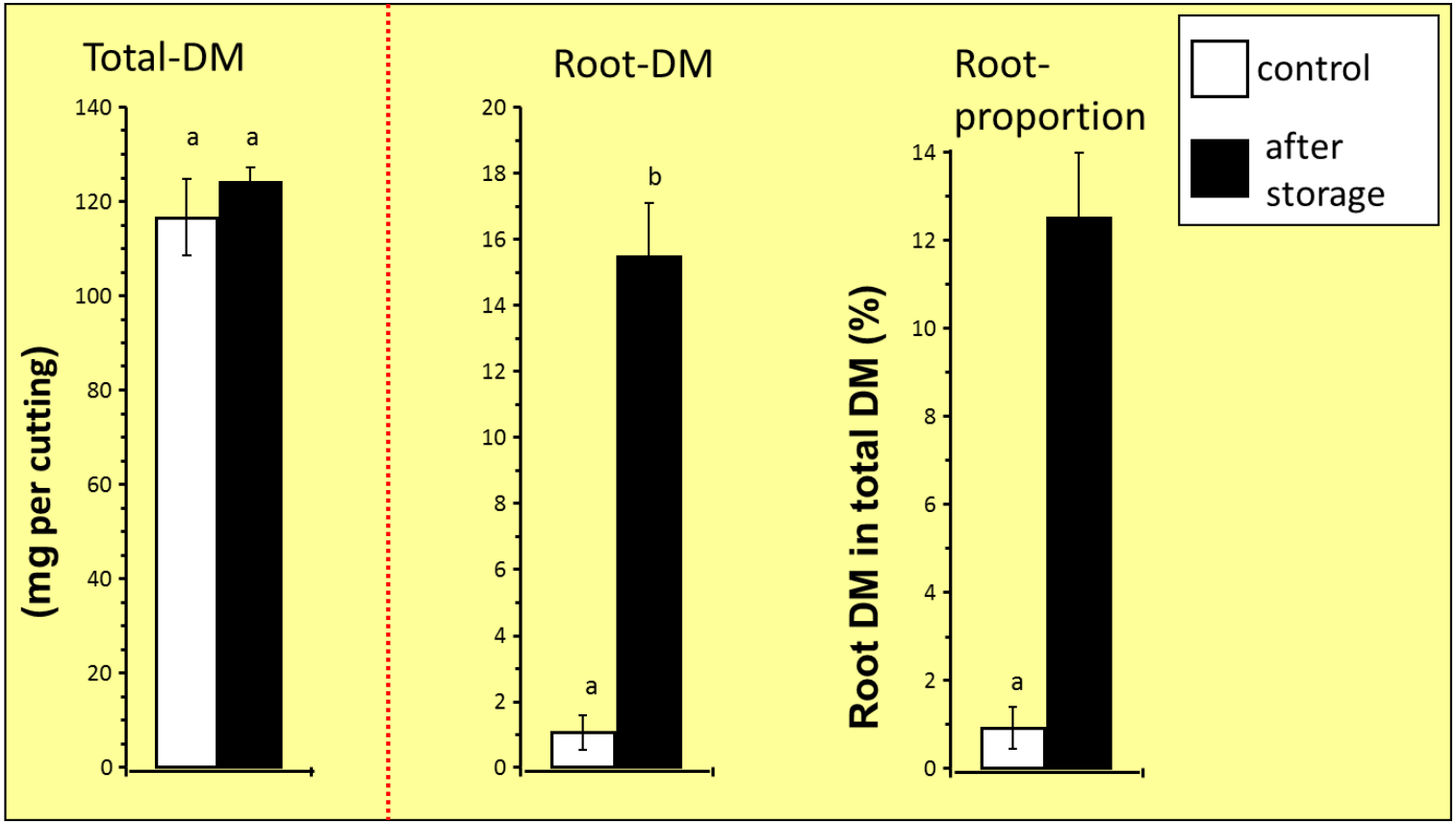
P. *hybrida* cv. Mitchell

Control: the petunia cuttings were immediately planted under light condition (10/24h, 100 μmol $m^{-2}s^{-1}$, 22/20 °C) after excision from mother plants.

Dark exposure: the cuttings were stored in dark storage room for 7 days (10 °C), and thereafter planted into the same growth condition as control.

Dark exposure: accelerated ARF

Enhanced dry matter partitioning towards roots after cold dark storage



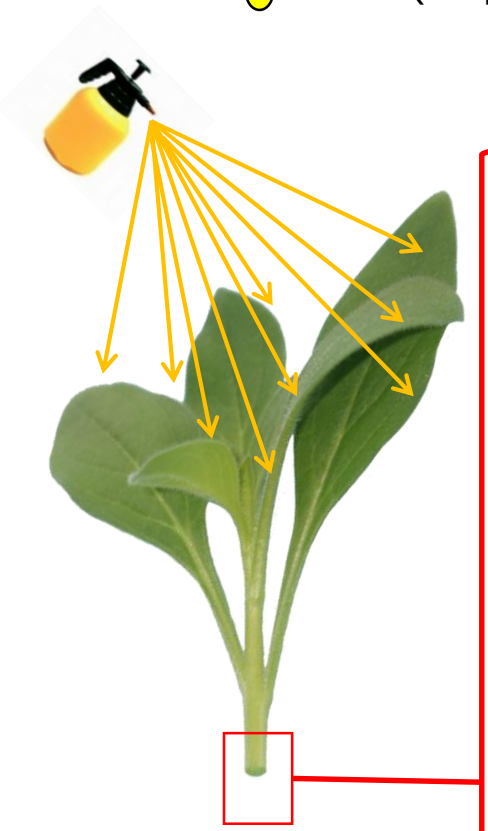
during rooting under light: (0- 9 days after sticking),
n = 4, each with 20 cuttings

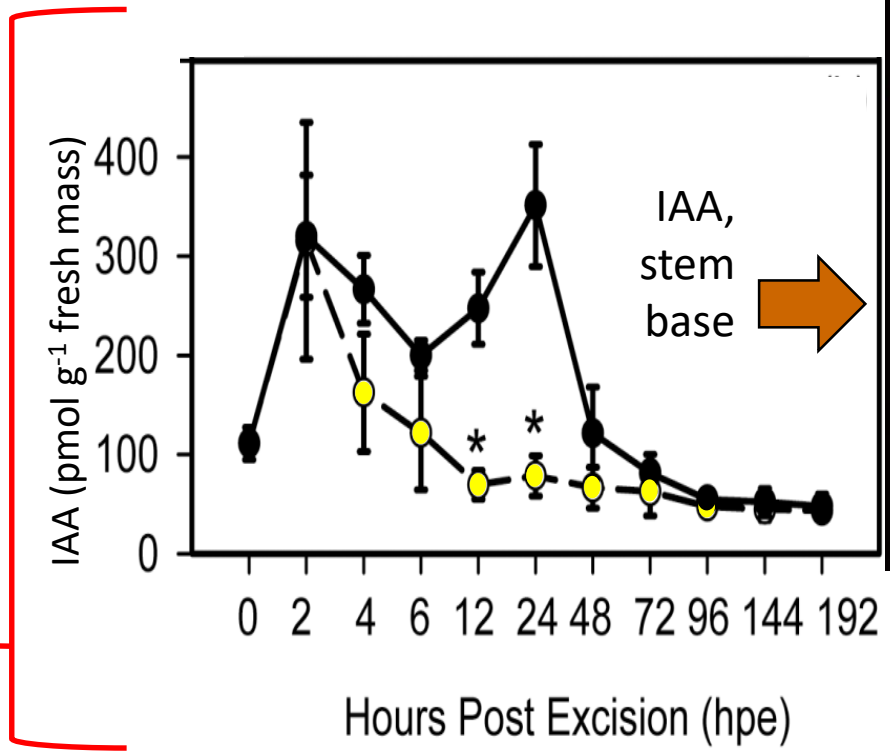
Drüge, Rooting 2014

Auxin homeostasis and AR formation

Control (H_2O)

NPA (50 µM)





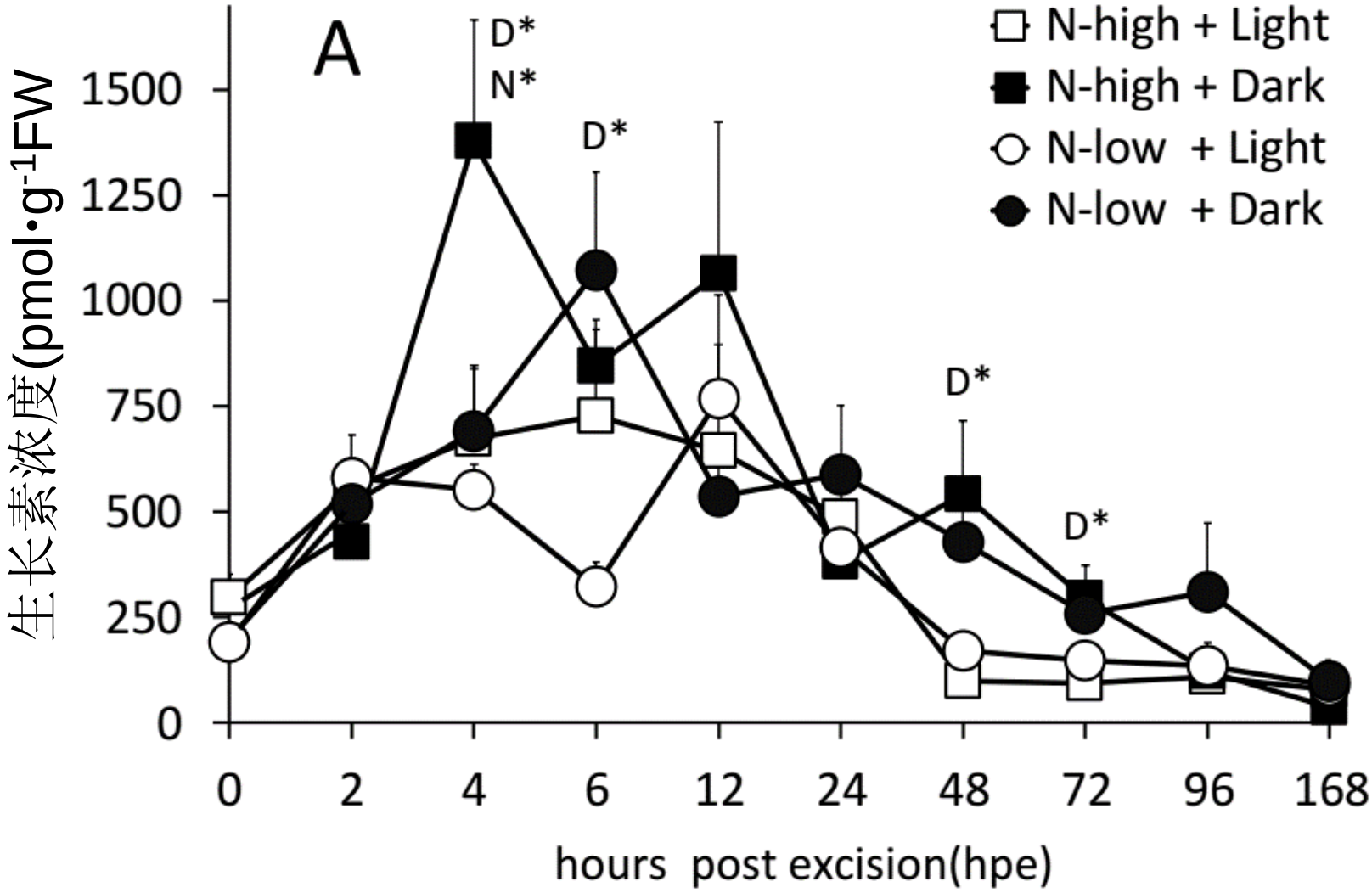
IAA, stem base

Control (H_2O)

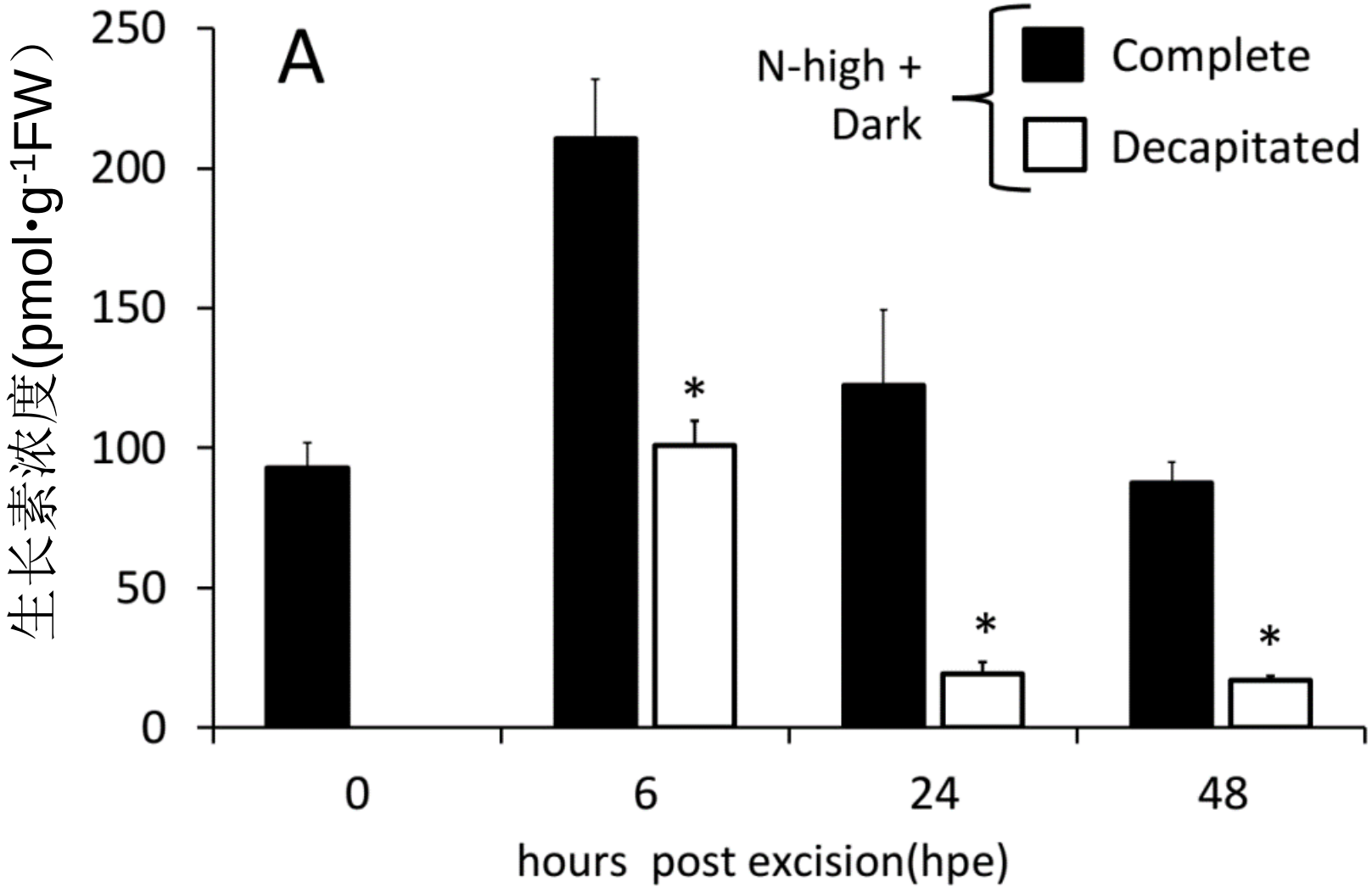
NPA (50 µM)

Standard rooting conditions under light

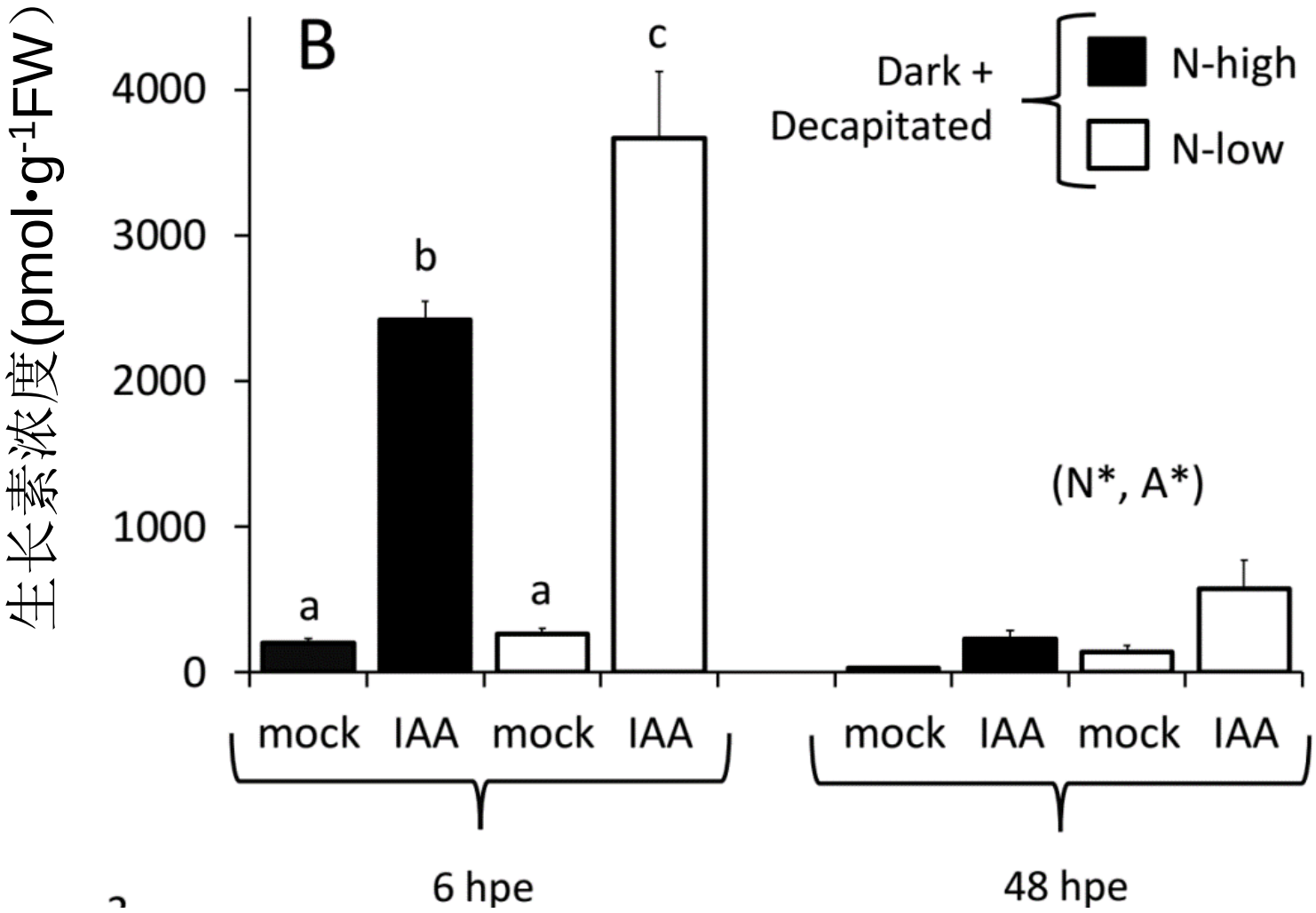
黑暗处理和高氮供应促进茎基部生长素的累积



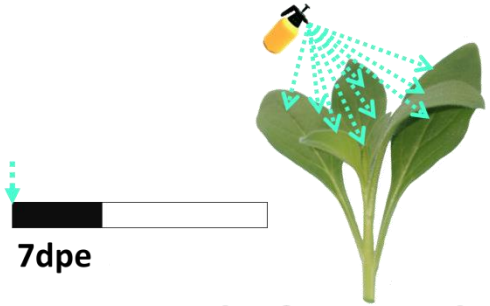
茎尖是茎基部生长素的主要来源



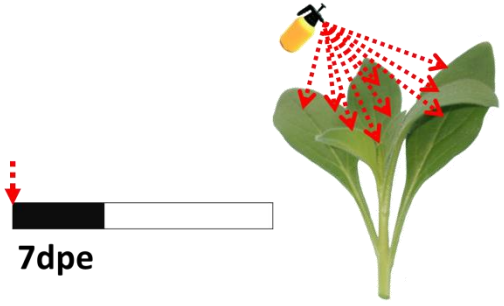
外源供给生长素的能在茎基部的累积



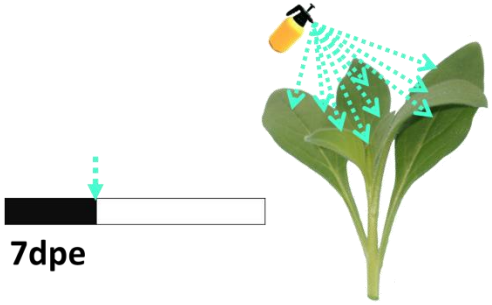
Interaction of the dark x PAT



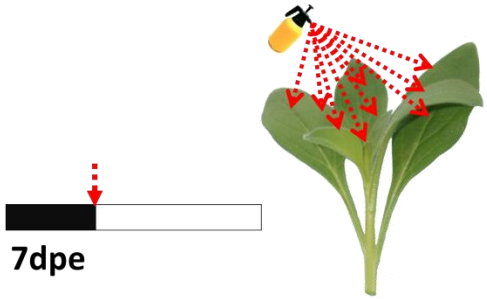
Water before Dark



NPA before Dark

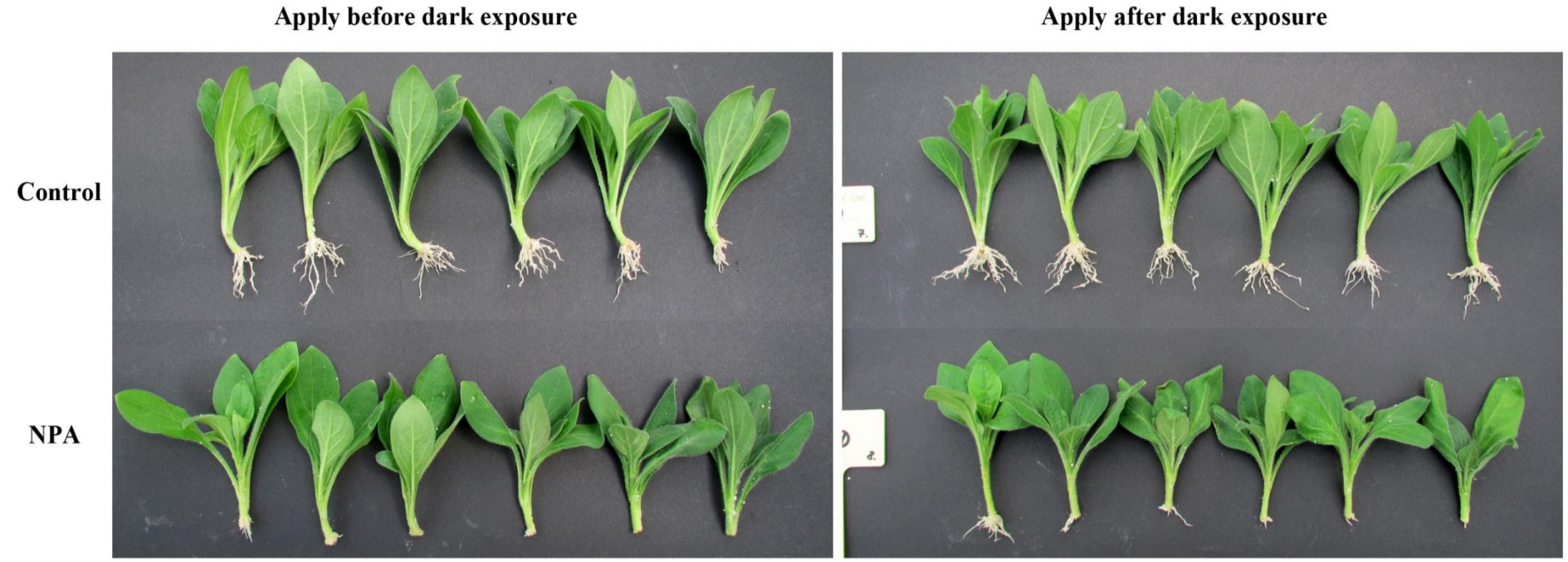


Water post Dark



NPA post Dark

When does the auxin involve in ARF?



Interaction of the dark x PAT

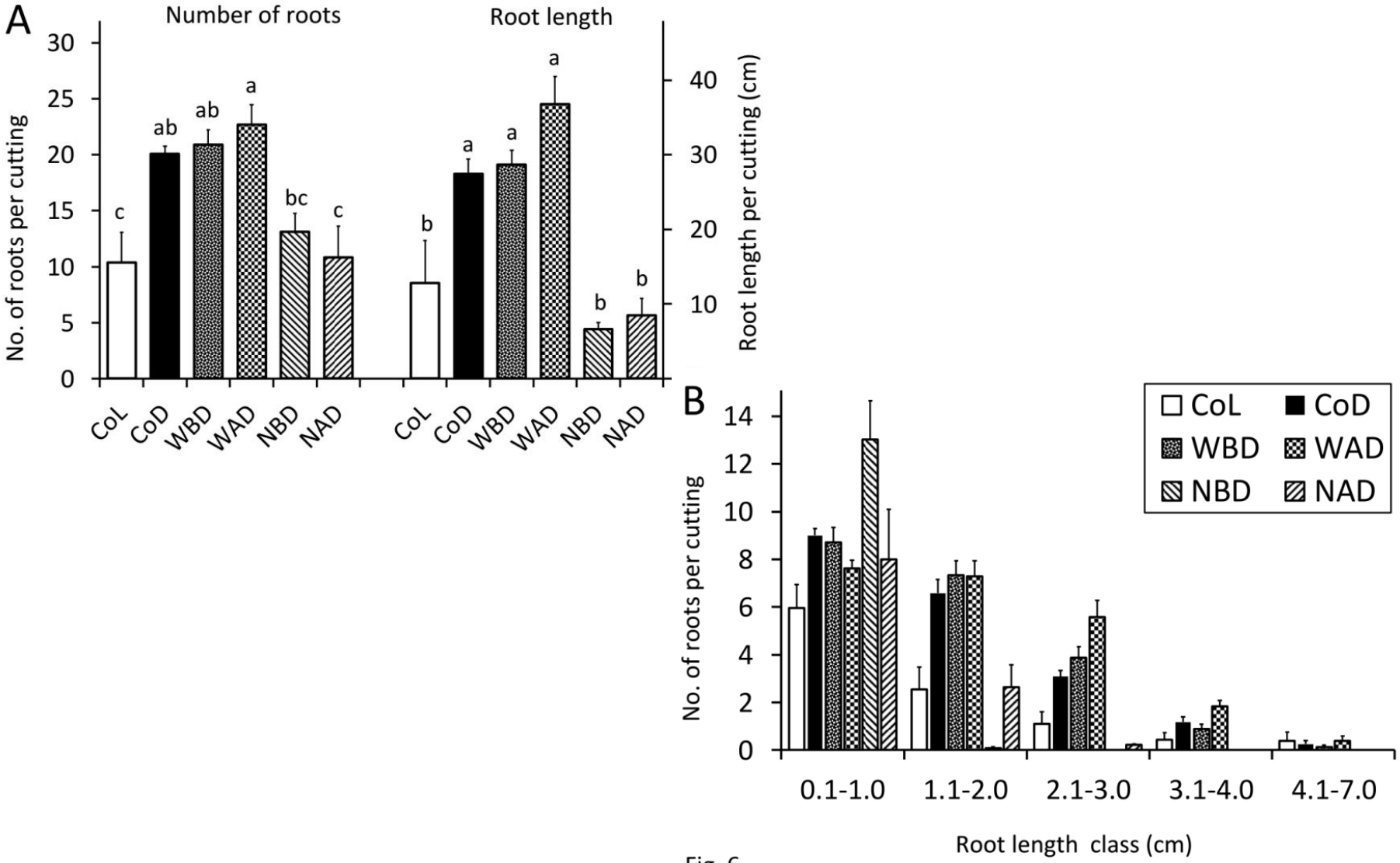
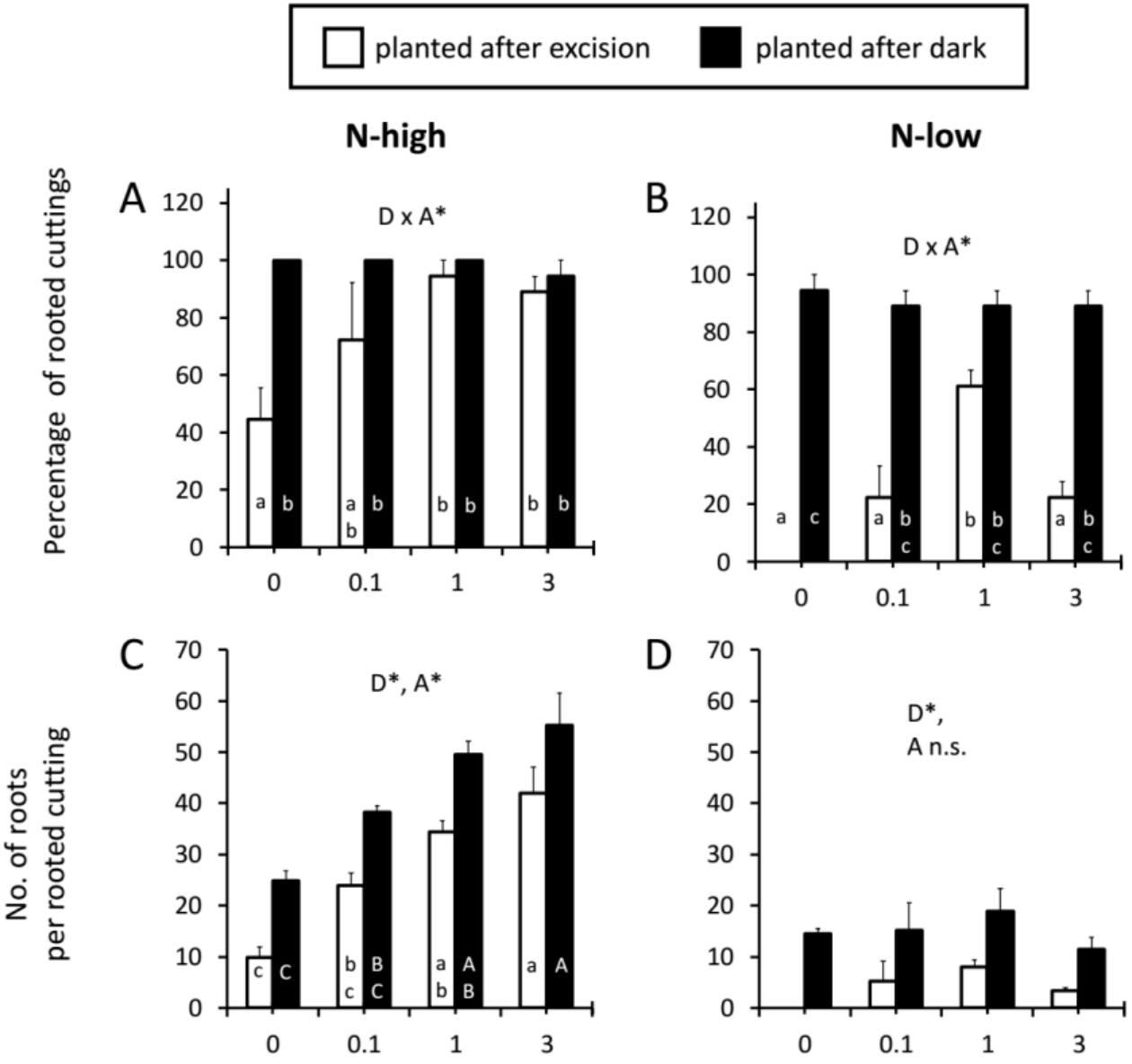


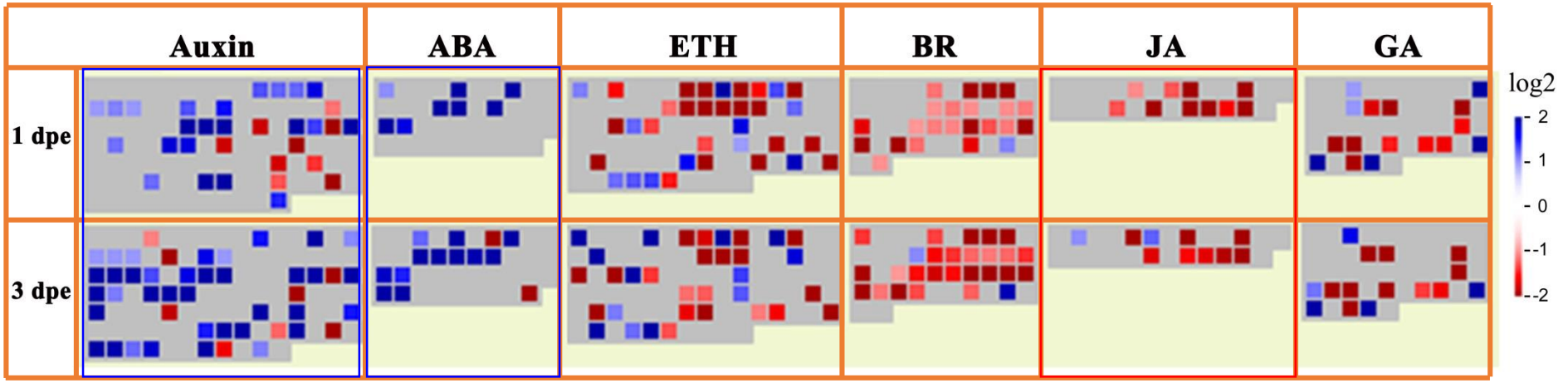
Fig. 6

Interaction of the nitrogen, dark and PAT



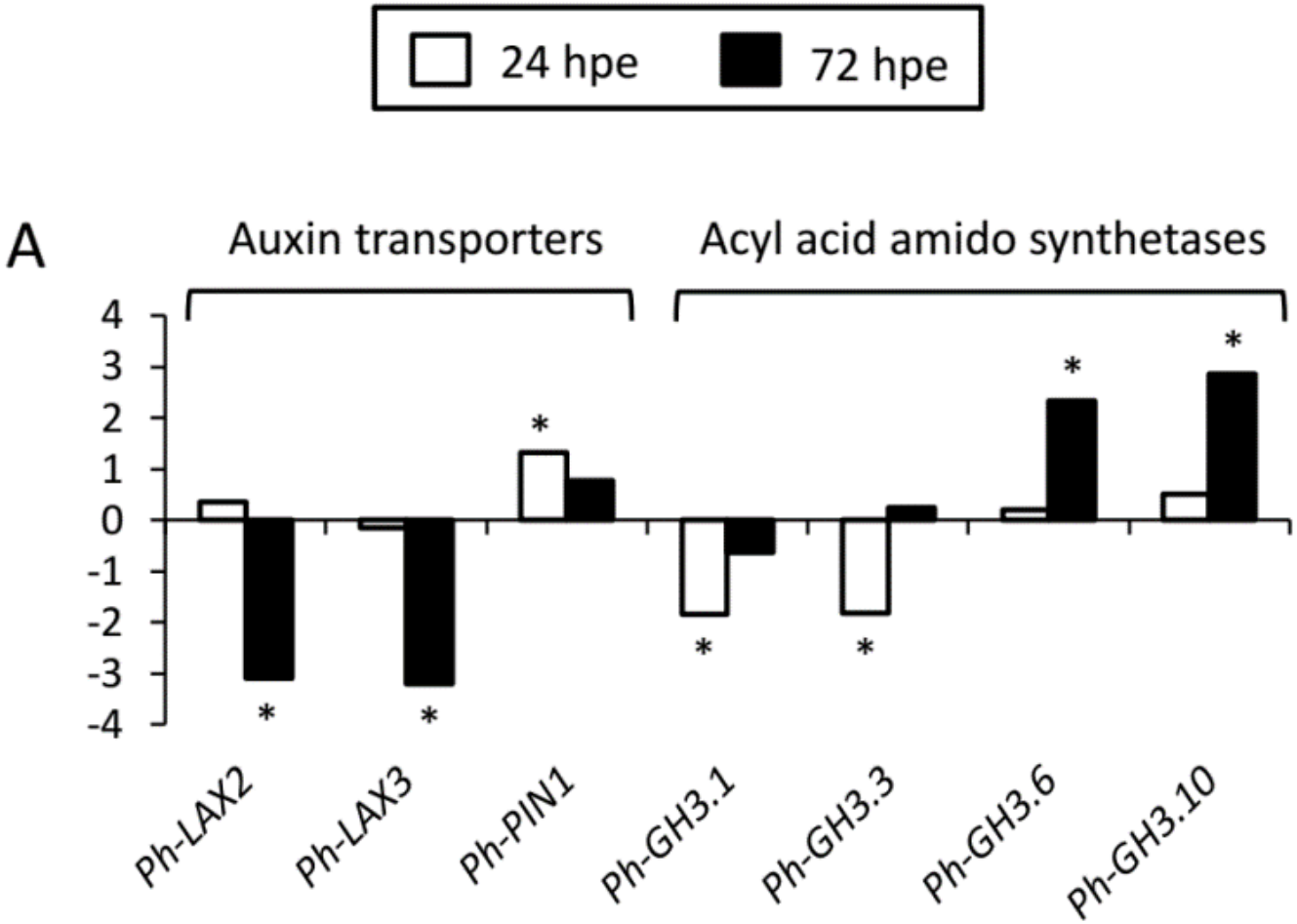
转录组学:植物激素对黑暗处理的响应

Dark exposure vs Light

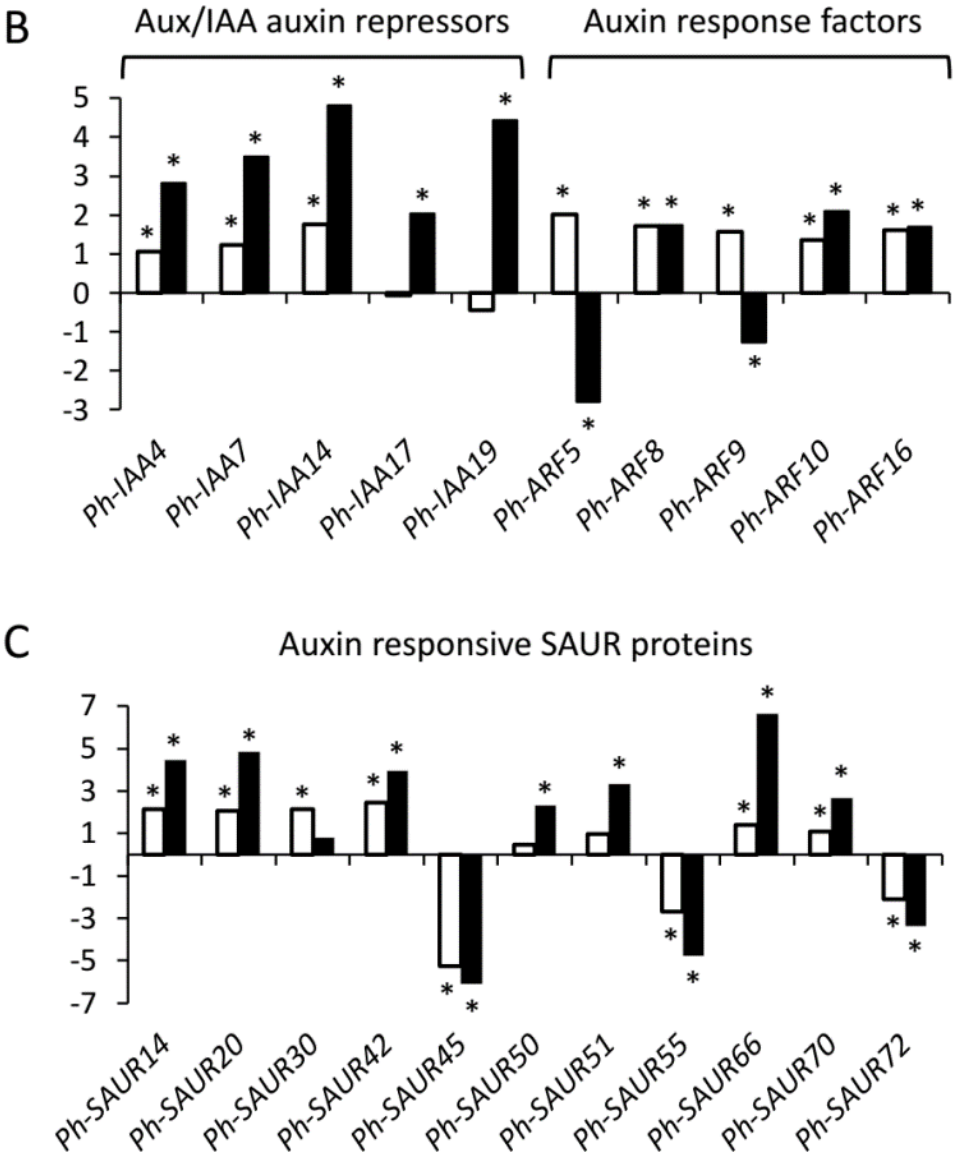


ABA: abscisic acid
ETH: ethylene
BR: brassinosteroid
JA : jasmonic acid
GA: gibberellic acid

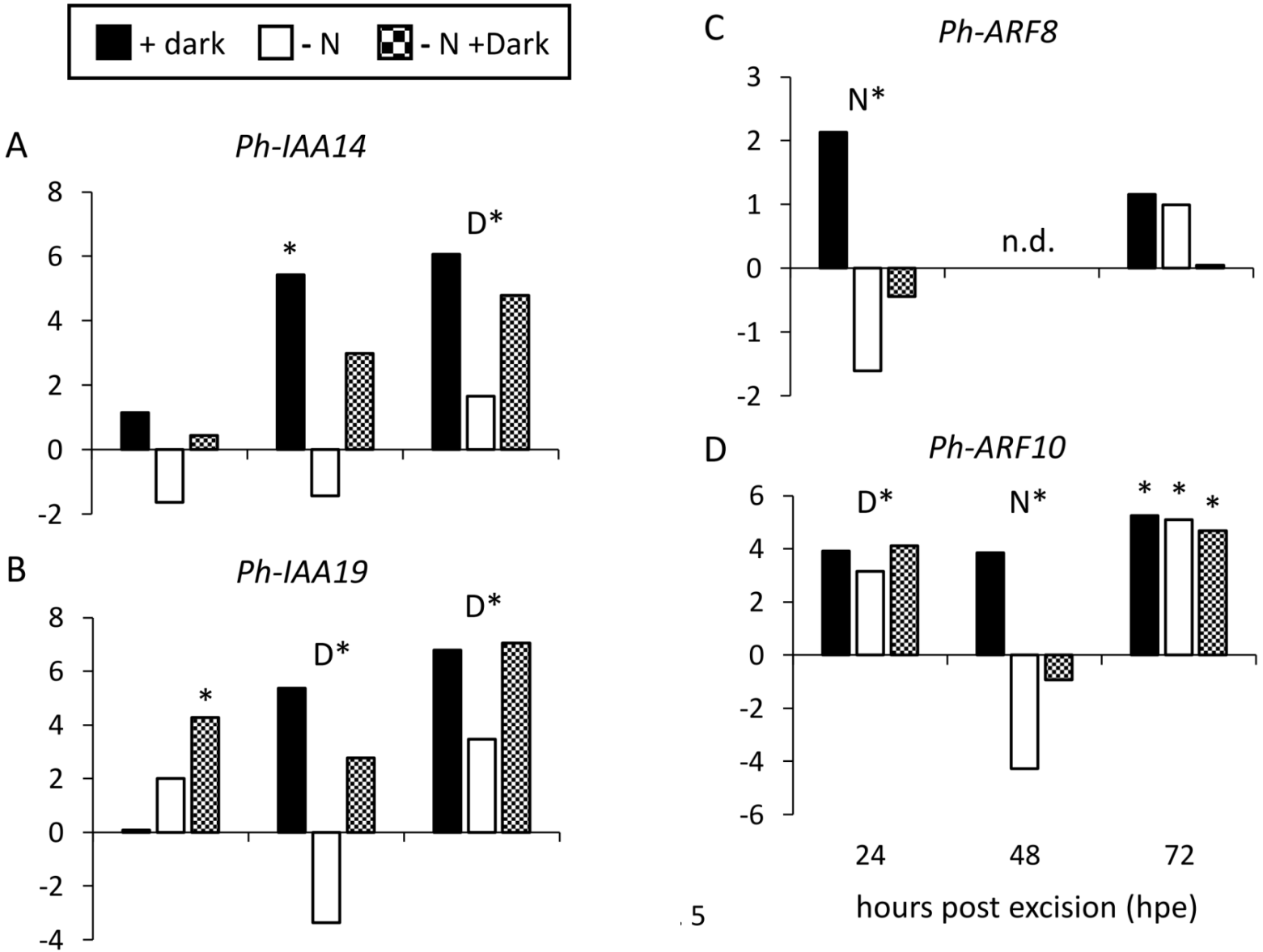
Dark-induced expression of Auxin transporters, Aux/IAA proteins and ARFs in stem base



Dark-induced expression of Auxin transporters, Aux/IAA proteins and ARFs in stem base



Dark recovered low nitrogen suppressed expression of Auxin response gene



小结

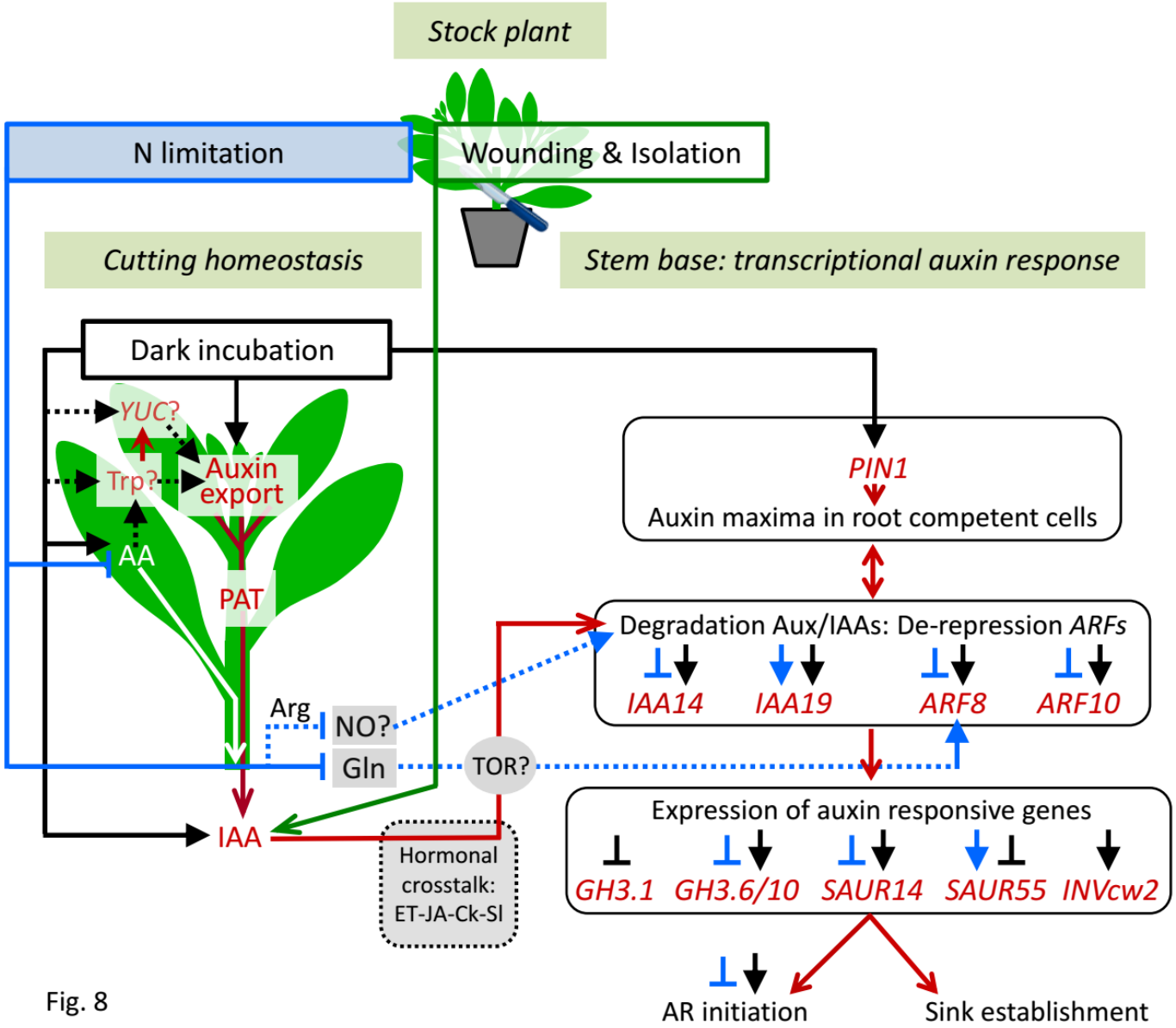

Stock plant
N limitation
Wounding & Isolation
Cutting homeostasis
Stem base: transcriptional auxin response
Dark incubation
YUC?
Trp?
Auxin export
AA
PAT
Arg
NO?
Gln
TOR?
IAA
Hormonal crosstalk: ET-JA-Ck-Sl
PIN1
Auxin maxima in root competent cells
Degradation Aux/IAAs: De-repression ARFs
IAA14
IAA19
ARF8
ARF10
Expression of auxin responsive genes
GH3.1
GH3.6/10
SAUR14
SAUR55
INVcw2
AR initiation
Sink establishment

Fig. 8

西南大学植物营养与调控团队


Attention
Suggestions
Thanks
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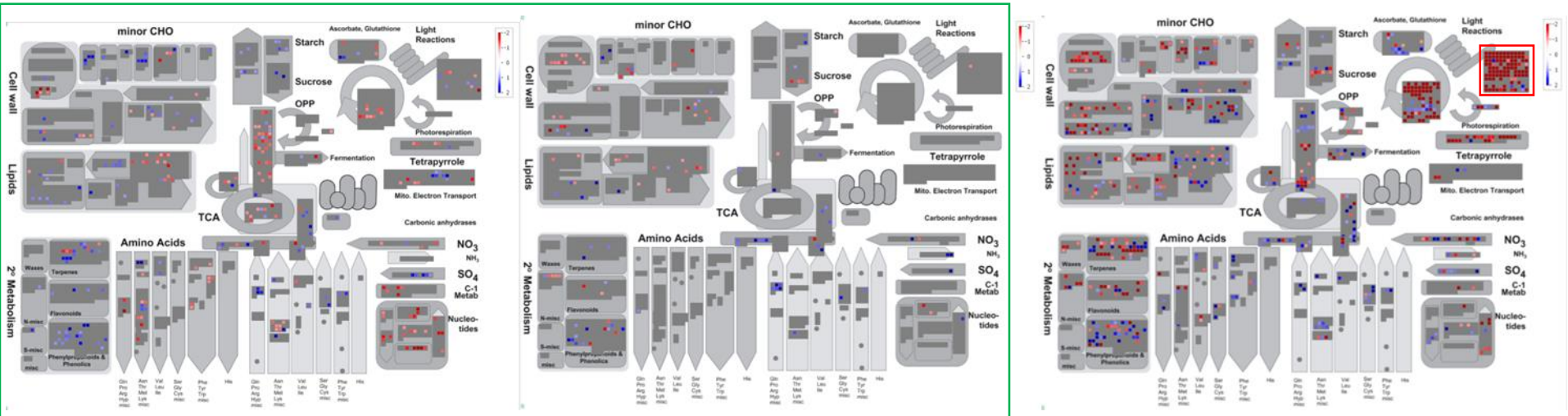
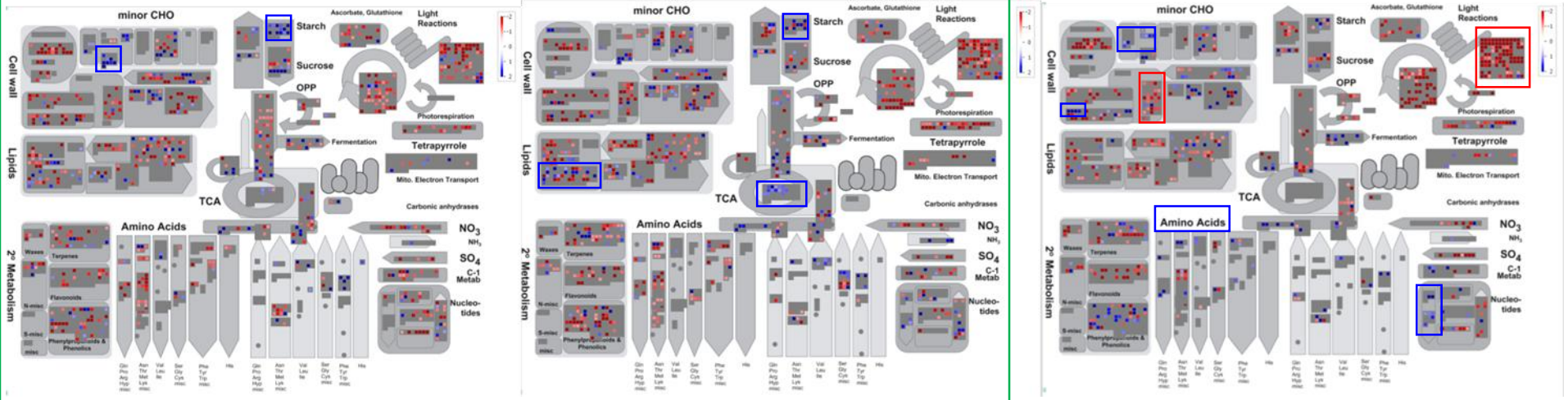
Comments
Advices

Metabolism overview

Light 1dpe **Apex** **Leaf** **Stem base**



Dark 1dpe **Apex** **Leaf** **Stem base**



Blue: up Red: down *P*<0.05 and expression signal at least >50

Interaction of the nitrogen, dark and PAT

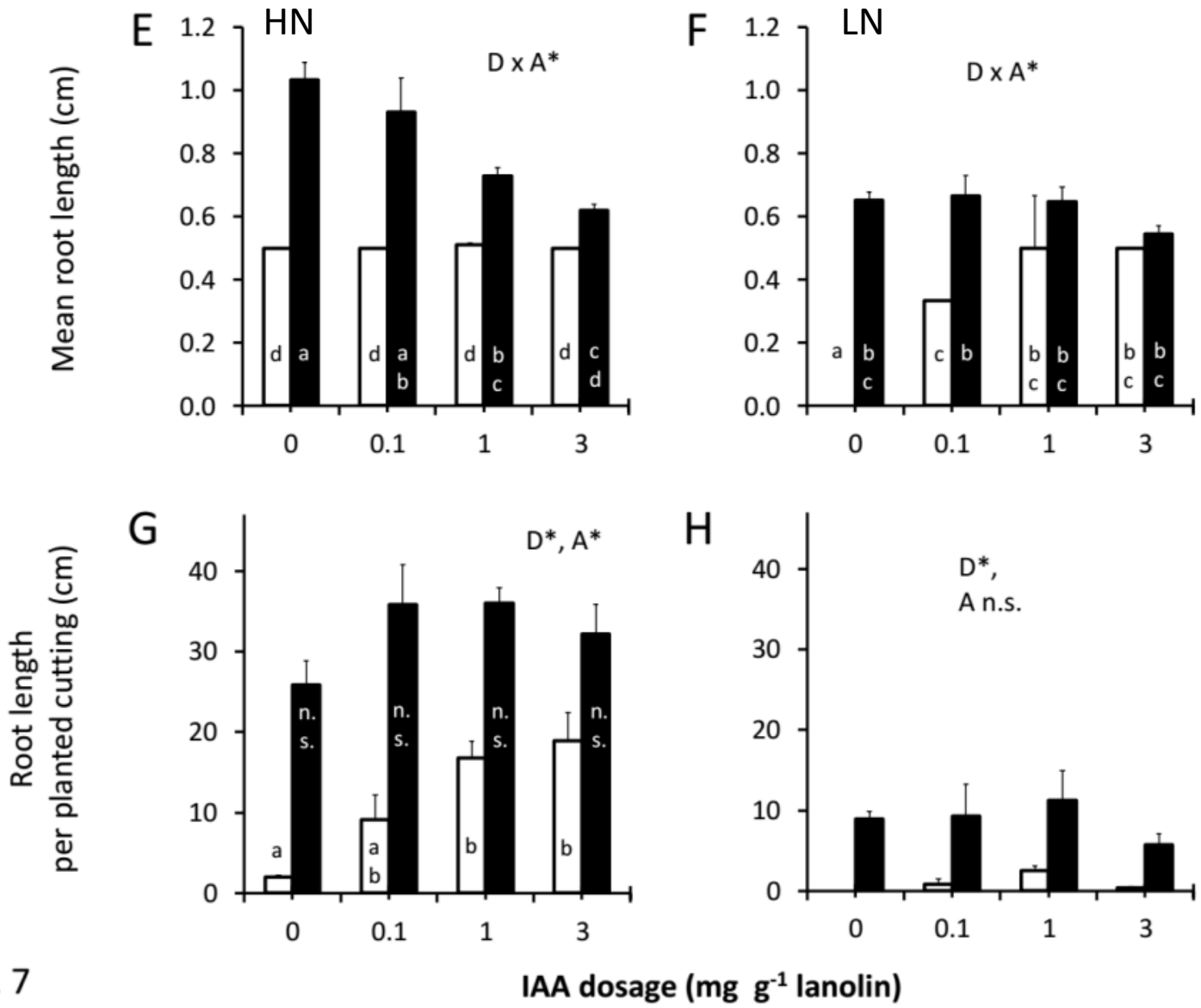


Fig. 7