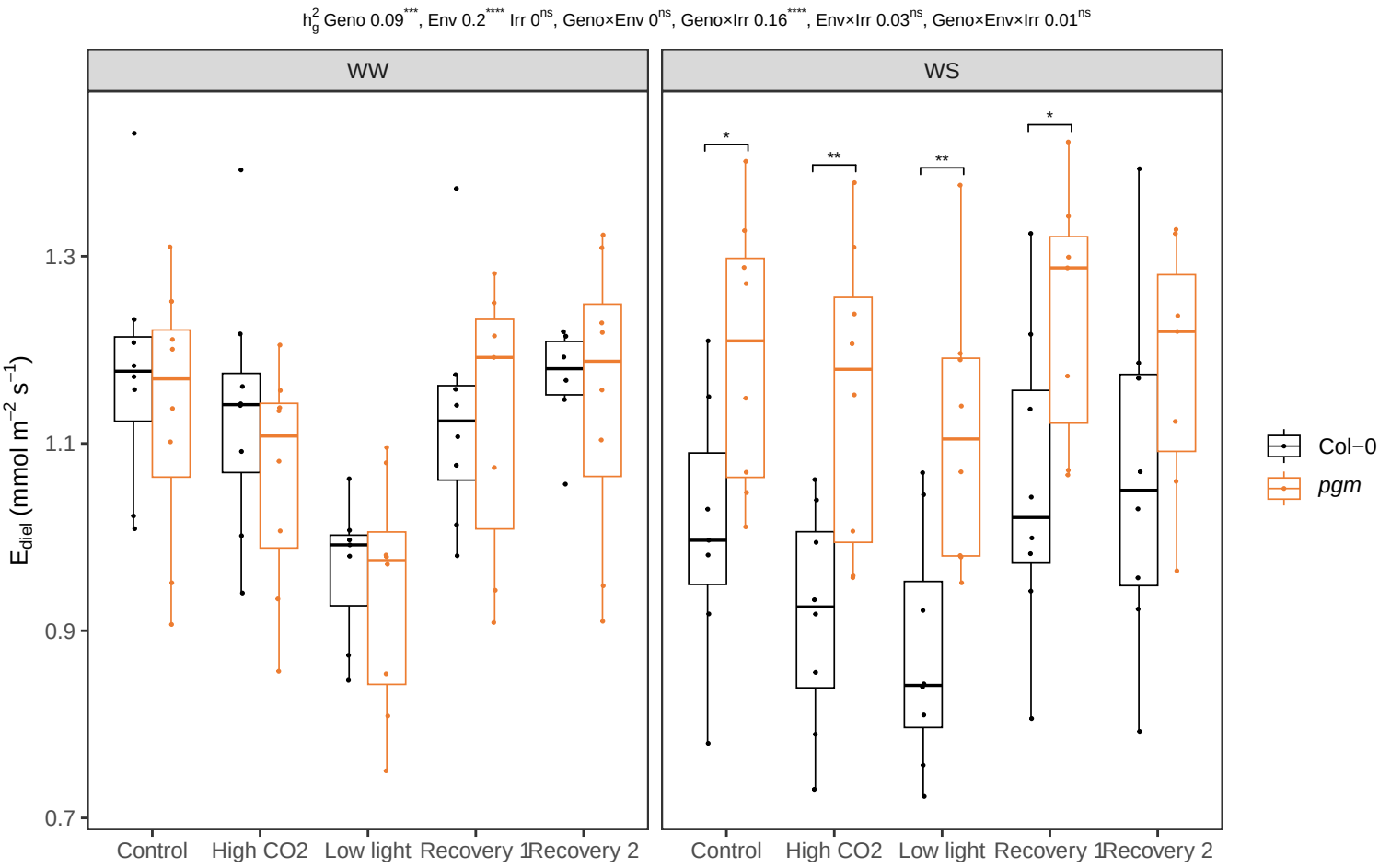
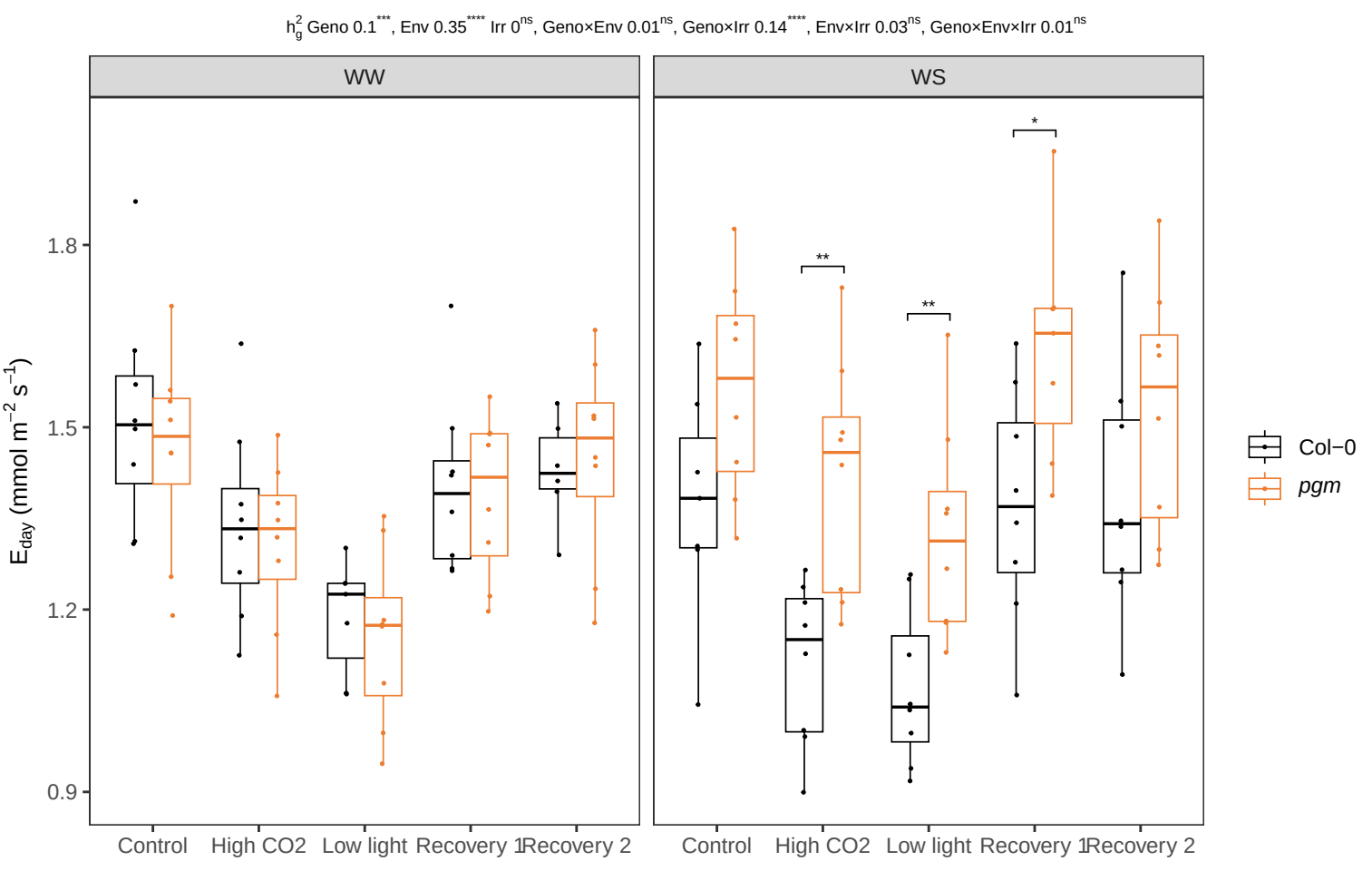
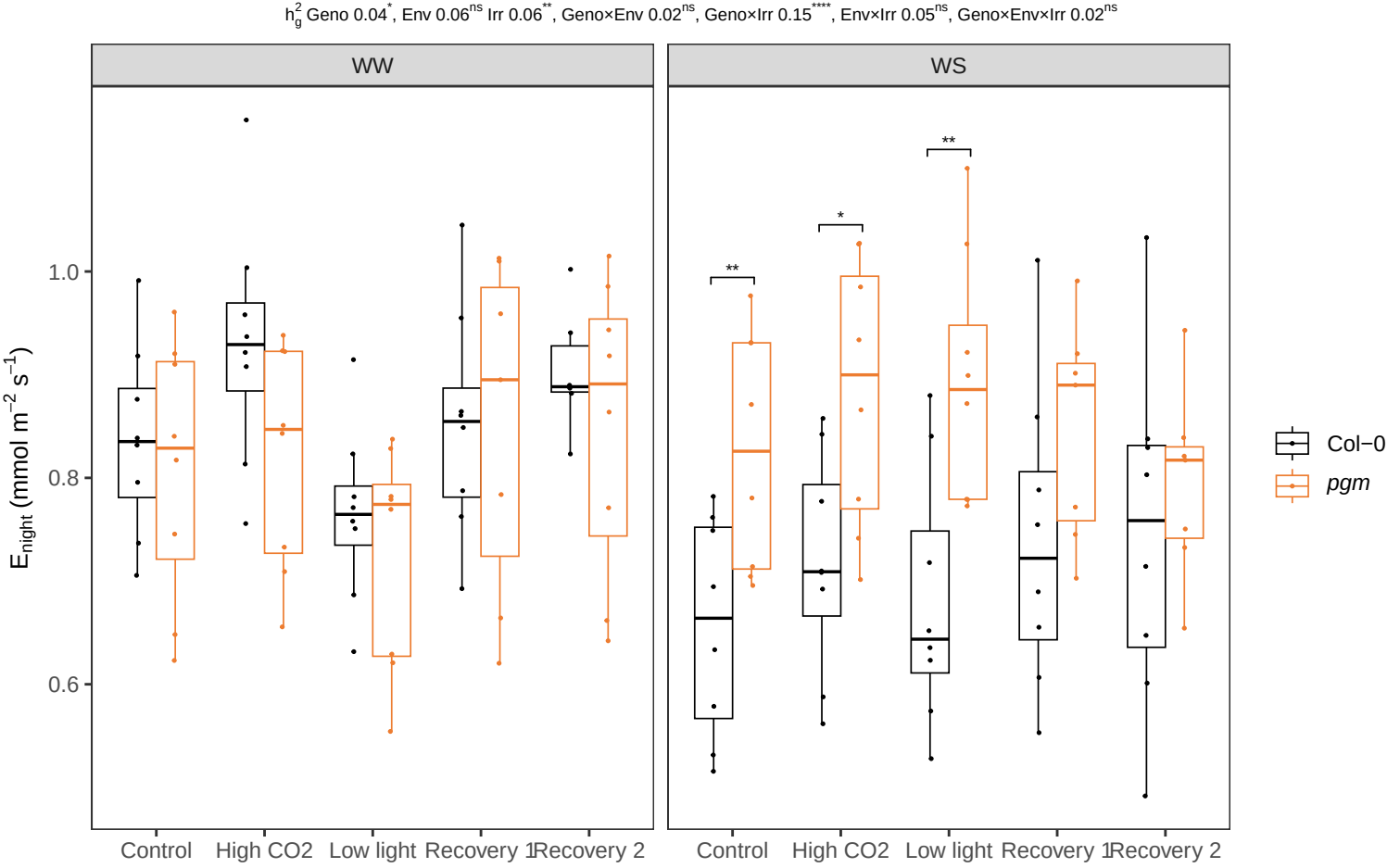
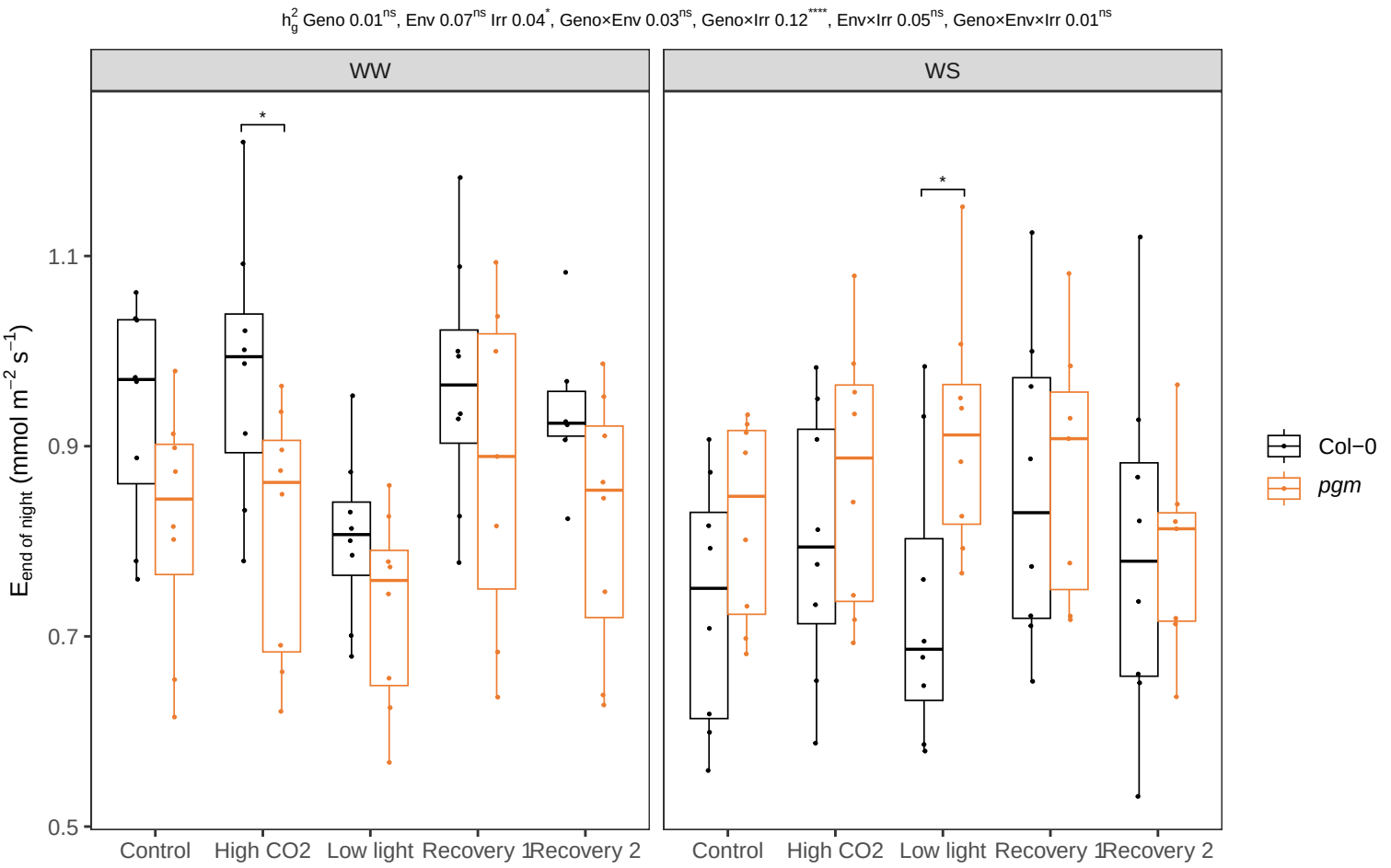
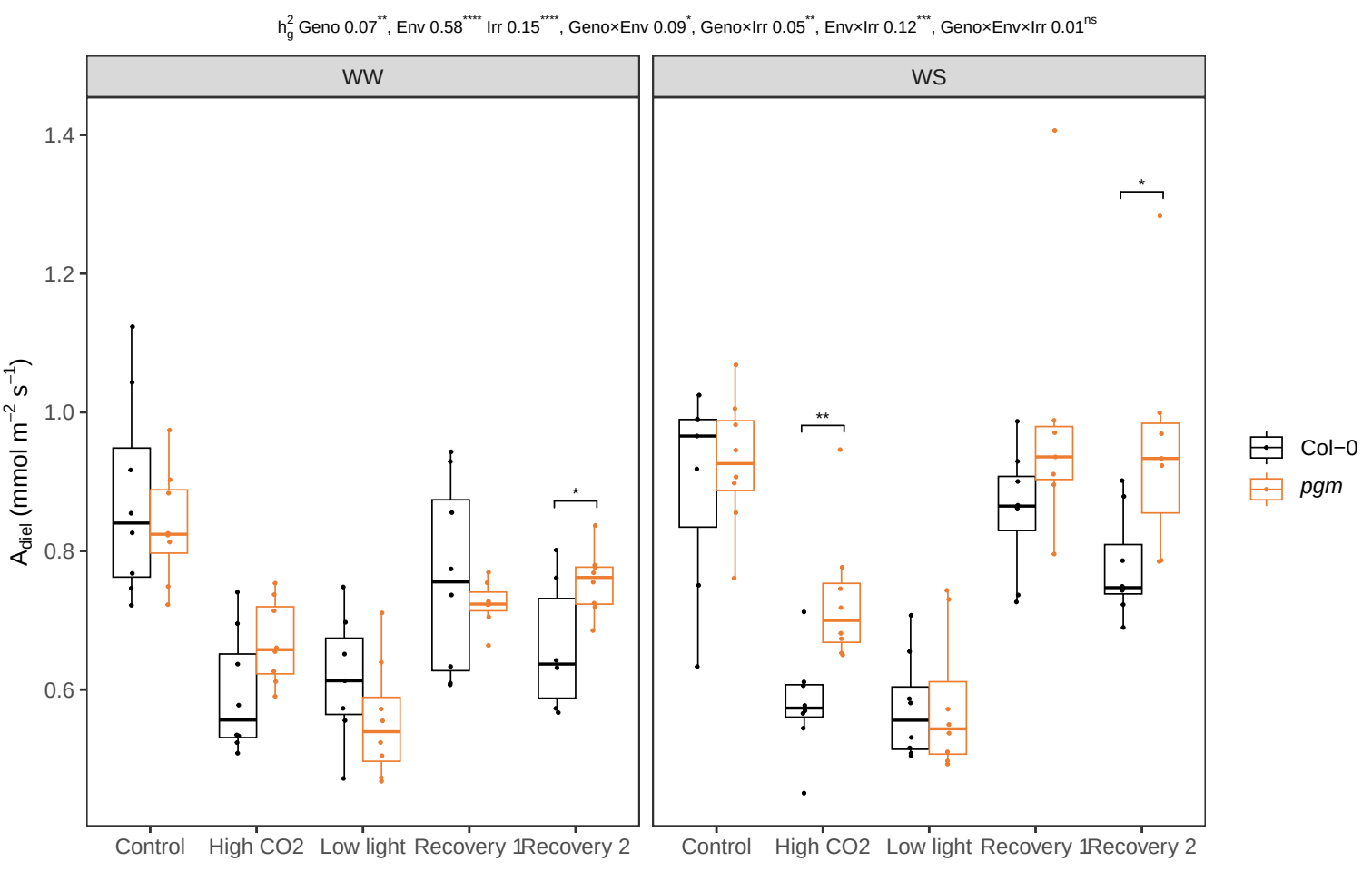
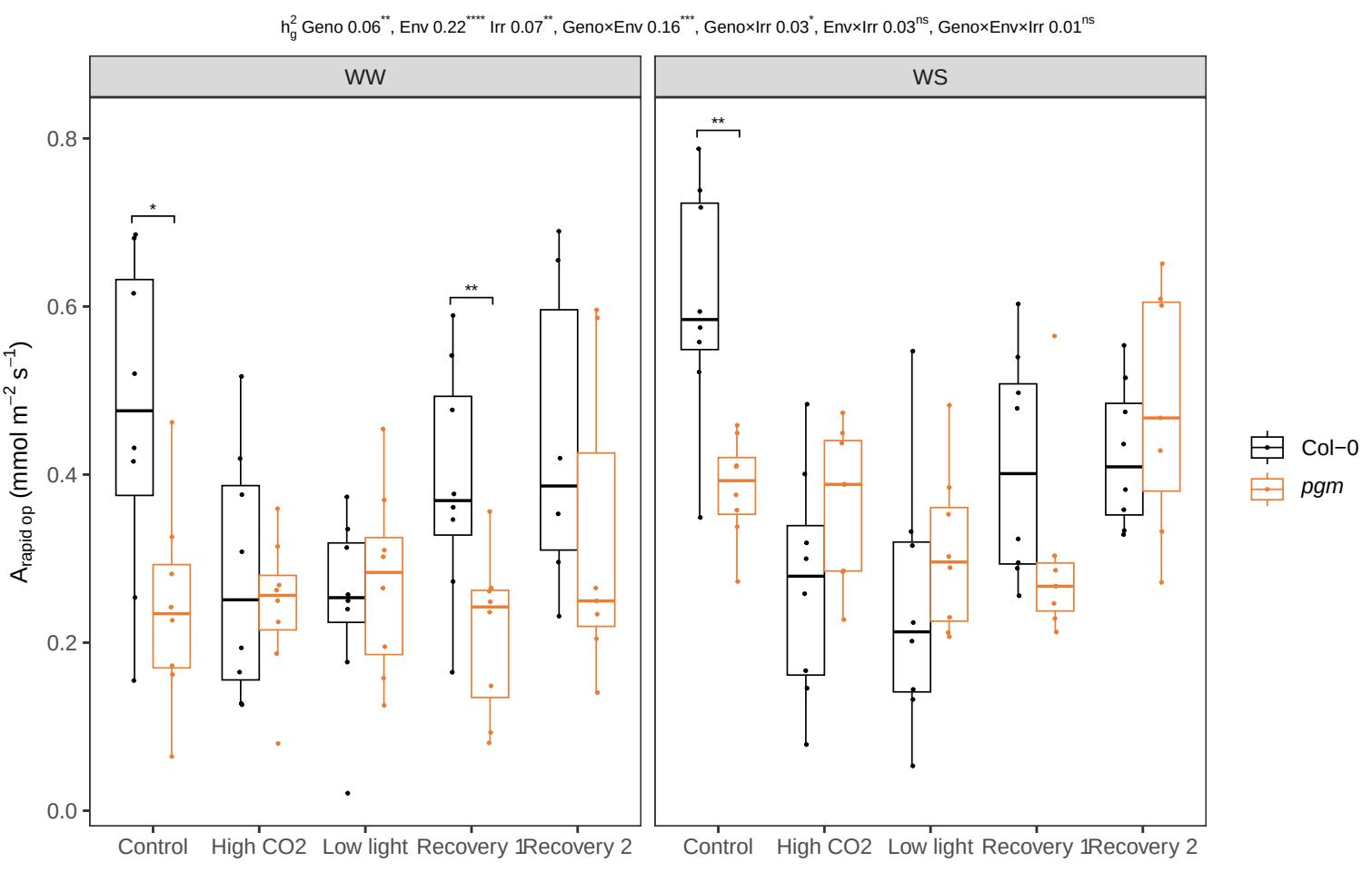

$h^2_g$ Geno 0.09$^{***}$, Env 0.2$^{****}$ Irr 0$^{ns}$, Geno×Env 0$^{ns}$, Geno×Irr 0.16$^{****}$, Env×Irr 0.03$^{ns}$, Geno×Env×Irr 0.01$^{ns}$
WW
WS
$E_{diel}$ (mmol $m^{-2}$ $s^{-1}$)
1.3
1.1
0.9
0.7
*
**
**
*
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

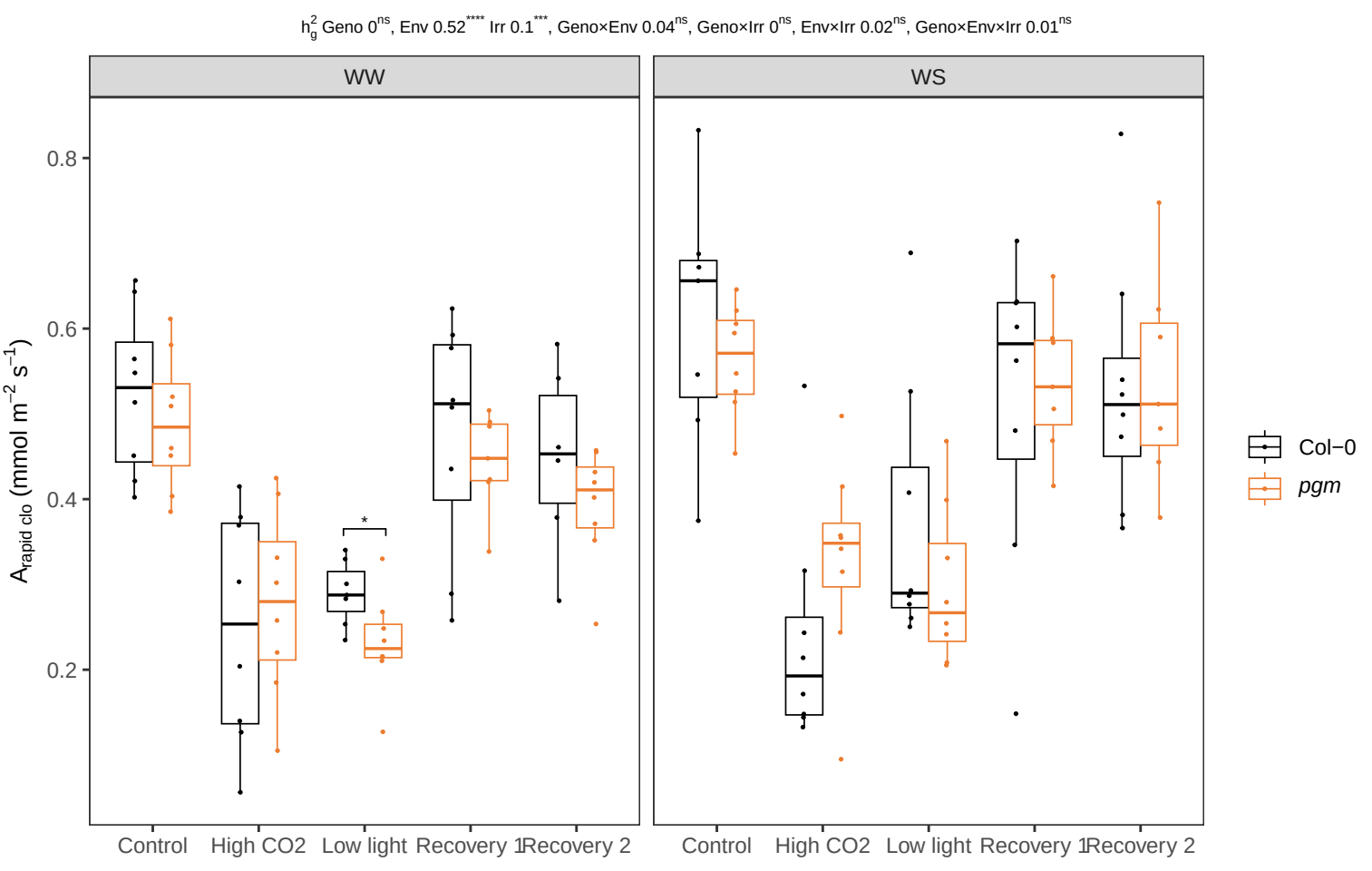

$h^2_g$ Geno 0.1$^{***}$, Env 0.35$^{****}$ Irr 0$^{ns}$, Geno×Env 0.01$^{ns}$, Geno×Irr 0.14$^{****}$, Env×Irr 0.03$^{ns}$, Geno×Env×Irr 0.01$^{ns}$
WW
WS
$E_{day}$ (mmol $m^{-2}$ $s^{-1}$)
1.8
1.5
1.2
0.9
*
**
**
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

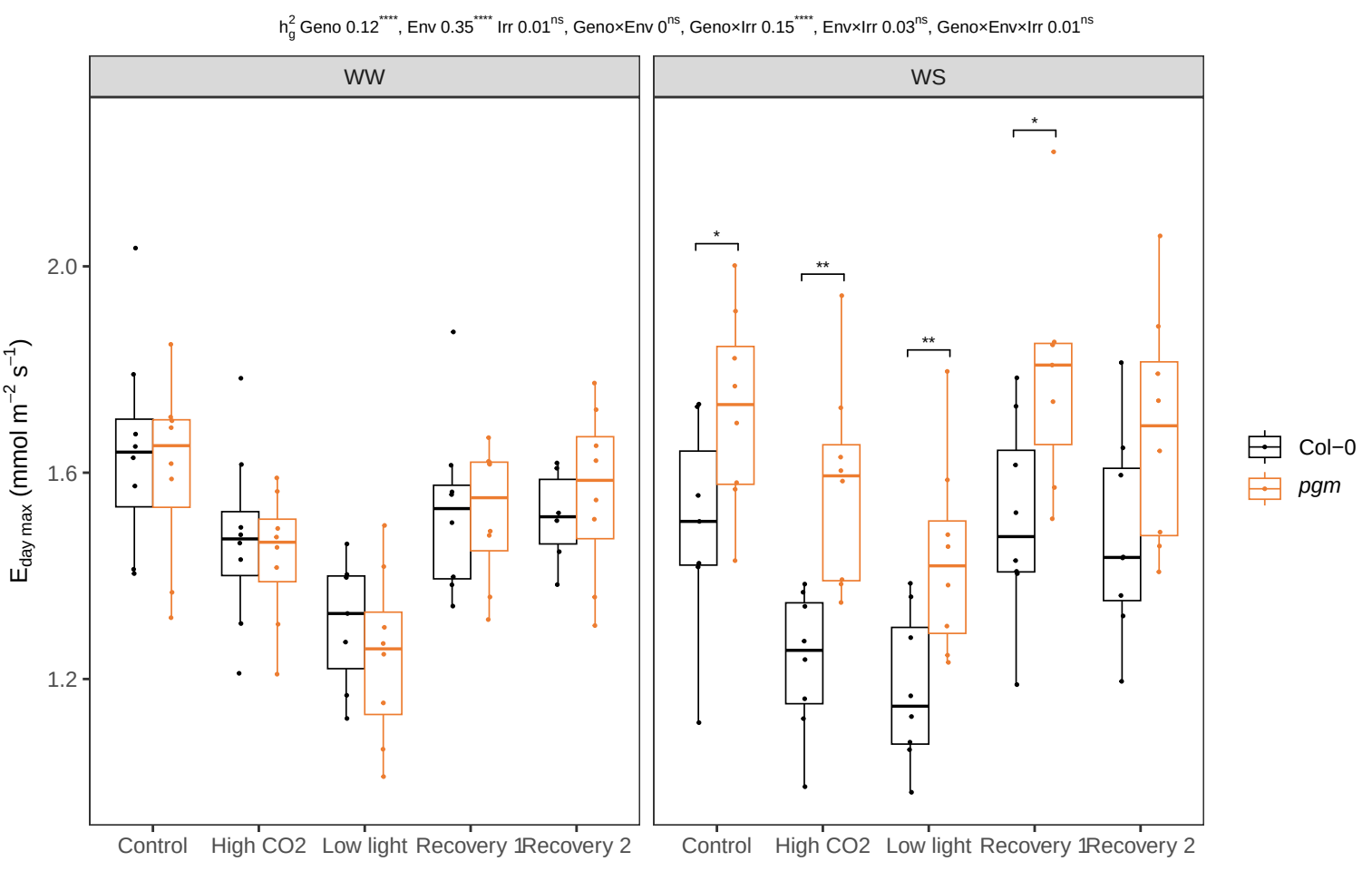

$h^2_g$ Geno 0.04*, Env 0.06ns Irr 0.06**, Geno×Env 0.02ns, Geno×Irr 0.15****, Env×Irr 0.05ns, Geno×Env×Irr 0.02ns
WW
WS
$E_{night}$ (mmol $m^{-2}$ $s^{-1}$)
1.0
0.8
0.6
**
*
**
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

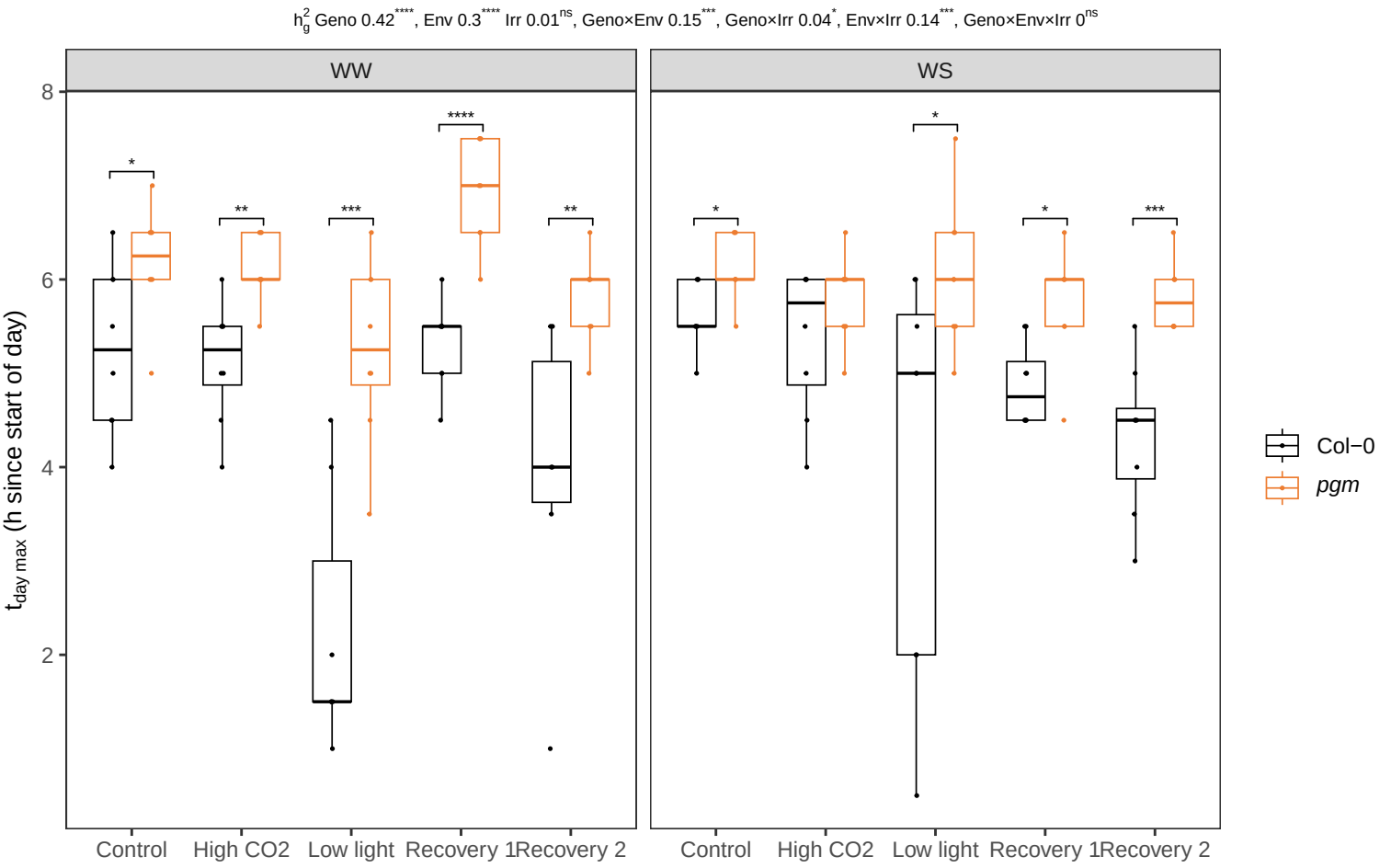

$h^2_g$ Geno 0.01$^{ns}$, Env 0.07$^{ns}$ Irr 0.04$^{*}$, Geno×Env 0.03$^{ns}$, Geno×Irr 0.12$^{****}$, Env×Irr 0.05$^{ns}$, Geno×Env×Irr 0.01$^{ns}$
WW
WS
$E_{end\ of\ night}$ (mmol $m^{-2}$ $s^{-1}$)
1.1
0.9
0.7
0.5
*
*
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

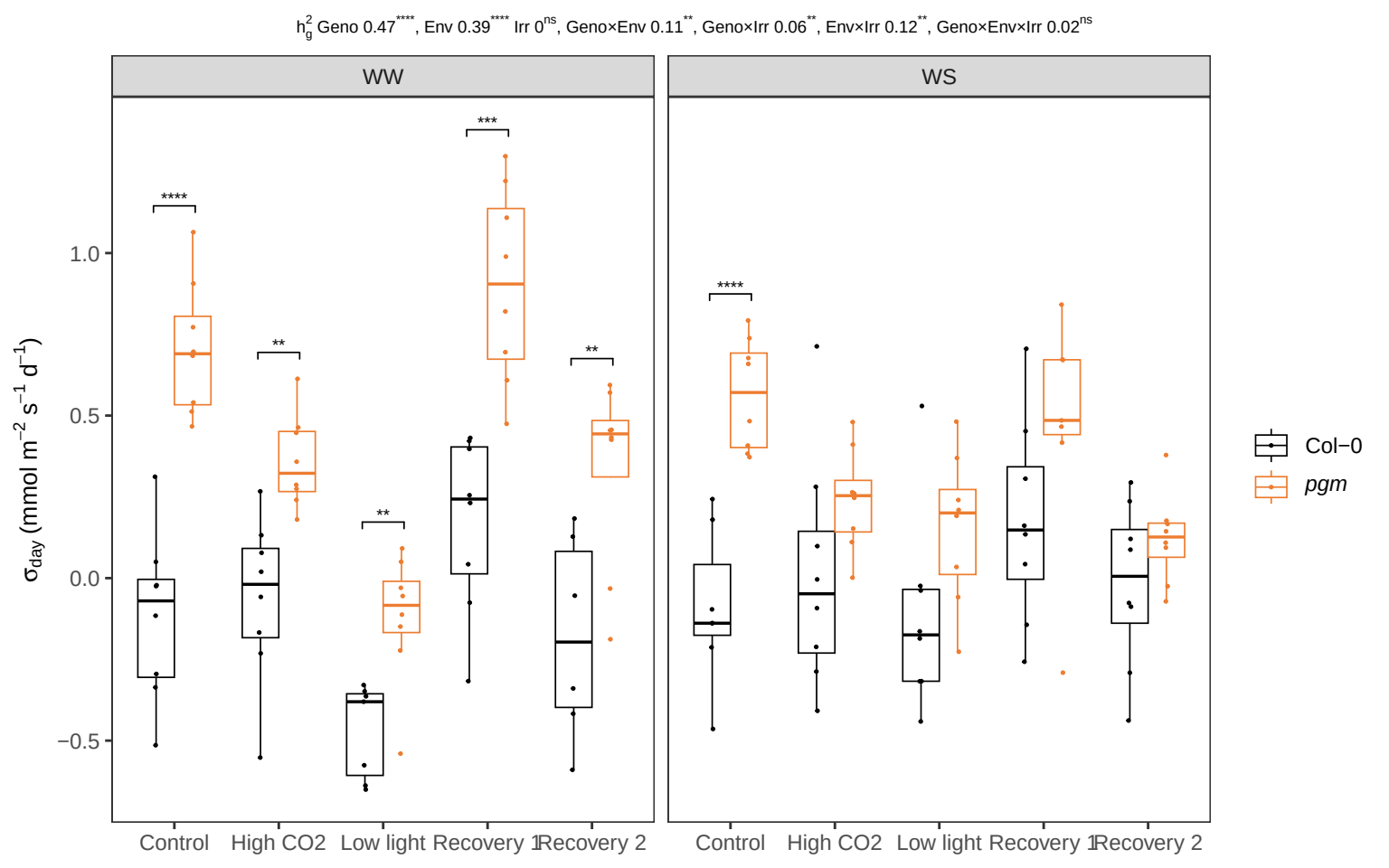

$h^2_g$ Geno 0.07$^{**}$, Env 0.58$^{****}$ Irr 0.15$^{****}$, Geno×Env 0.09$^{*}$, Geno×Irr 0.05$^{**}$, Env×Irr 0.12$^{***}$, Geno×Env×Irr 0.01$^{ns}$
WW
WS
$A_{diel}$ (mmol $m^{-2}$ $s^{-1}$)
1.4
1.2
1.0
0.8
0.6
Control
High CO2
Low light
Recovery 1
Recovery 2
*
**
Col−0
pgm

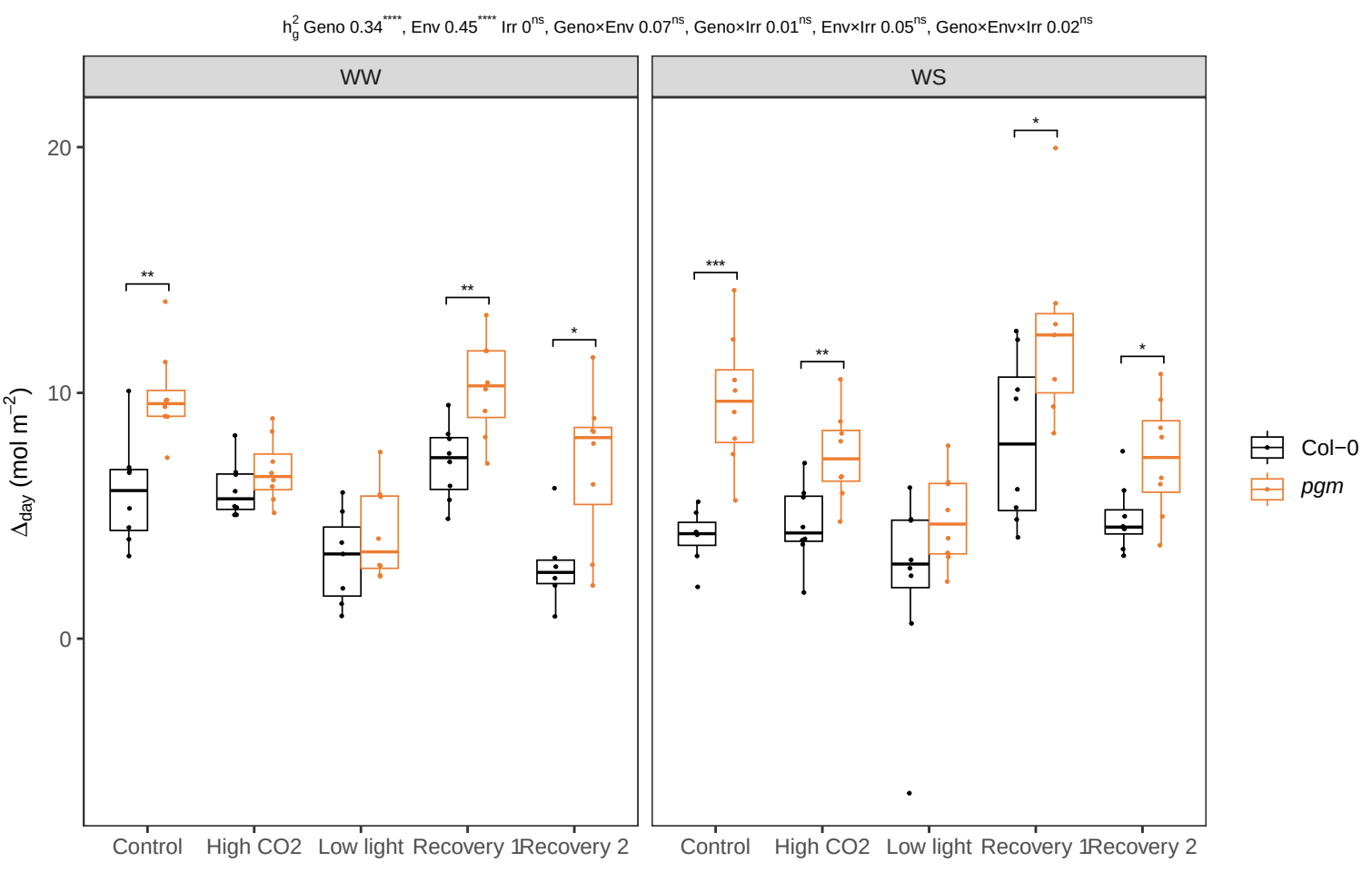

$h_g^2$ Geno 0.06$^{**}$, Env 0.22$^{****}$ Irr 0.07$^{**}$, Geno×Env 0.16$^{***}$, Geno×Irr 0.03$^{*}$, Env×Irr 0.03$^{ns}$, Geno×Env×Irr 0.01$^{ns}$
WW
WS
$A_{rapid\ op}$ (mmol $m^{-2}$ $s^{-1}$)
0.0
0.2
0.4
0.6
0.8
*
**
**
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

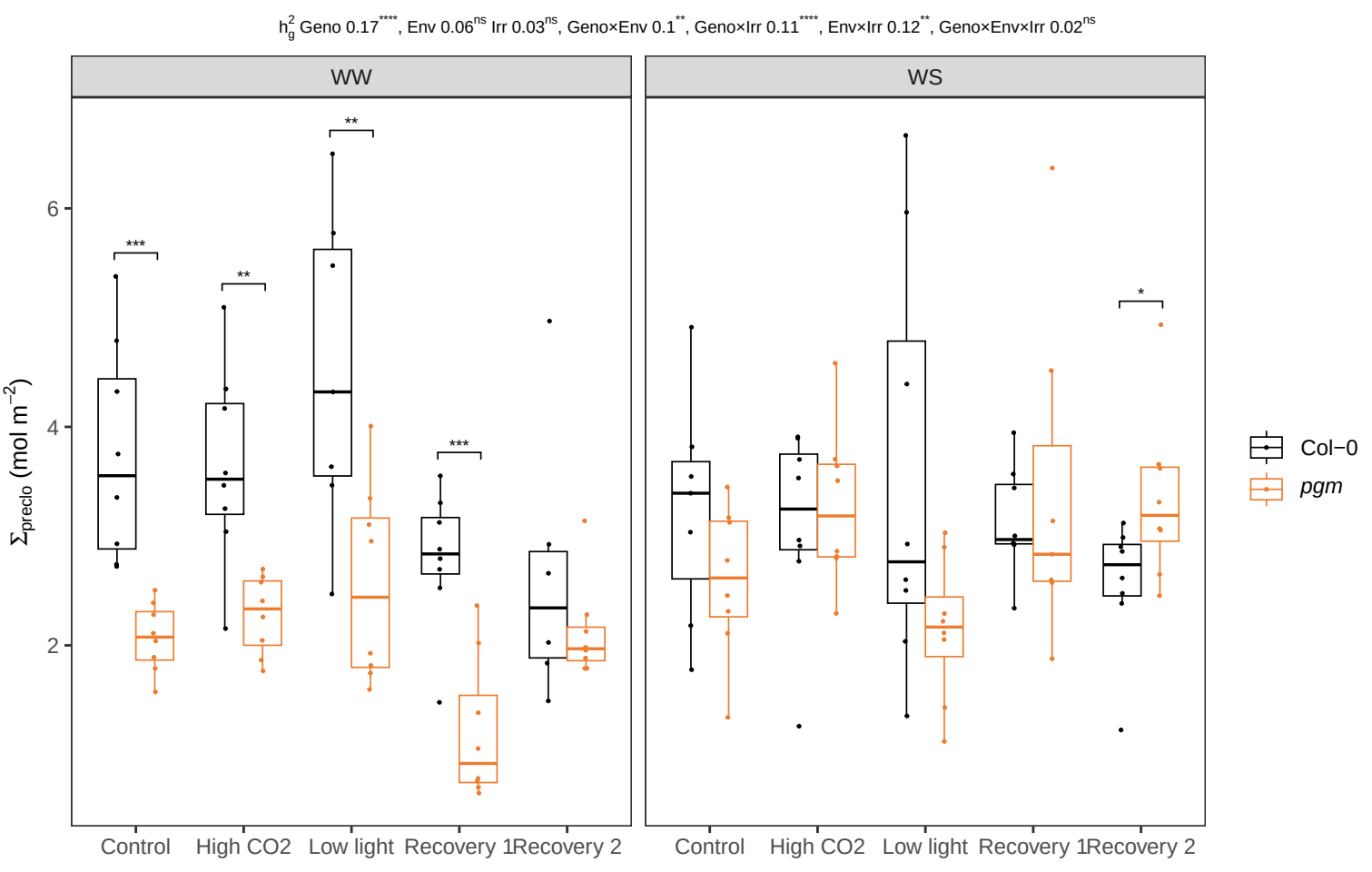

$h^2_g$ Geno $0^{ns}$, Env $0.52^{****}$ Irr $0.1^{***}$, Geno×Env $0.04^{ns}$, Geno×Irr $0^{ns}$, Env×Irr $0.02^{ns}$, Geno×Env×Irr $0.01^{ns}$
WW
WS
$A_{rapid\ clo}$ (mmol $m^{-2}$ $s^{-1}$)
0.8
0.6
0.4
0.2
*
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

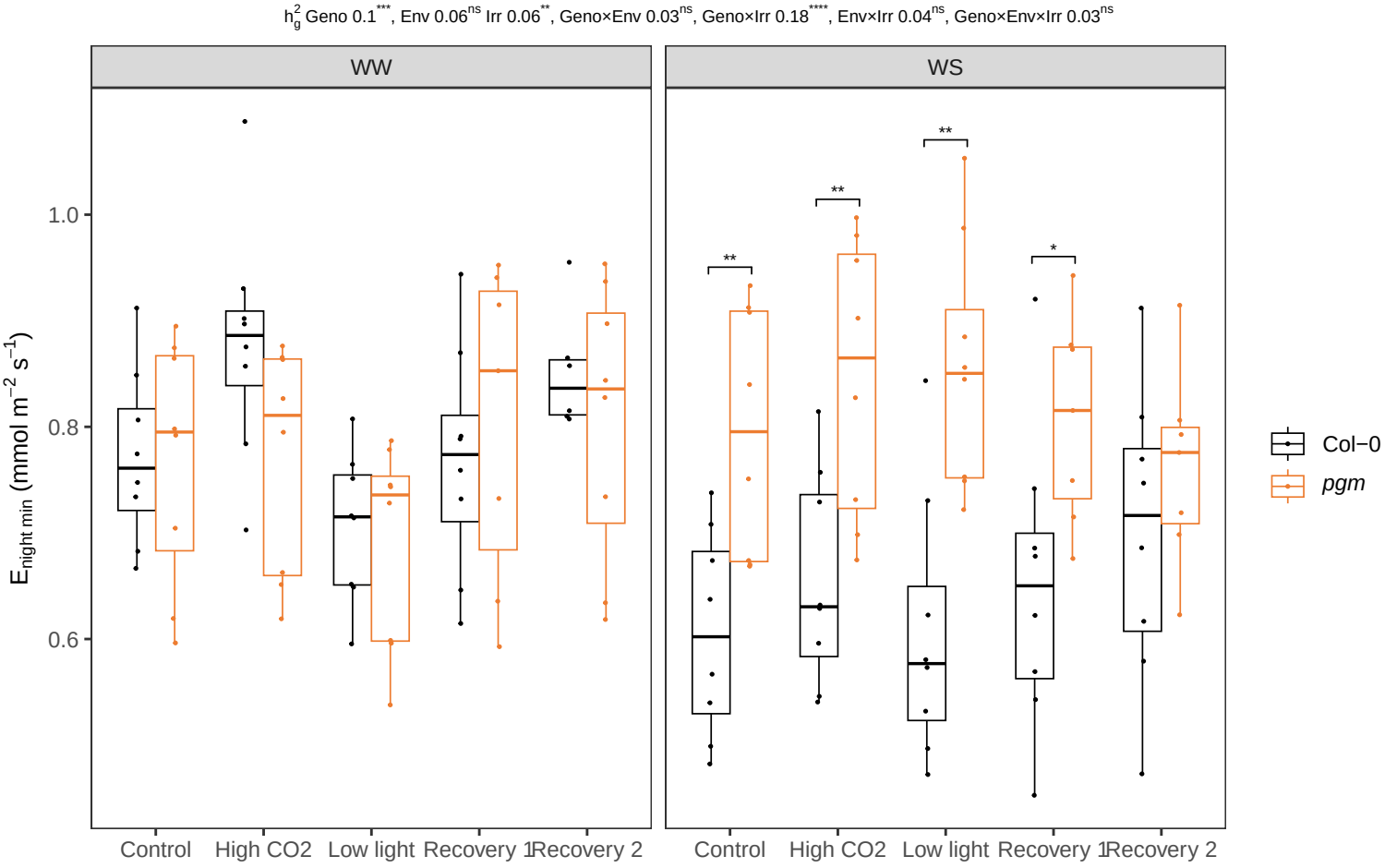

$h^2_g$ Geno 0.12$^{****}$, Env 0.35$^{****}$ Irr 0.01$^{ns}$, Geno×Env 0$^{ns}$, Geno×Irr 0.15$^{****}$, Env×Irr 0.03$^{ns}$, Geno×Env×Irr 0.01$^{ns}$
WW
WS
$E_{day\ max}$ (mmol $m^{-2}$ $s^{-1}$)
2.0
1.6
1.2
*
**
**
*
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

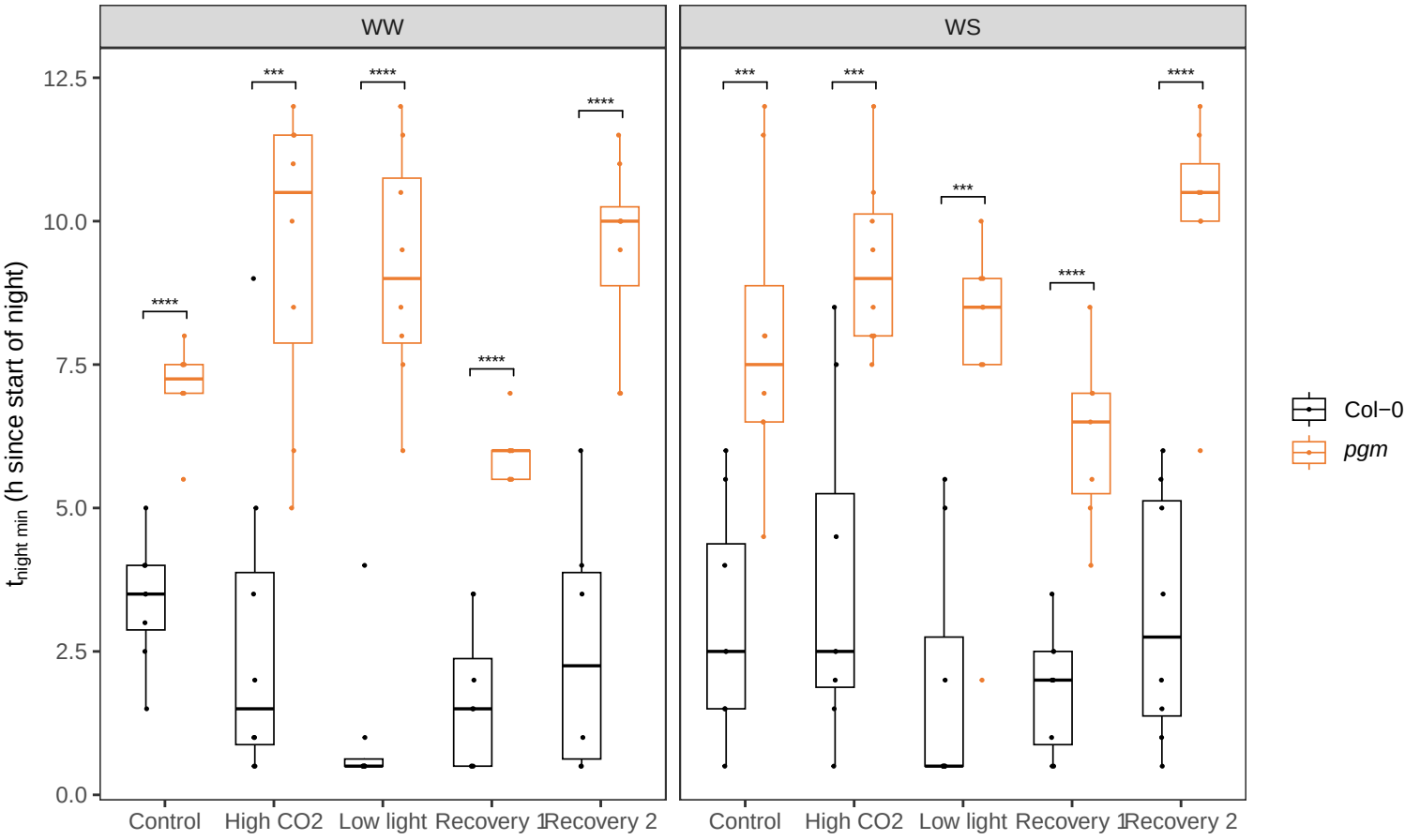

$h^2_g$ Geno 0.42$^{****}$, Env 0.3$^{****}$ Irr 0.01$^{ns}$, Geno×Env 0.15$^{***}$, Geno×Irr 0.04$^{*}$, Env×Irr 0.14$^{***}$, Geno×Env×Irr 0$^{ns}$
WW
WS
$t_{day\ max}$ (h since start of day)
8
6
4
2
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

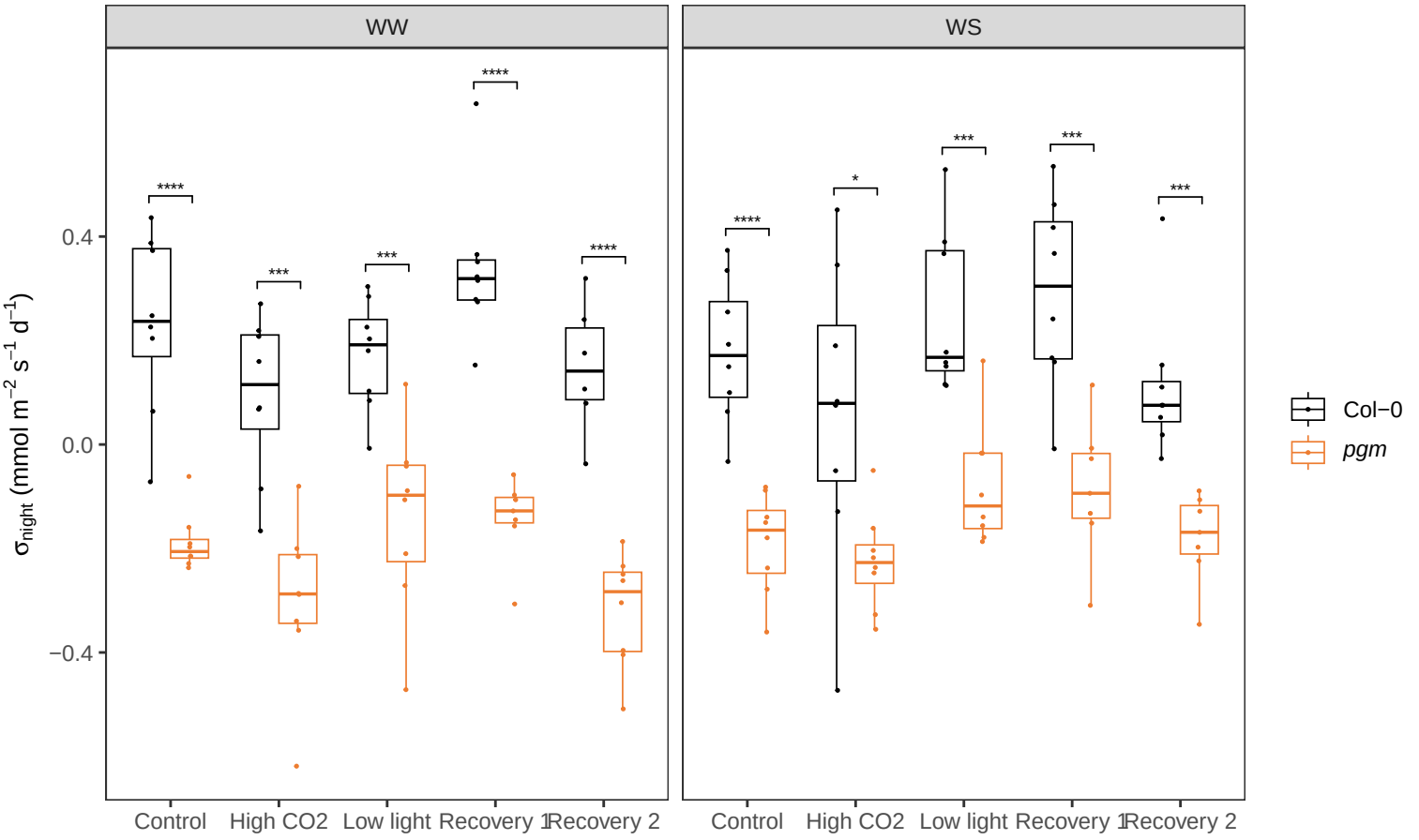

$h^2_g$ Geno 0.47$^{****}$, Env 0.39$^{****}$ Irr 0$^{ns}$, Geno×Env 0.11$^{**}$, Geno×Irr 0.06$^{**}$, Env×Irr 0.12$^{**}$, Geno×Env×Irr 0.02$^{ns}$
WW
WS
$\sigma_{day}$ (mmol m$^{-2}$ s$^{-1}$ d$^{-1}$)
1.0
0.5
0.0
−0.5
****
**
**
***
**
****
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

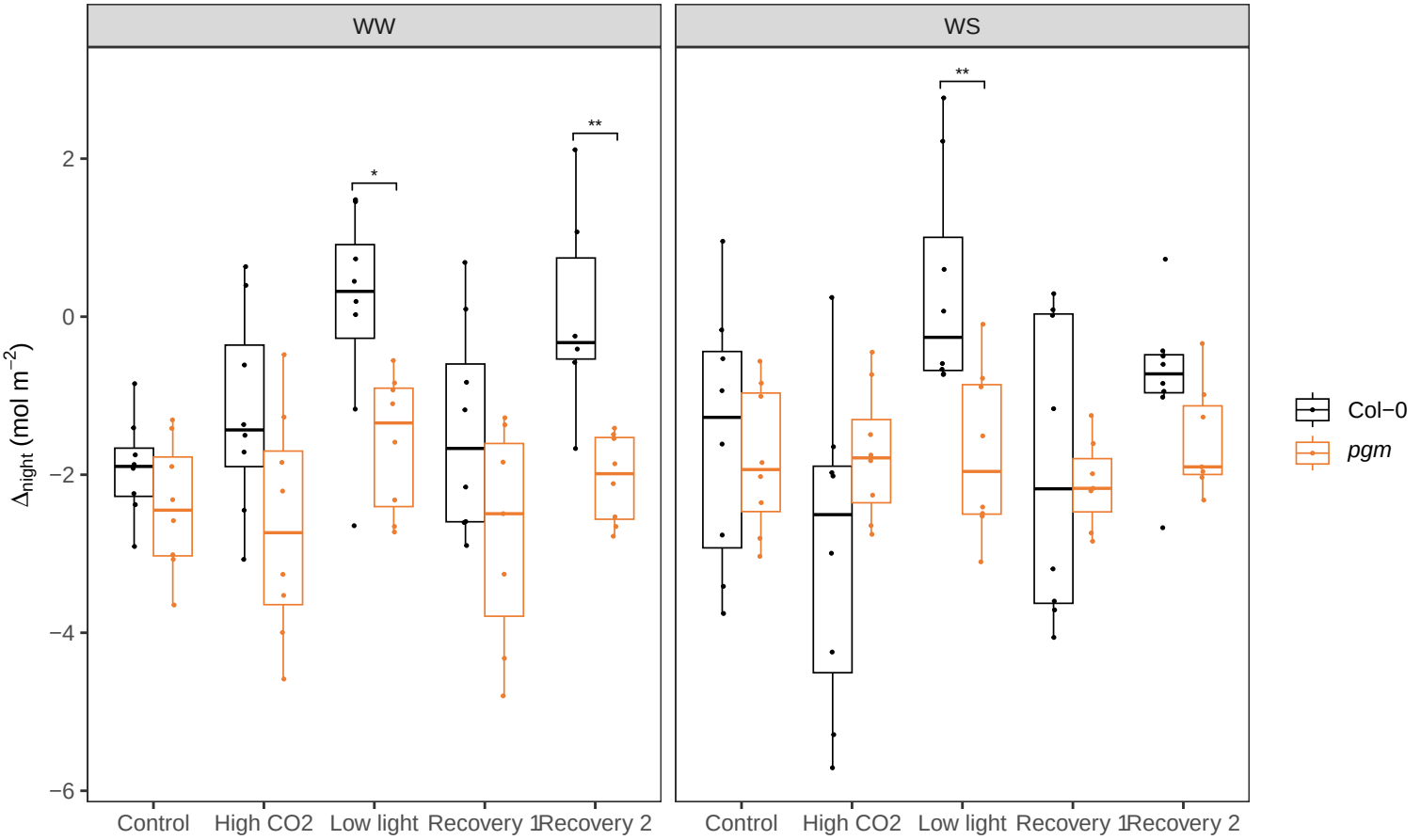

$h^2_g$ Geno 0.34$^{****}$, Env 0.45$^{****}$ Irr 0$^{ns}$, Geno×Env 0.07$^{ns}$, Geno×Irr 0.01$^{ns}$, Env×Irr 0.05$^{ns}$, Geno×Env×Irr 0.02$^{ns}$
WW
WS
$\Delta_{day}$ (mol m$^{-2}$)
20
10
0
**
**
*
***
**
*
*
Control
High CO2
Low light
Recovery 1
Recovery 2
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

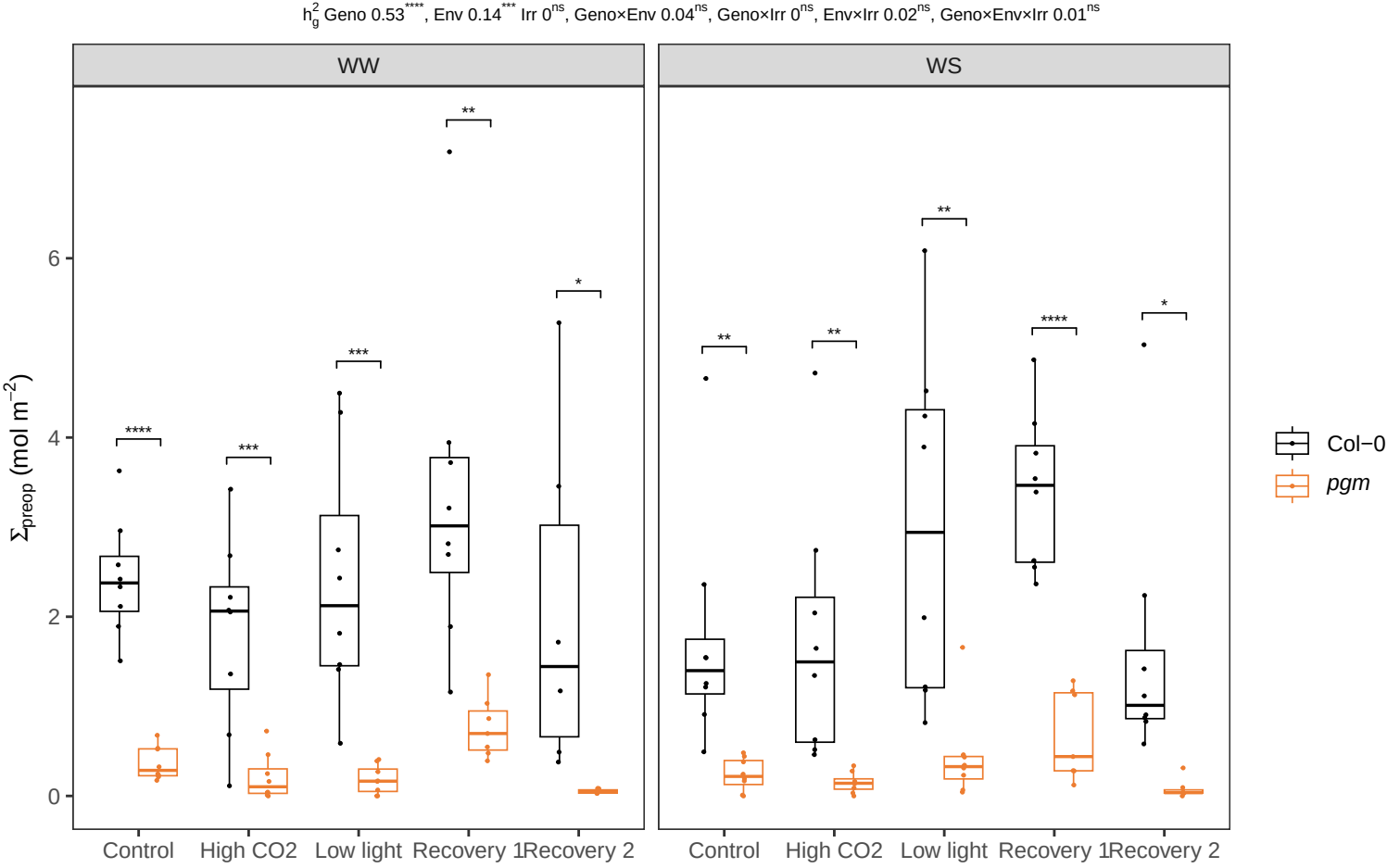

$h^2_g$ Geno 0.17$^{****}$, Env 0.06$^{ns}$ Irr 0.03$^{ns}$, Geno×Env 0.1$^{**}$, Geno×Irr 0.11$^{****}$, Env×Irr 0.12$^{**}$, Geno×Env×Irr 0.02$^{ns}$
WW
WS
$\Sigma_{precio}$ (mol m$^{-2}$)
6
4
2
***
**
**
***
*
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

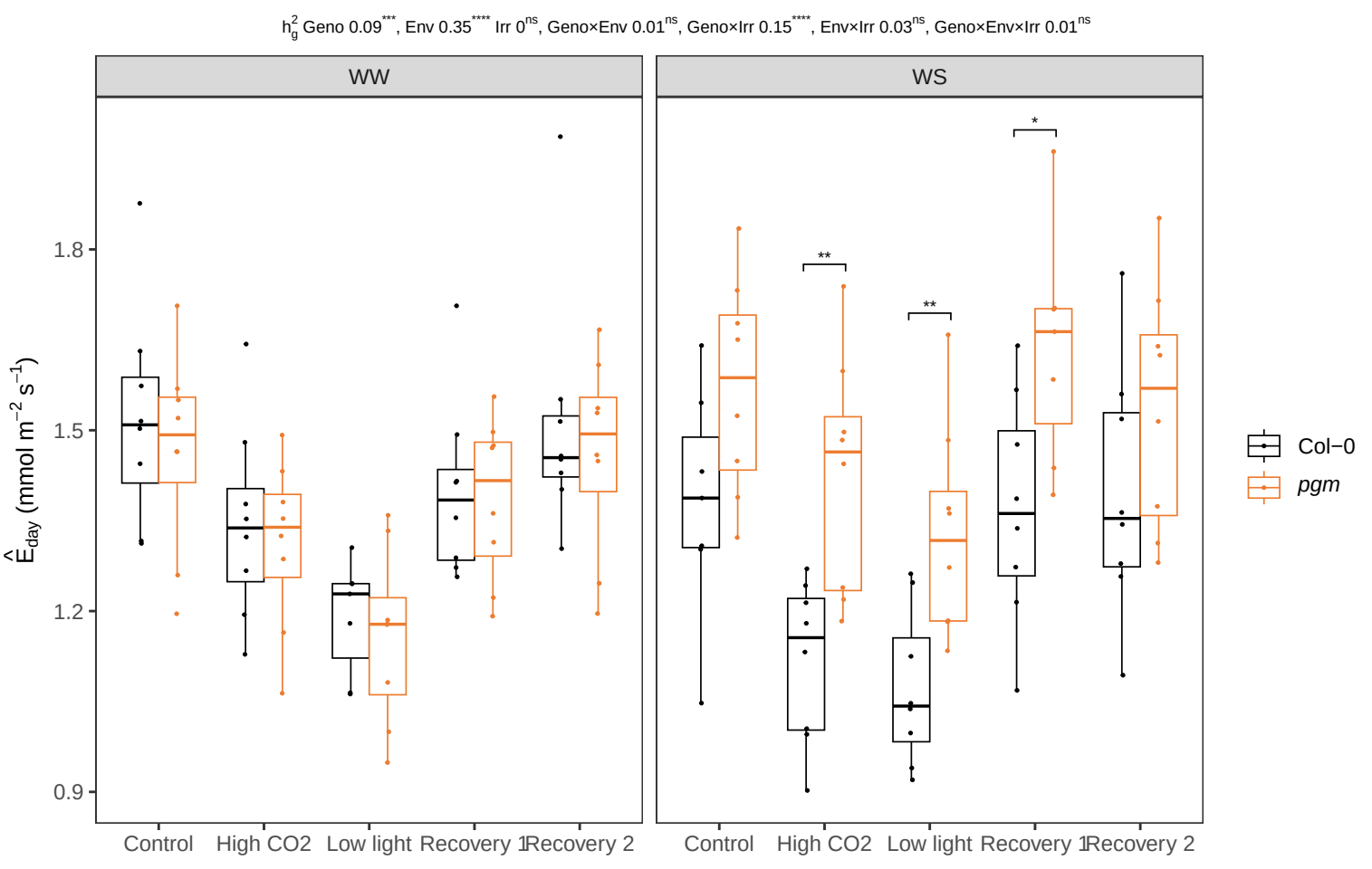

$h^2_g$ Geno 0.1$^{***}$, Env 0.06$^{ns}$ Irr 0.06$^{**}$, Geno×Env 0.03$^{ns}$, Geno×Irr 0.18$^{****}$, Env×Irr 0.04$^{ns}$, Geno×Env×Irr 0.03$^{ns}$
WW
WS
$E_{night\ min}$ (mmol $m^{-2}$ $s^{-1}$)
1.0
0.8
0.6
**
**
**
*
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

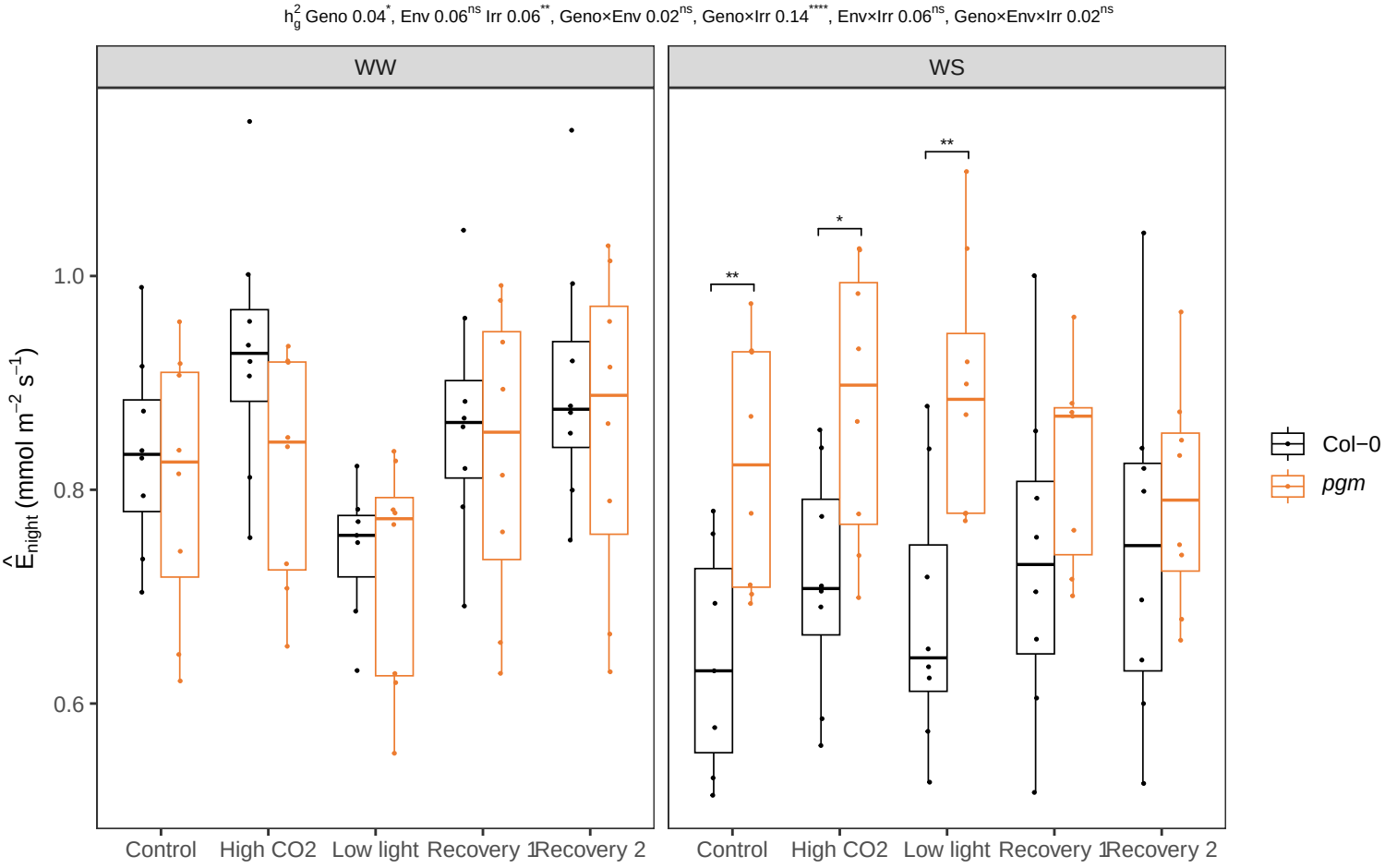

$h^2_g$ Geno 0.71$^{****}$, Env 0.19$^{****}$ Irr 0$^{ns}$, Geno×Env 0.09$^{**}$, Geno×Irr 0$^{ns}$, Env×Irr 0.01$^{ns}$, Geno×Env×Irr 0.03$^{ns}$
WW
WS
$t_{night\ min}$ (h since start of night)
12.5
10.0
7.5
5.0
2.5
0.0
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

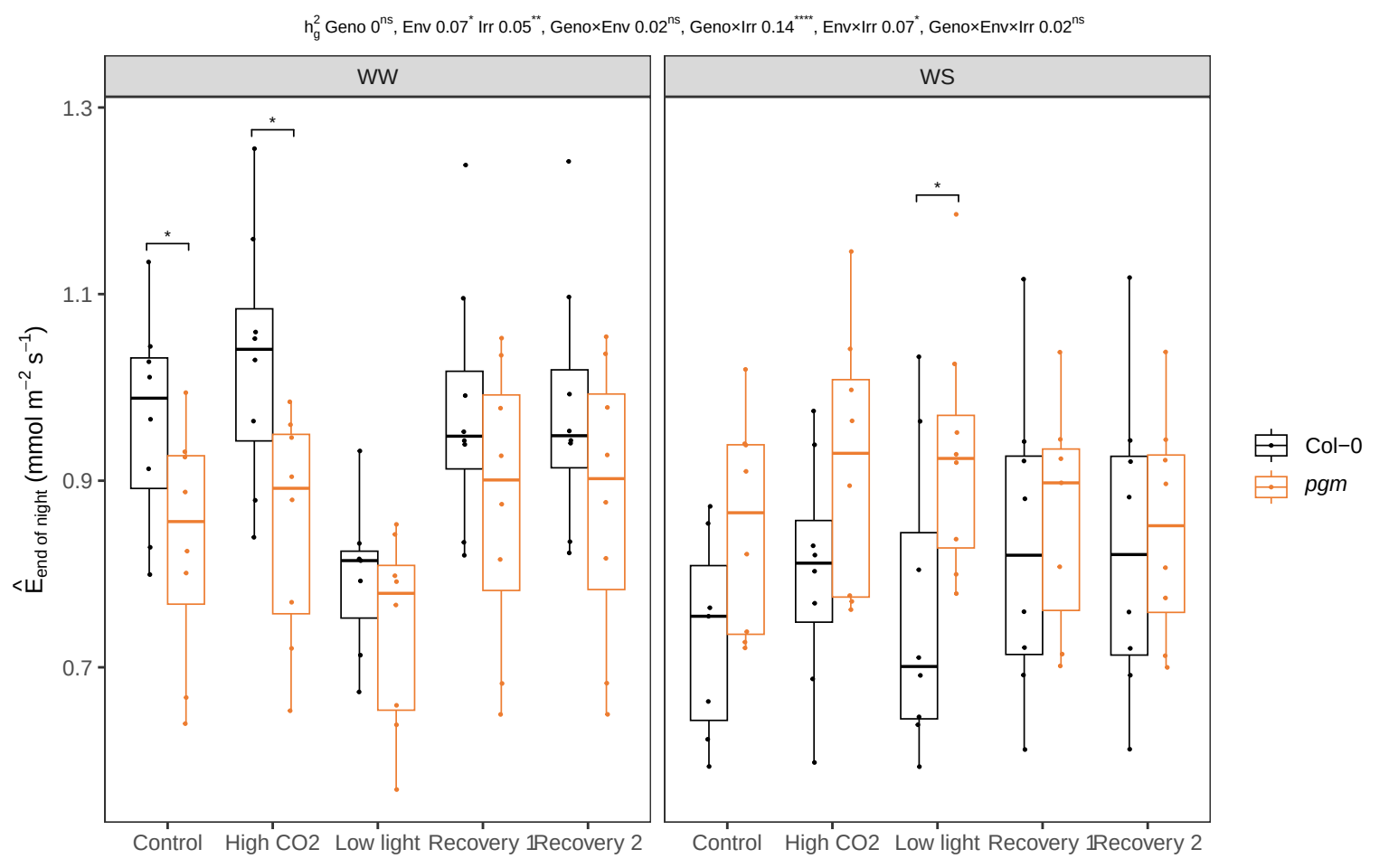

$h^2_g$ Geno 0.65$^{****}$, Env 0.21$^{****}$ Irr 0.01$^{ns}$, Geno×Env 0.02$^{ns}$, Geno×Irr 0.02$^{ns}$, Env×Irr 0.02$^{ns}$, Geno×Env×Irr 0.01$^{ns}$
WW
WS
$\sigma_{night}$ (mmol m$^{-2}$ s$^{-1}$ d$^{-1}$)
0.4
0.0
−0.4
****
***
***
****
****
****
*
***
***
***
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

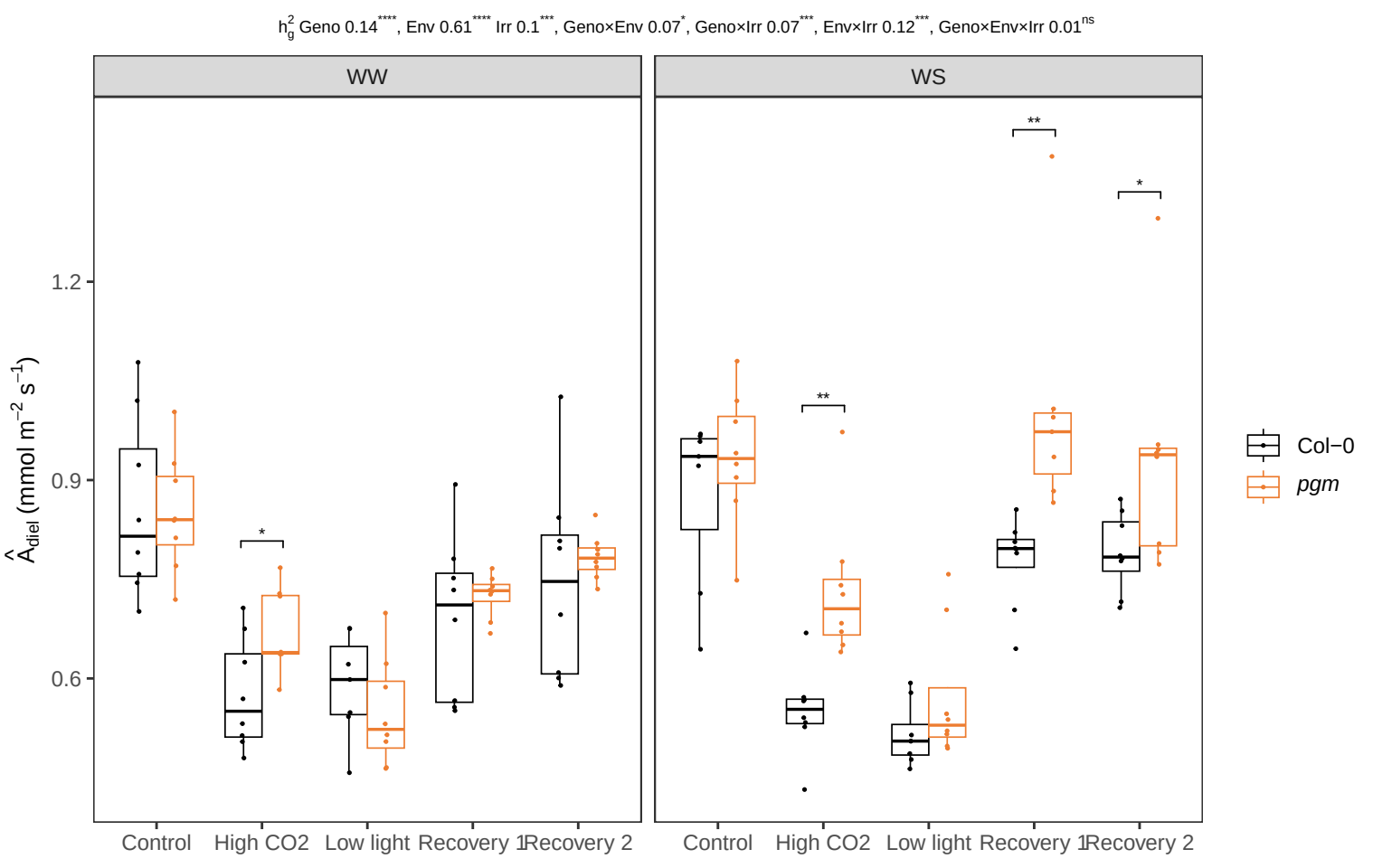

$h^2_g$ Geno 0.14$^{****}$, Env 0.2$^{****}$ Irr 0$^{ns}$, Geno×Env 0.08$^{*}$, Geno×Irr 0.04$^{*}$, Env×Irr 0.02$^{ns}$, Geno×Env×Irr 0.05$^{ns}$
WW
WS
$\Delta_{night}$ (mol m$^{-2}$)
2
0
−2
−4
−6
*
**
**
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

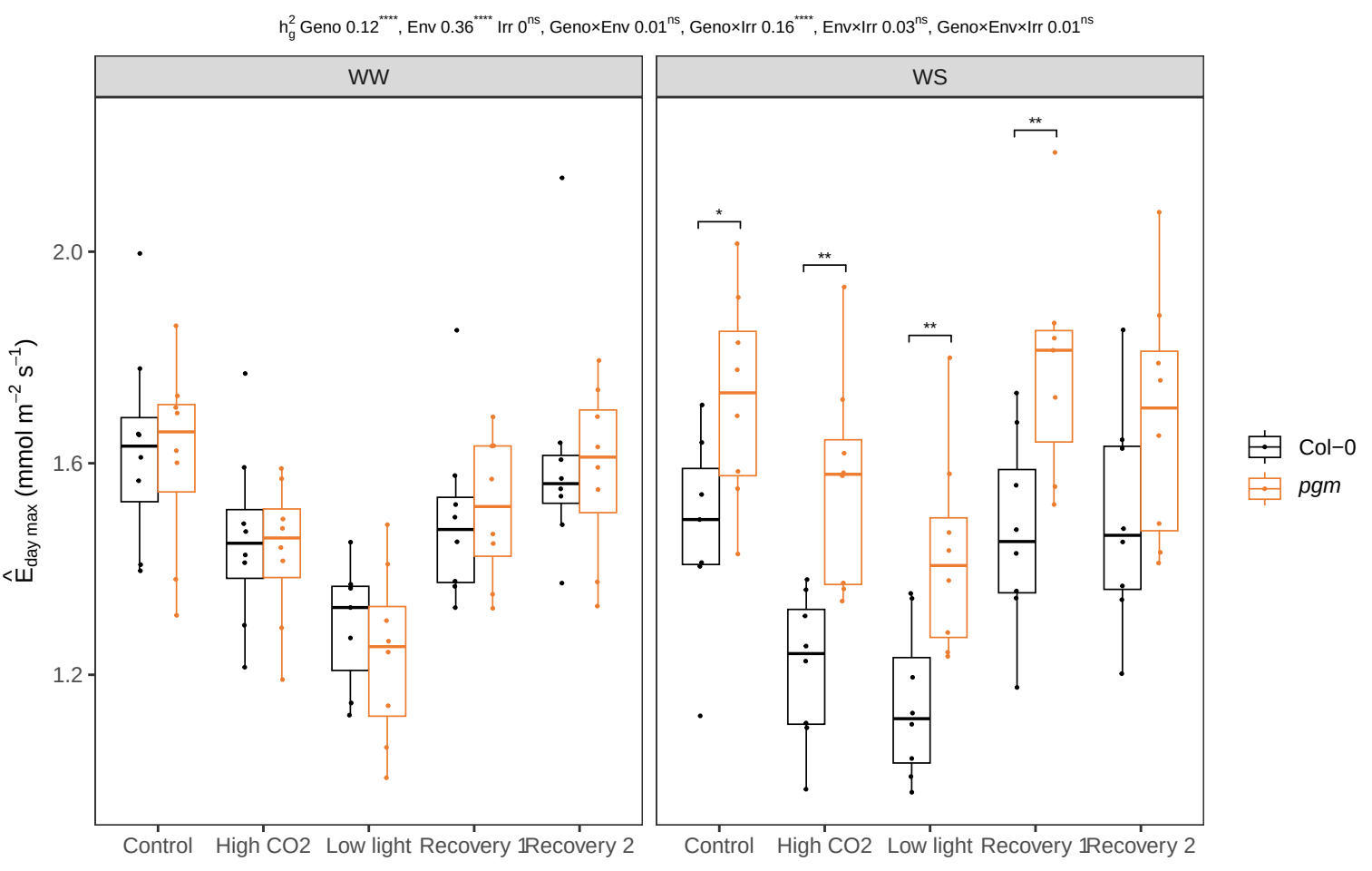

$h^2_g$ Geno 0.53$^{****}$, Env 0.14$^{***}$ Irr 0$^{ns}$, Geno×Env 0.04$^{ns}$, Geno×Irr 0$^{ns}$, Env×Irr 0.02$^{ns}$, Geno×Env×Irr 0.01$^{ns}$
WW
WS
$\Sigma_{preop}$ (mol m$^{-2}$)
0
2
4
6
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

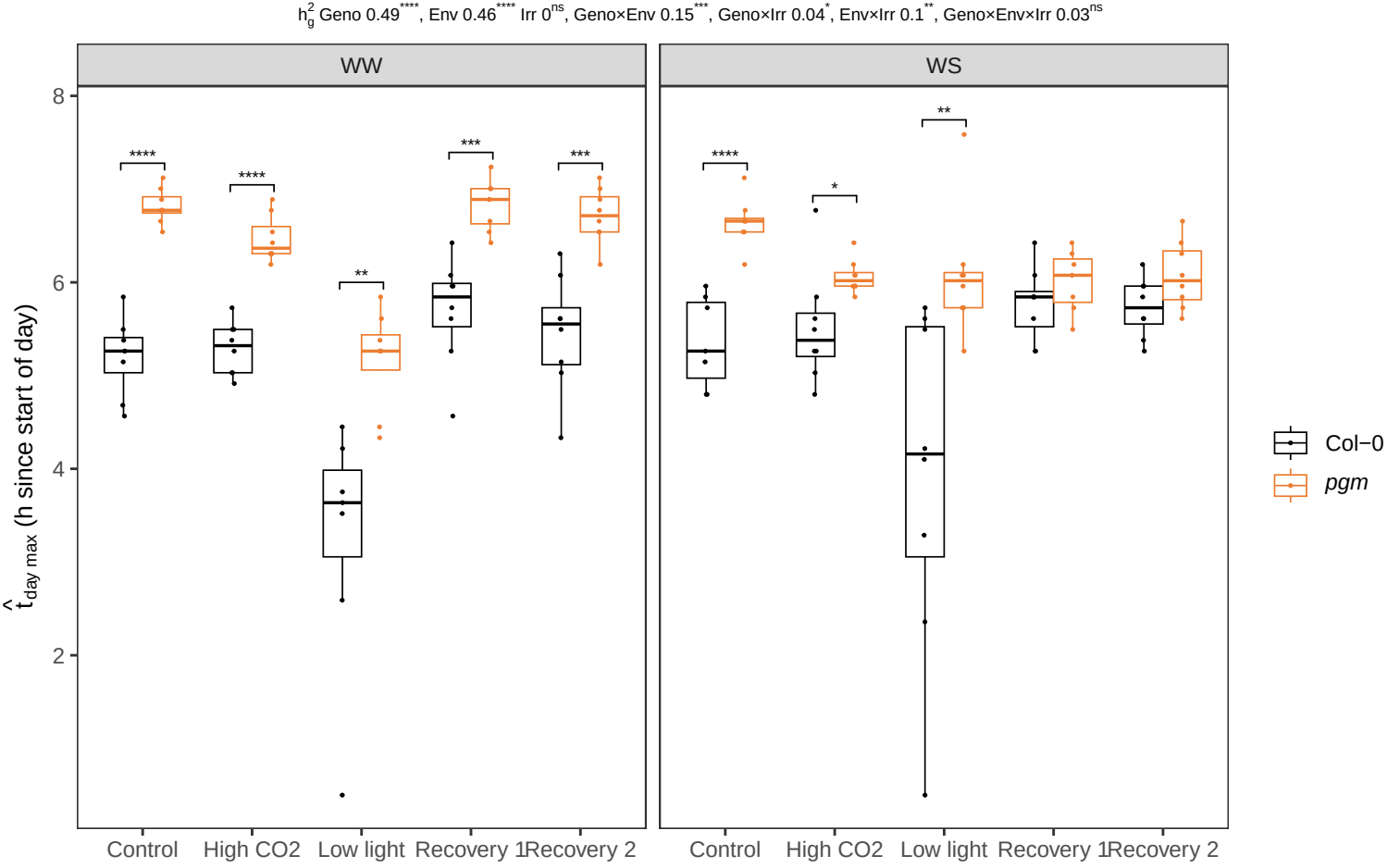

$h^2_g$ Geno 0.09$^{***}$, Env 0.35$^{****}$ Irr 0$^{ns}$, Geno×Env 0.01$^{ns}$, Geno×Irr 0.15$^{****}$, Env×Irr 0.03$^{ns}$, Geno×Env×Irr 0.01$^{ns}$
WW
WS
$\hat{E}_{day}$ (mmol m$^{-2}$ s$^{-1}$)
1.8
1.5
1.2
0.9
**
**
*
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

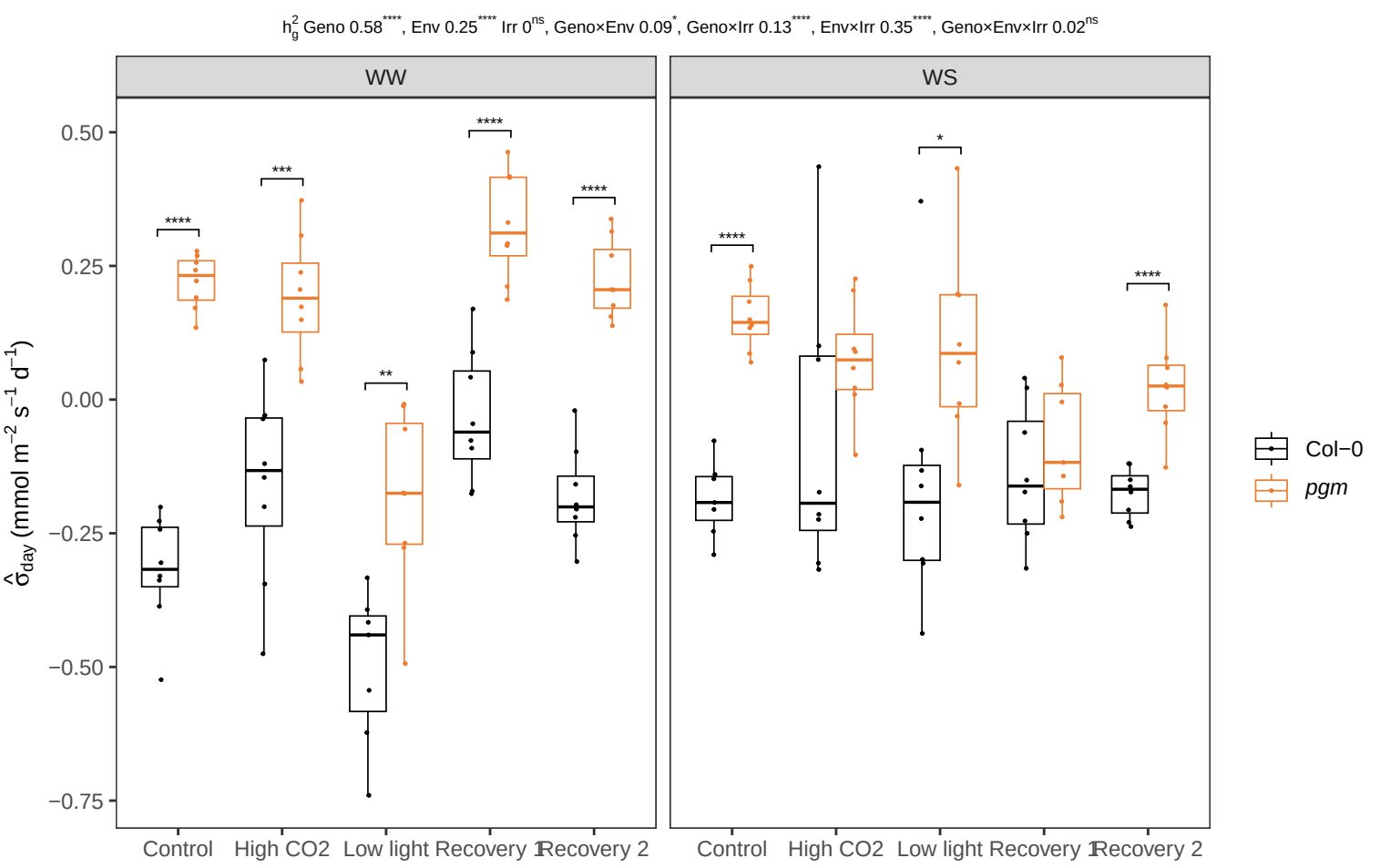

$h^2_g$ Geno 0.04*, Env 0.06ns Irr 0.06**, Geno×Env 0.02ns, Geno×Irr 0.14****, Env×Irr 0.06ns, Geno×Env×Irr 0.02ns
WW
WS
$\hat{E}_{night}$ (mmol $m^{-2}$ $s^{-1}$)
1.0
0.8
0.6
**
*
**
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

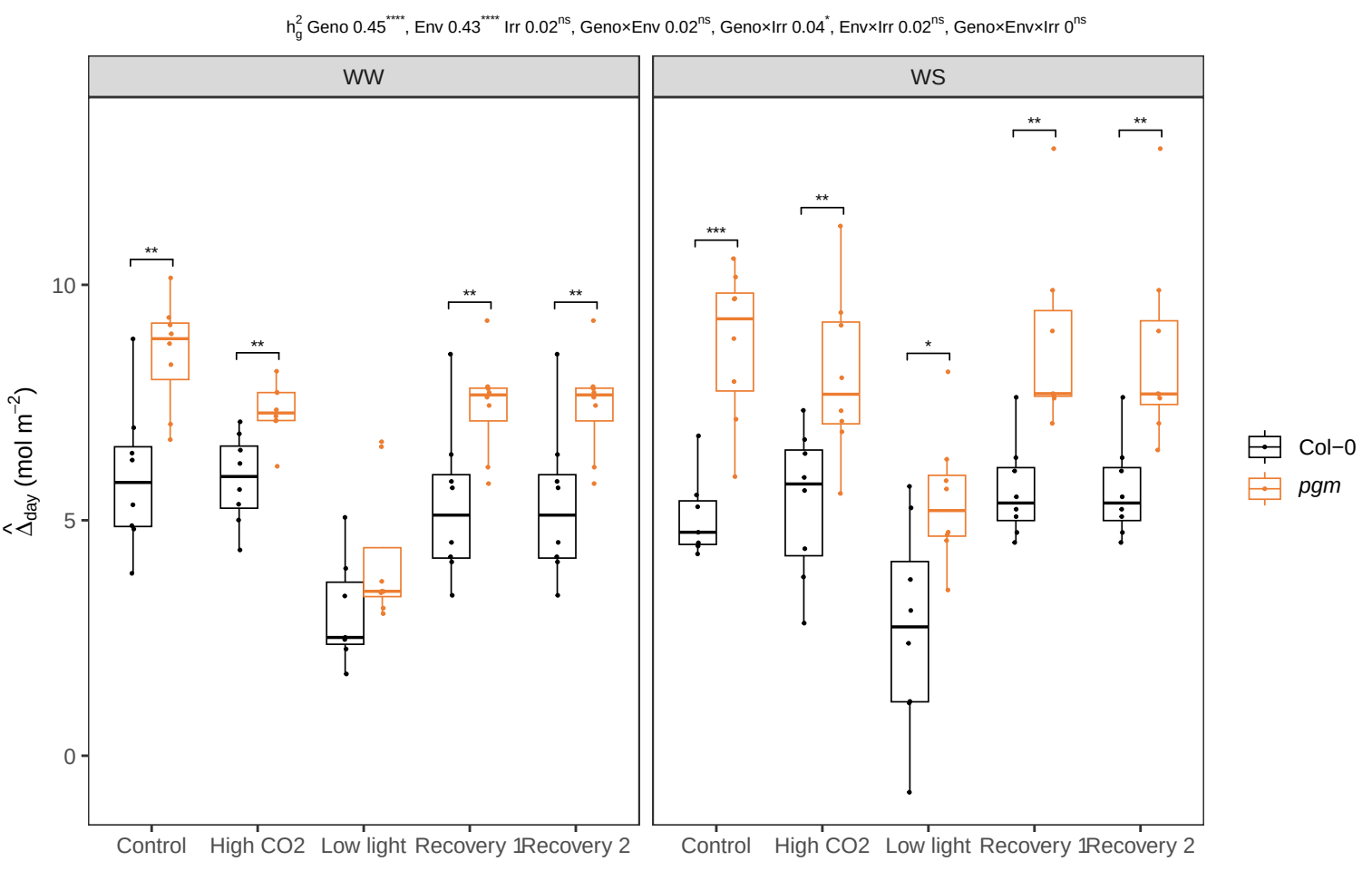

$h^2_g$ Geno $0^{ns}$, Env $0.07^{*}$ Irr $0.05^{**}$, Geno×Env $0.02^{ns}$, Geno×Irr $0.14^{****}$, Env×Irr $0.07^{*}$, Geno×Env×Irr $0.02^{ns}$
WW
WS
1.3
1.1
0.9
0.7
$\hat{E}_{\text{end of night}}$ (mmol $m^{-2}$ $s^{-1}$)
*
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

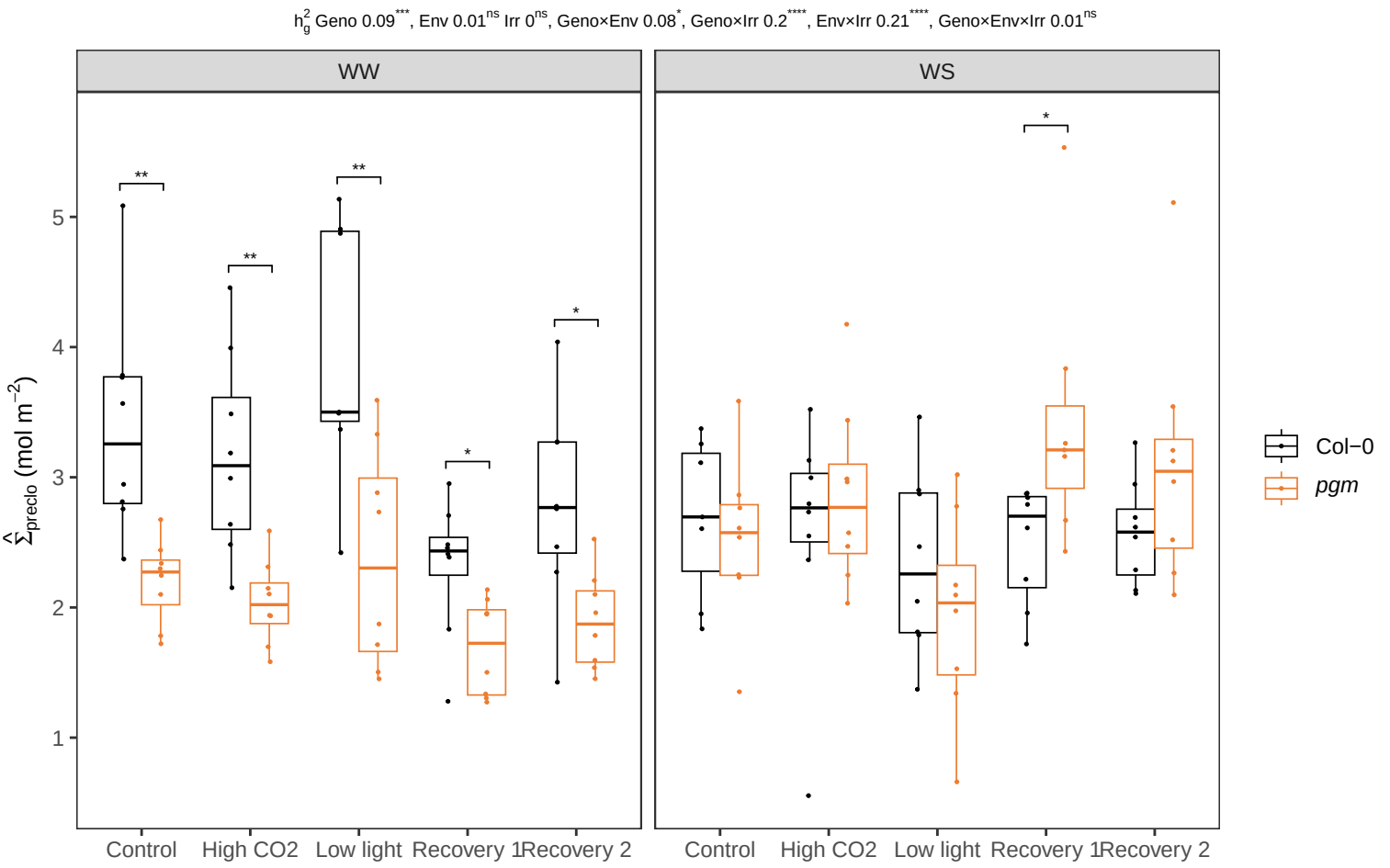

$h^2_g$ Geno 0.14$^{****}$, Env 0.61$^{****}$ Irr 0.1$^{***}$, Geno×Env 0.07$^{*}$, Geno×Irr 0.07$^{***}$, Env×Irr 0.12$^{***}$, Geno×Env×Irr 0.01$^{ns}$
WW
WS
$\hat{A}_{diel}$ (mmol m$^{-2}$ s$^{-1}$)
1.2
0.9
0.6
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm
*
**
**
*

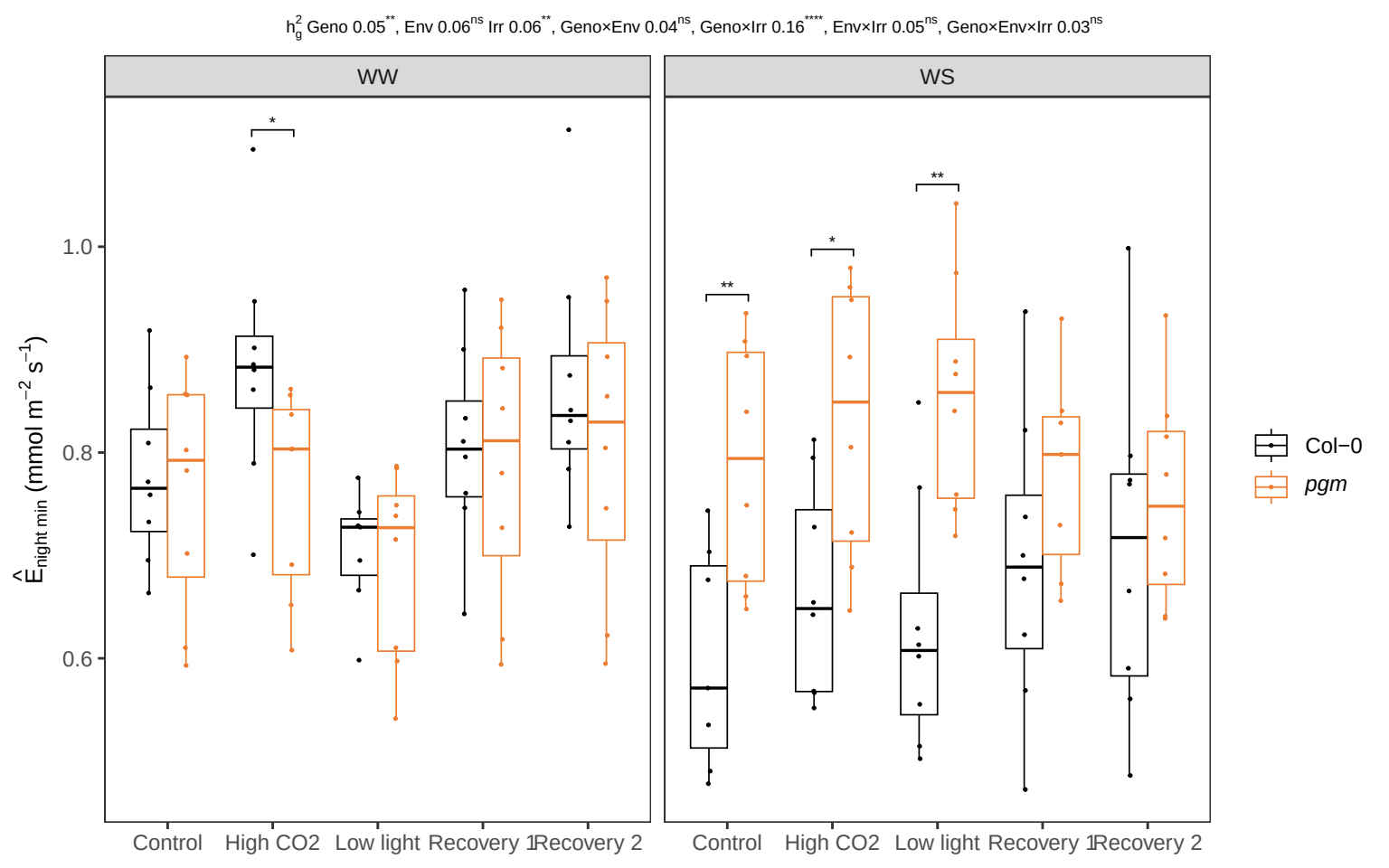

$h^2_g$ Geno 0.12$^{****}$, Env 0.36$^{****}$ Irr 0$^{ns}$, Geno×Env 0.01$^{ns}$, Geno×Irr 0.16$^{****}$, Env×Irr 0.03$^{ns}$, Geno×Env×Irr 0.01$^{ns}$
WW
WS
$\hat{E}_{day\ max}$ (mmol m$^{-2}$ s$^{-1}$)
2.0
1.6
1.2
*
**
**
**
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

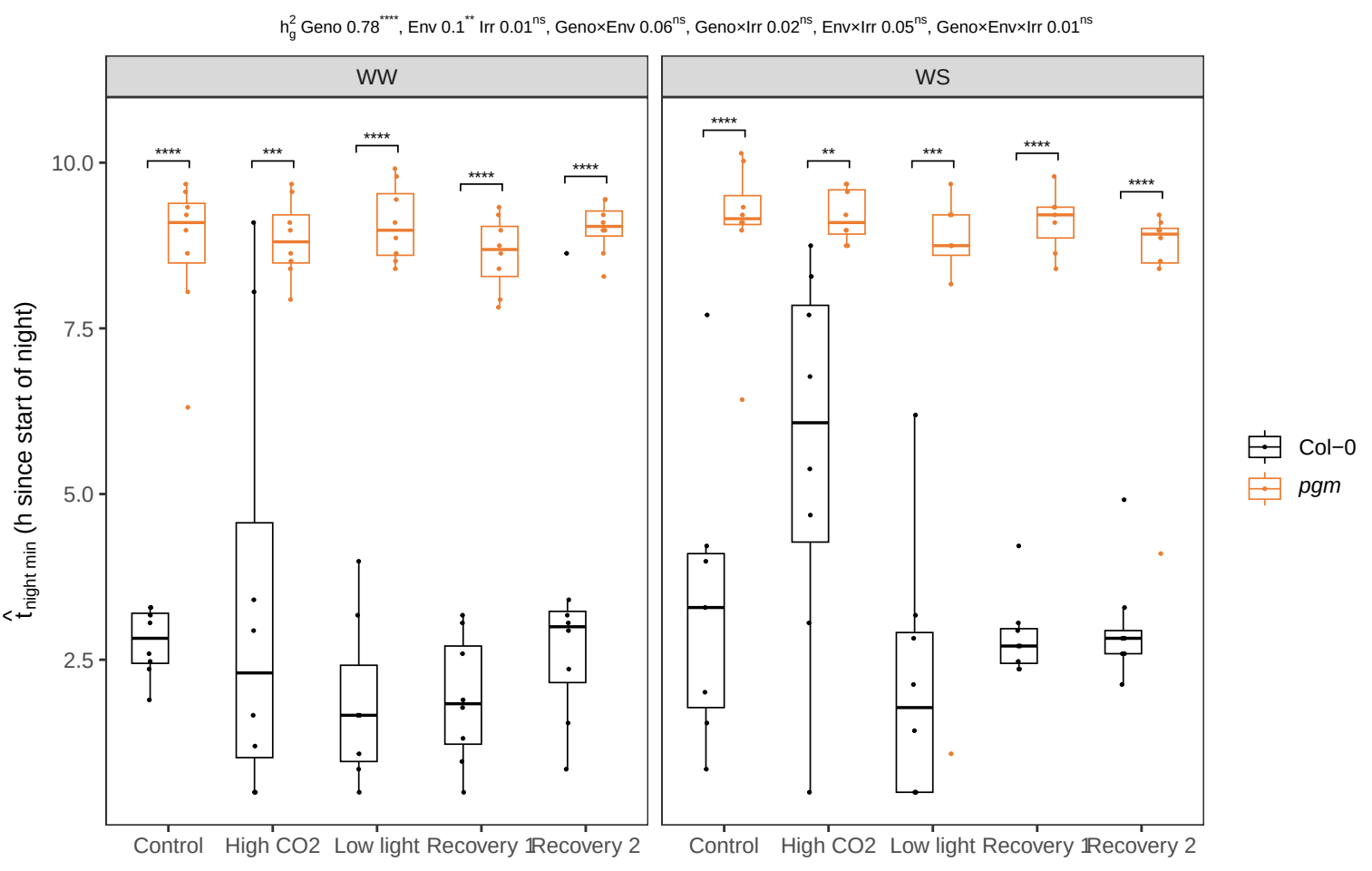

$h_g^2$ Geno 0.49$^{****}$, Env 0.46$^{****}$ Irr 0$^{ns}$, Geno×Env 0.15$^{***}$, Geno×Irr 0.04$^{*}$, Env×Irr 0.1$^{**}$, Geno×Env×Irr 0.03$^{ns}$
WW
WS
$\hat{t}_{day\ max}$ (h since start of day)
8
6
4
2
****
****
**
***
***
****
*
**
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

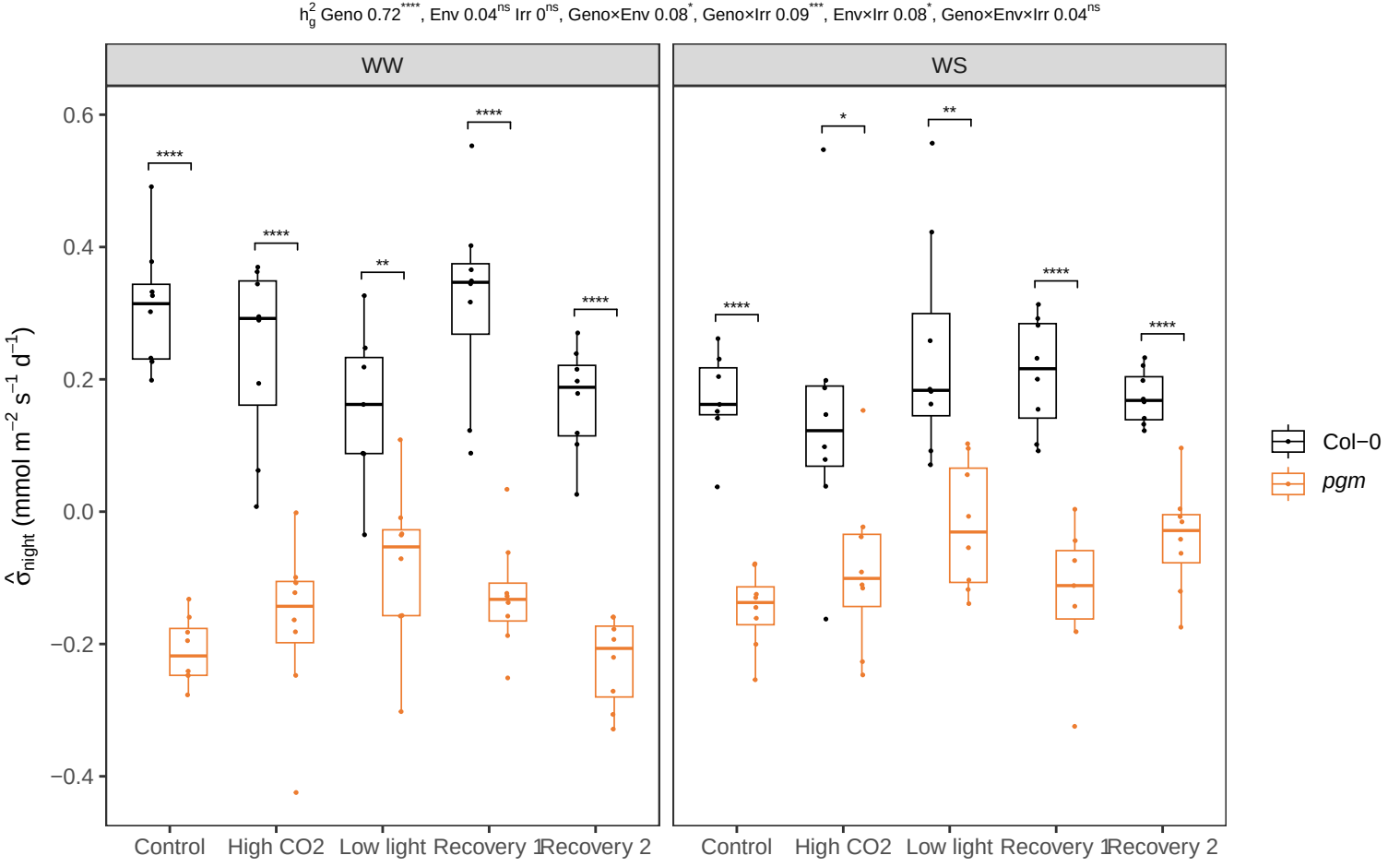

$h_g^2$ Geno 0.58$^{****}$, Env 0.25$^{****}$ Irr 0$^{ns}$, Geno×Env 0.09$^{*}$, Geno×Irr 0.13$^{****}$, Env×Irr 0.35$^{****}$, Geno×Env×Irr 0.02$^{ns}$
WW
WS
$\hat{\sigma}_{day}$ (mmol m$^{-2}$ s$^{-1}$ d$^{-1}$)
0.50
0.25
0.00
−0.25
−0.50
−0.75
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

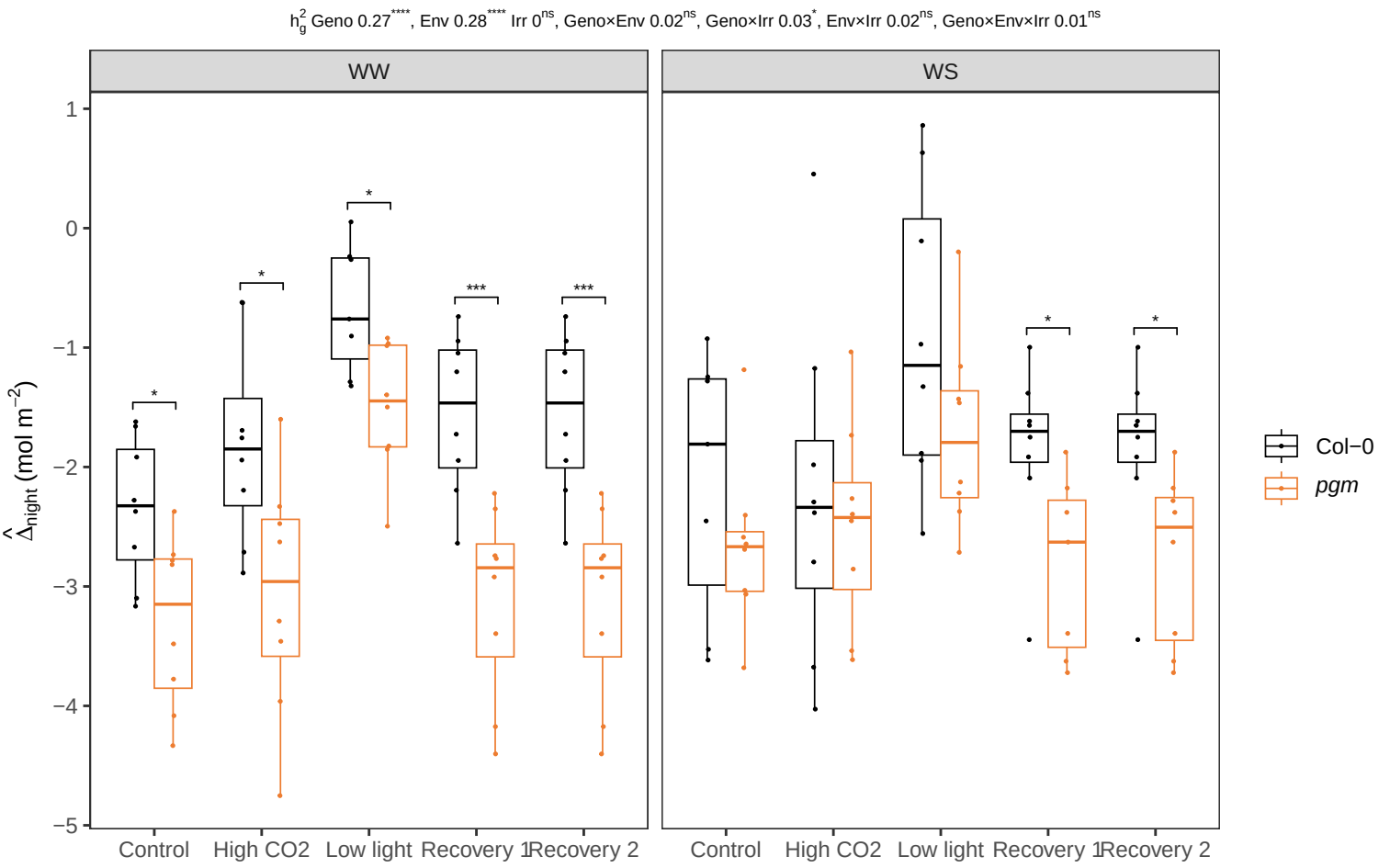

$h^2_g$ Geno 0.45$^{****}$, Env 0.43$^{****}$ Irr 0.02$^{ns}$, Geno×Env 0.02$^{ns}$, Geno×Irr 0.04$^{*}$, Env×Irr 0.02$^{ns}$, Geno×Env×Irr 0$^{ns}$
WW
WS
$\hat{\Delta}_{day}$ (mol m$^{-2}$)
10
5
0
**
**
**
**
***
**
*
**
**
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

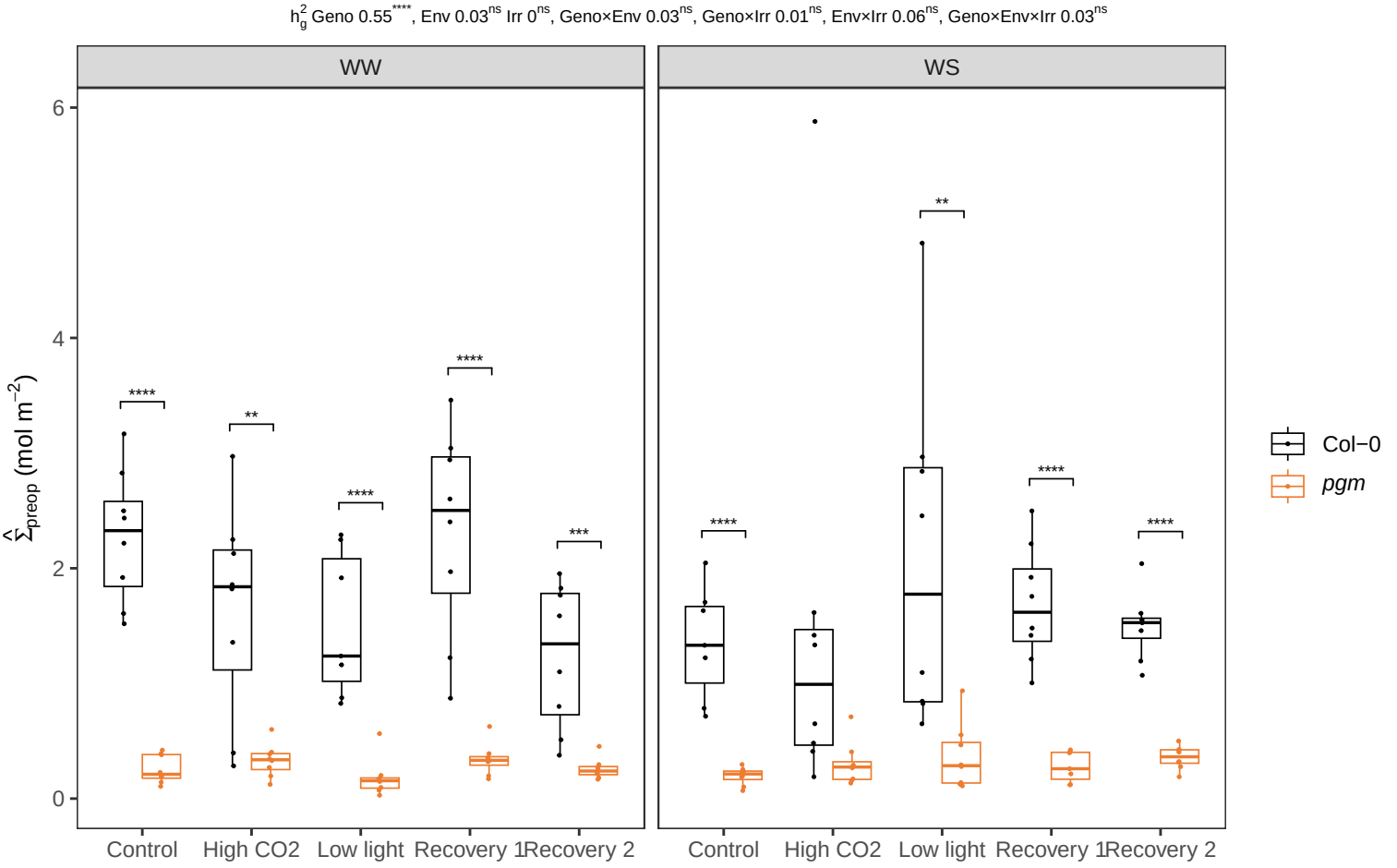

$h^2_g$ Geno 0.09$^{***}$, Env 0.01$^{ns}$ Irr 0$^{ns}$, Geno×Env 0.08$^{*}$, Geno×Irr 0.2$^{****}$, Env×Irr 0.21$^{****}$, Geno×Env×Irr 0.01$^{ns}$
WW
WS
$\hat{\Sigma}_{precIo}$ (mol m$^{-2}$)
1
2
3
4
5
**
**
**
*
*
*
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

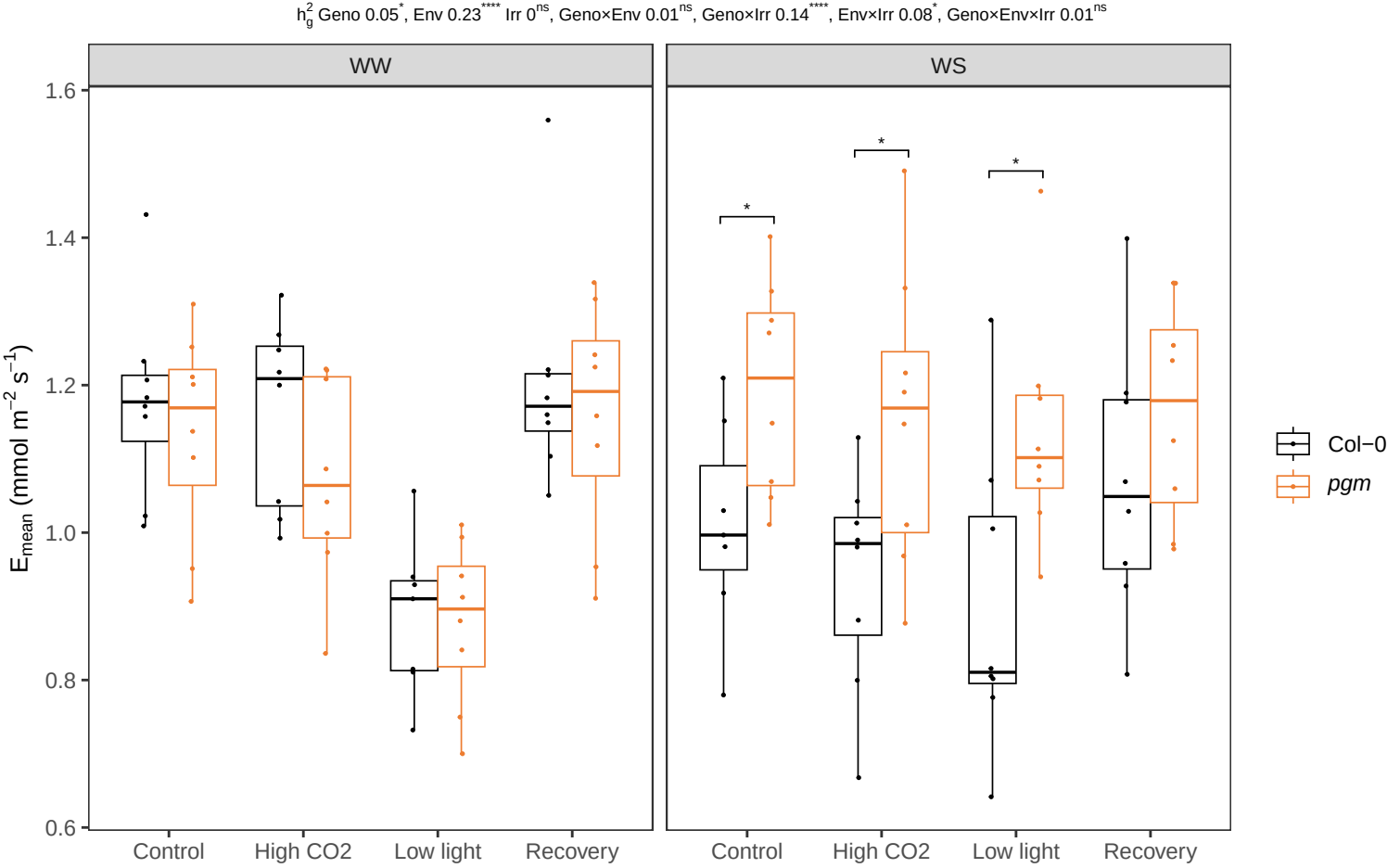

$h^2_g$ Geno 0.05**, Env 0.06ns Irr 0.06**, Geno×Env 0.04ns, Geno×Irr 0.16****, Env×Irr 0.05ns, Geno×Env×Irr 0.03ns
WW
WS
$\hat{E}_{night\ min}$ (mmol $m^{-2}$ $s^{-1}$)
1.0
0.8
0.6
*
**
*
**
**
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

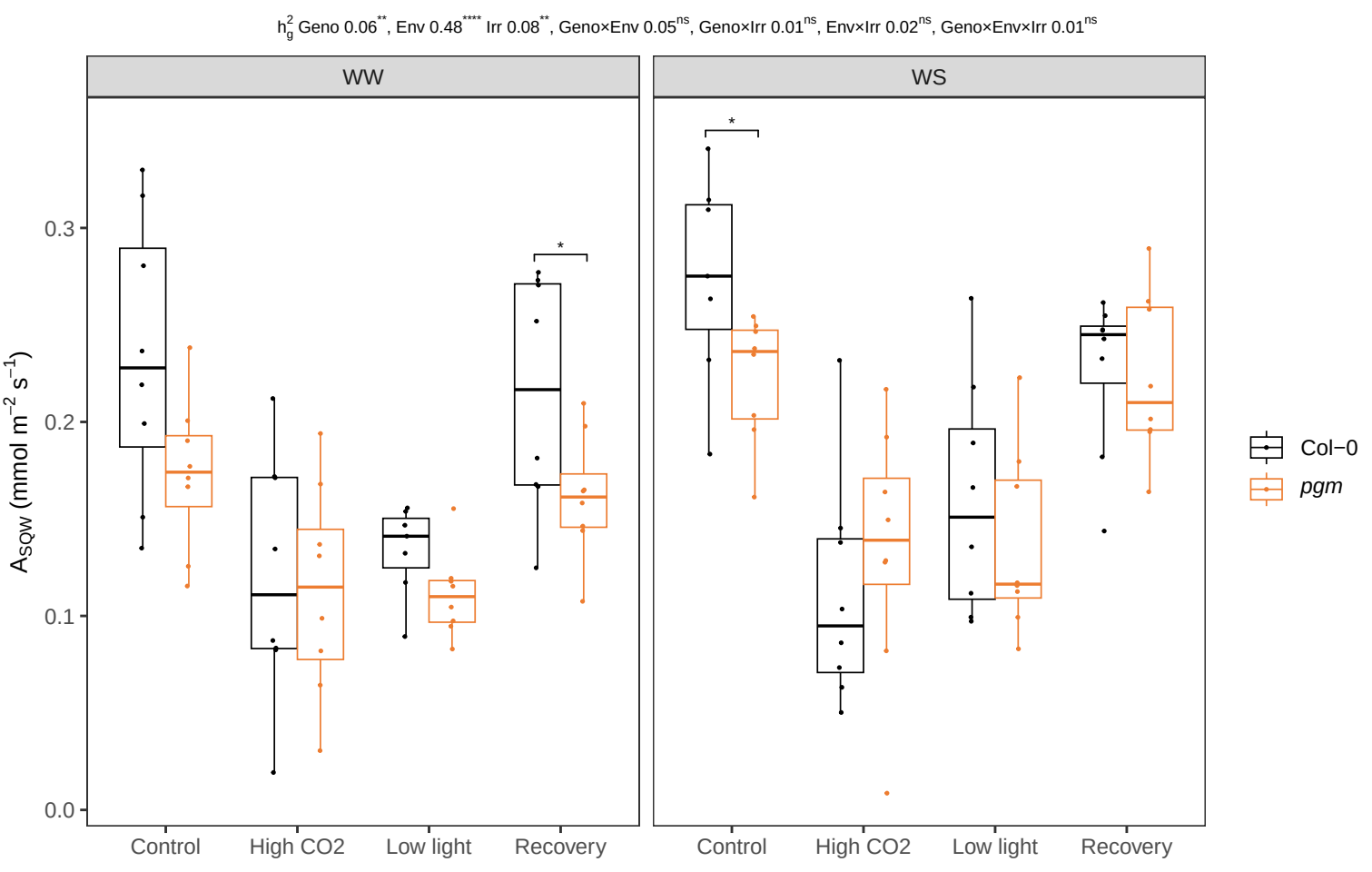

$h_g^2$ Geno 0.78$^{****}$, Env 0.1$^{**}$ Irr 0.01$^{ns}$, Geno×Env 0.06$^{ns}$, Geno×Irr 0.02$^{ns}$, Env×Irr 0.05$^{ns}$, Geno×Env×Irr 0.01$^{ns}$
WW
WS
$\hat{t}_{night\ min}$ (h since start of night)
10.0
7.5
5.0
2.5
****
***
****
****
****
****
**
***
****
****
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

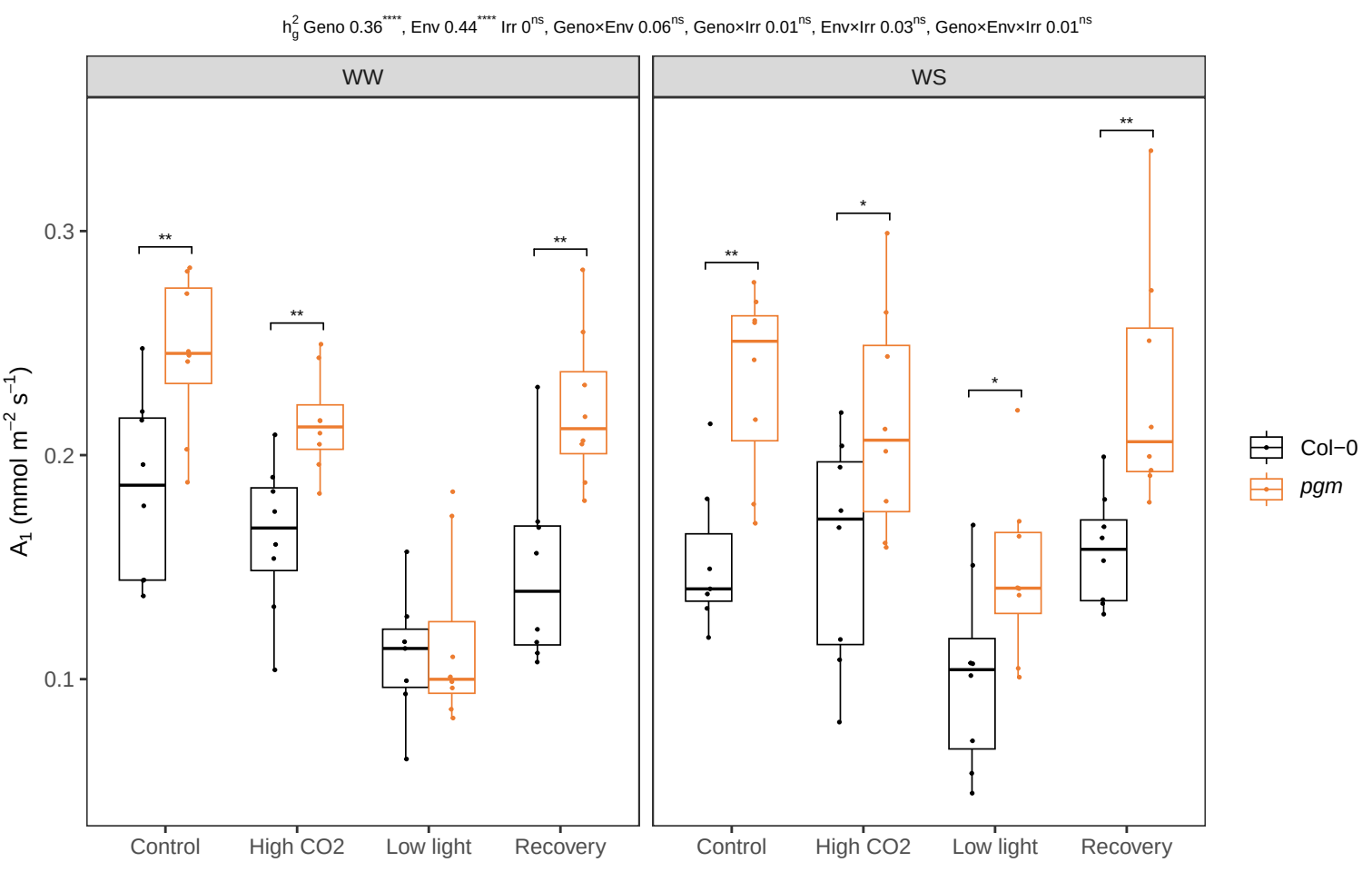

$h^2_g$ Geno 0.72$^{****}$, Env 0.04$^{ns}$ Irr 0$^{ns}$, Geno×Env 0.08$^{*}$, Geno×Irr 0.09$^{***}$, Env×Irr 0.08$^{*}$, Geno×Env×Irr 0.04$^{ns}$
WW
WS
$\hat{\sigma}_{night}$ (mmol m$^{-2}$ s$^{-1}$ d$^{-1}$)
0.6
0.4
0.2
0.0
−0.2
−0.4
****
****
**
****
****
*
**
****
****
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

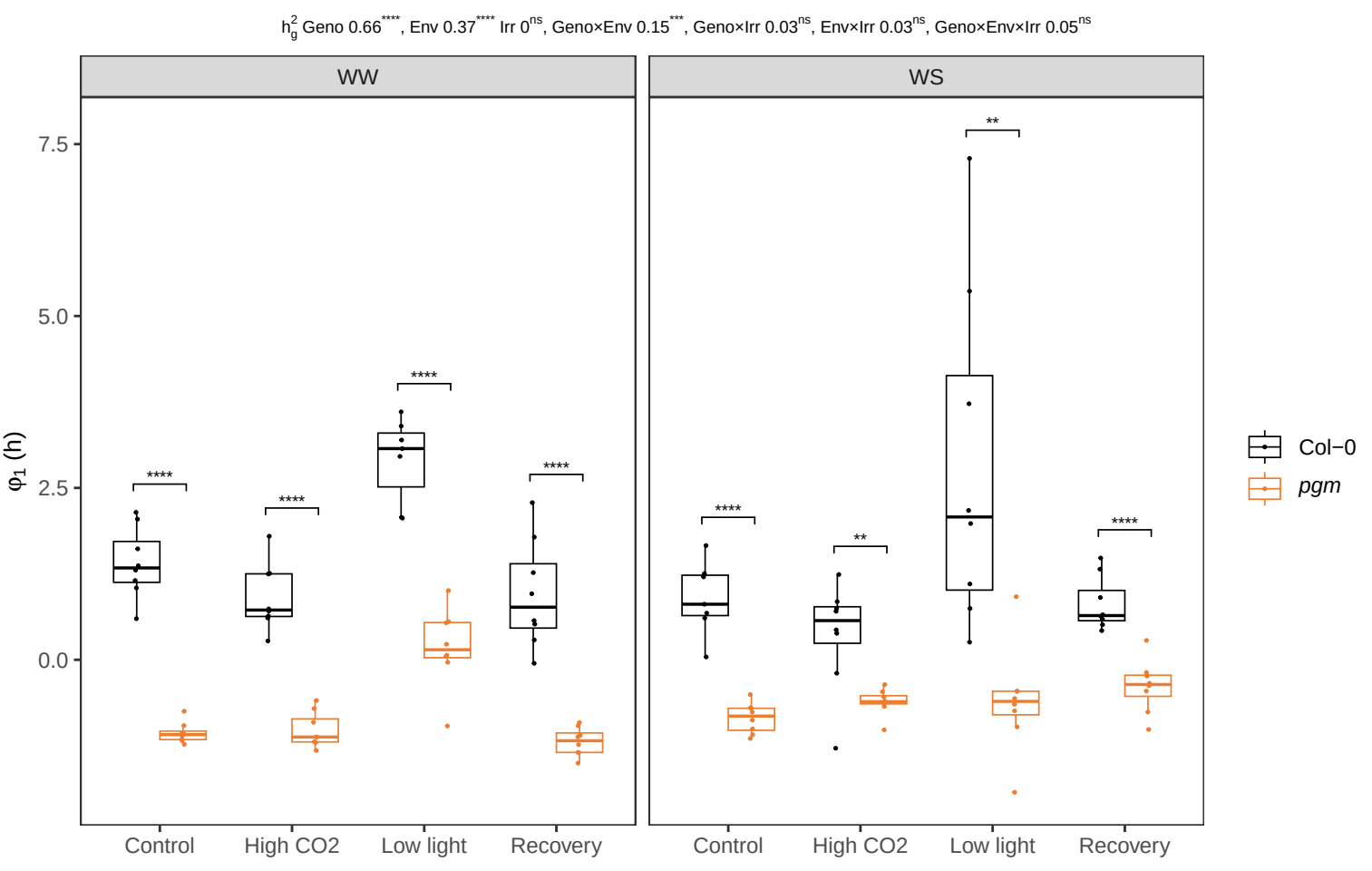

$h^2_g$ Geno 0.27$^{****}$, Env 0.28$^{****}$ Irr 0$^{ns}$, Geno×Env 0.02$^{ns}$, Geno×Irr 0.03$^{*}$, Env×Irr 0.02$^{ns}$, Geno×Env×Irr 0.01$^{ns}$
WW
WS
$\hat{\Delta}_{night}$ (mol m$^{-2}$)
1
0
−1
−2
−3
−4
−5
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

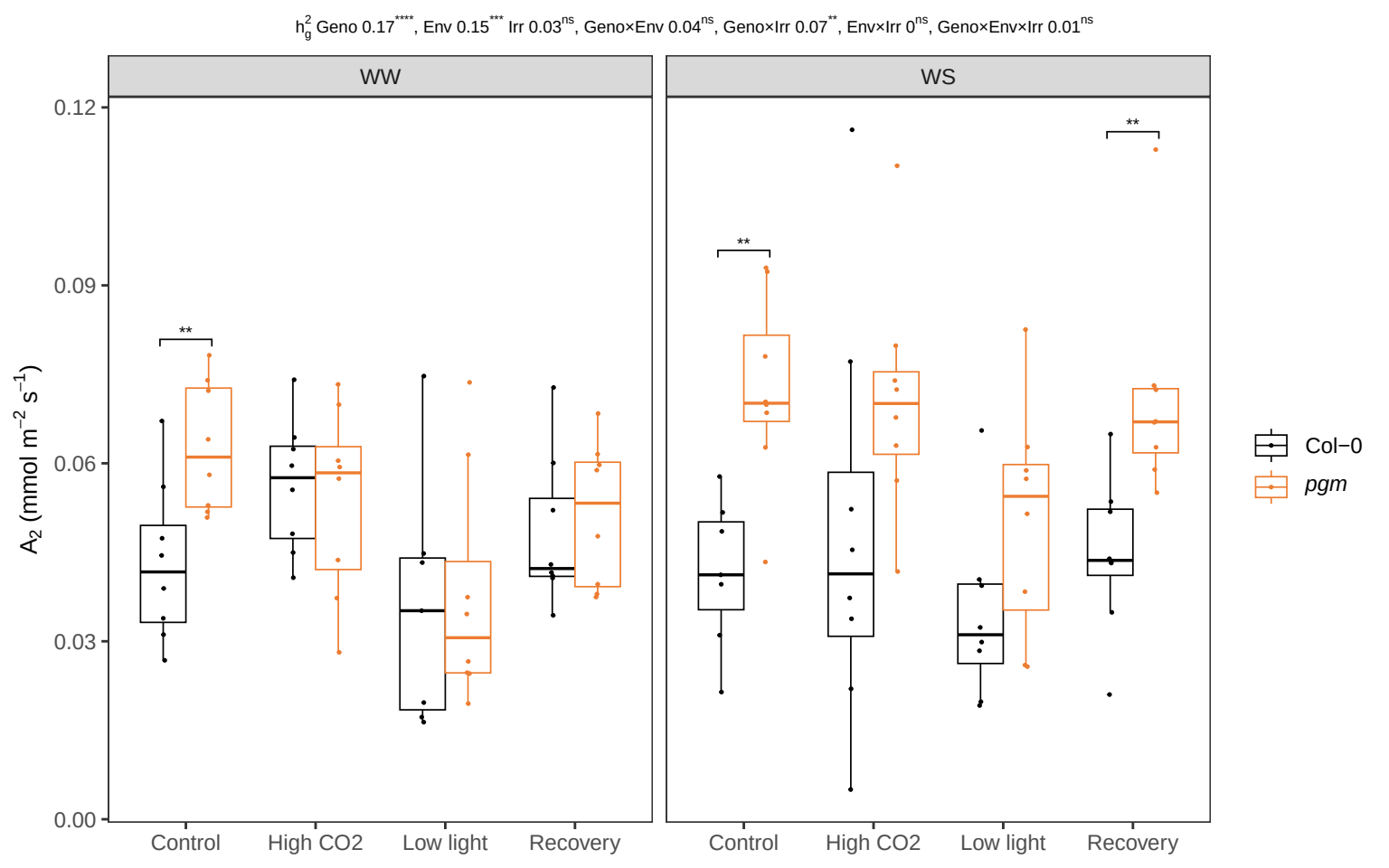

$h^2_g$ Geno 0.55$^{****}$, Env 0.03$^{ns}$ Irr 0$^{ns}$, Geno×Env 0.03$^{ns}$, Geno×Irr 0.01$^{ns}$, Env×Irr 0.06$^{ns}$, Geno×Env×Irr 0.03$^{ns}$
WW
WS
$\hat{\Sigma}_{preop}$ (mol m$^{-2}$)
0
2
4
6
****
**
****
****
***
**
****
****
Control
High CO2
Low light
Recovery 1
Recovery 2
Col−0
pgm

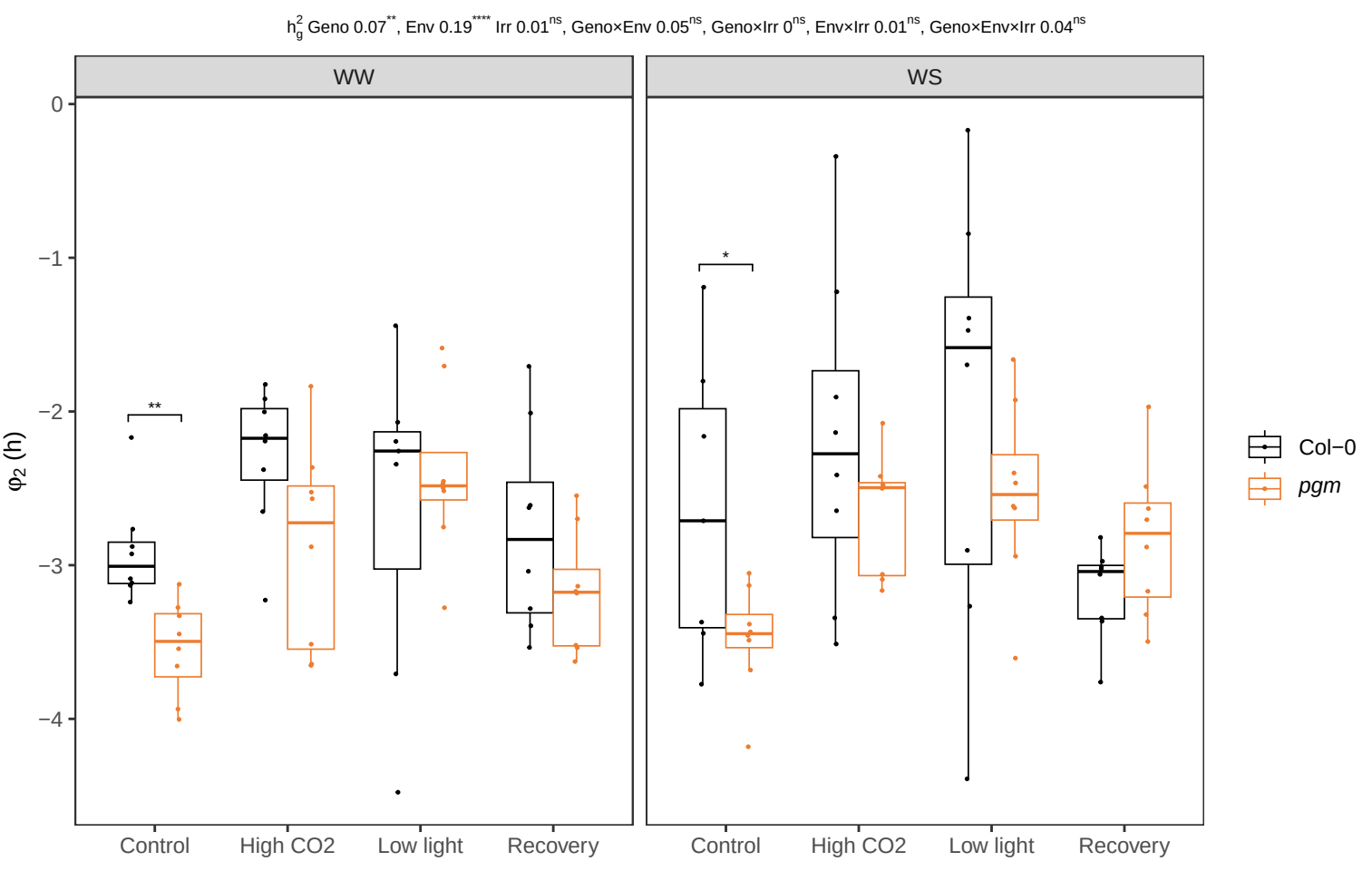

$h^2_g$ Geno 0.05*, Env 0.23**** Irr 0ns, Geno×Env 0.01ns, Geno×Irr 0.14****, Env×Irr 0.08*, Geno×Env×Irr 0.01ns
WW
WS
$E_{mean}$ (mmol $m^{-2}$ $s^{-1}$)
1.6
1.4
1.2
1.0
0.8
0.6
Control
High CO2
Low light
Recovery
*
Col−0
pgm

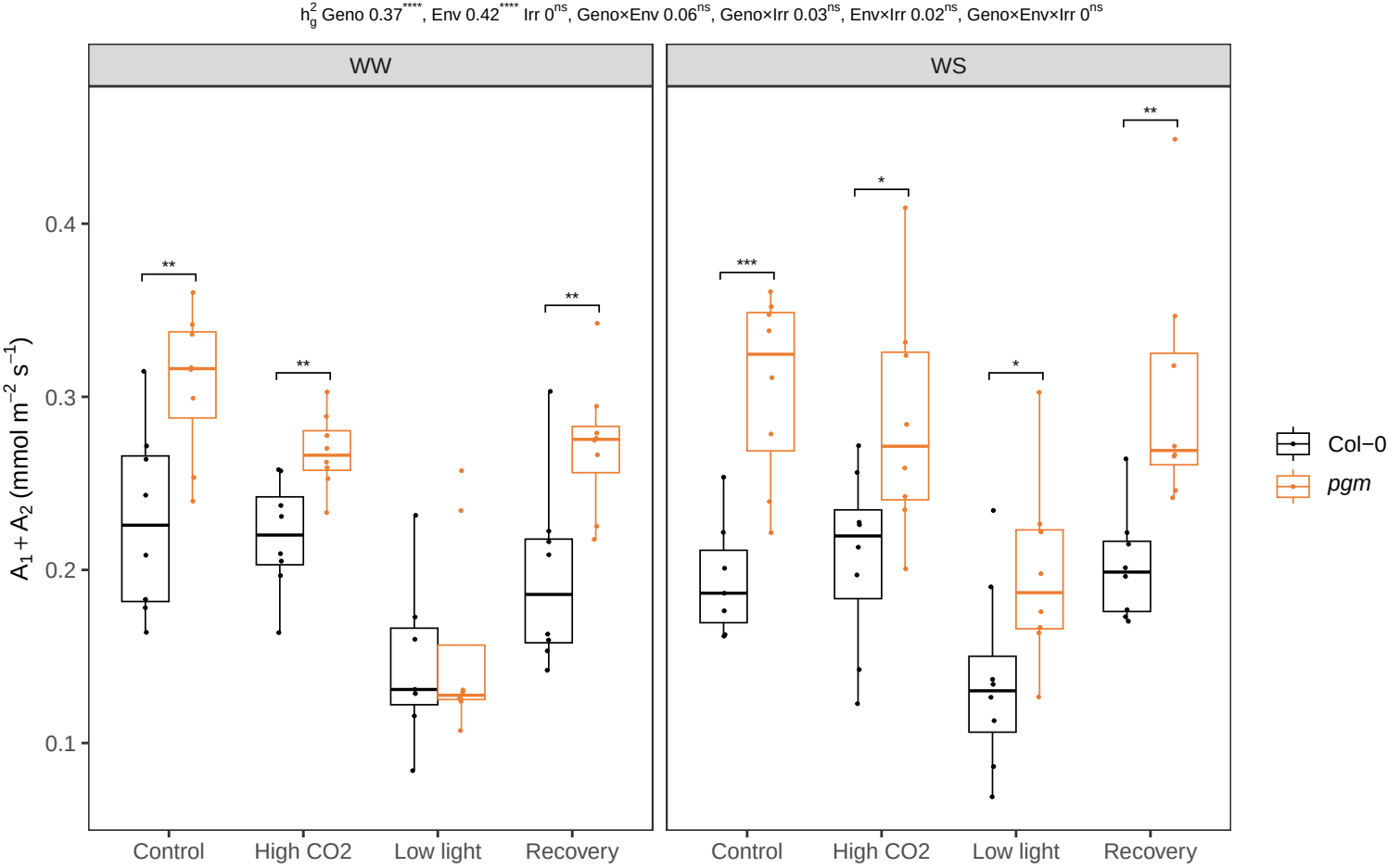

$h^2_g$ Geno 0.06$^{**}$, Env 0.48$^{****}$ Irr 0.08$^{**}$, Geno×Env 0.05$^{ns}$, Geno×Irr 0.01$^{ns}$, Env×Irr 0.02$^{ns}$, Geno×Env×Irr 0.01$^{ns}$
WW
WS
$A_{SQW}$ (mmol $m^{-2}$ $s^{-1}$)
0.0
0.1
0.2
0.3
*
*
Control
High CO2
Low light
Recovery
Control
High CO2
Low light
Recovery
Col−0
pgm

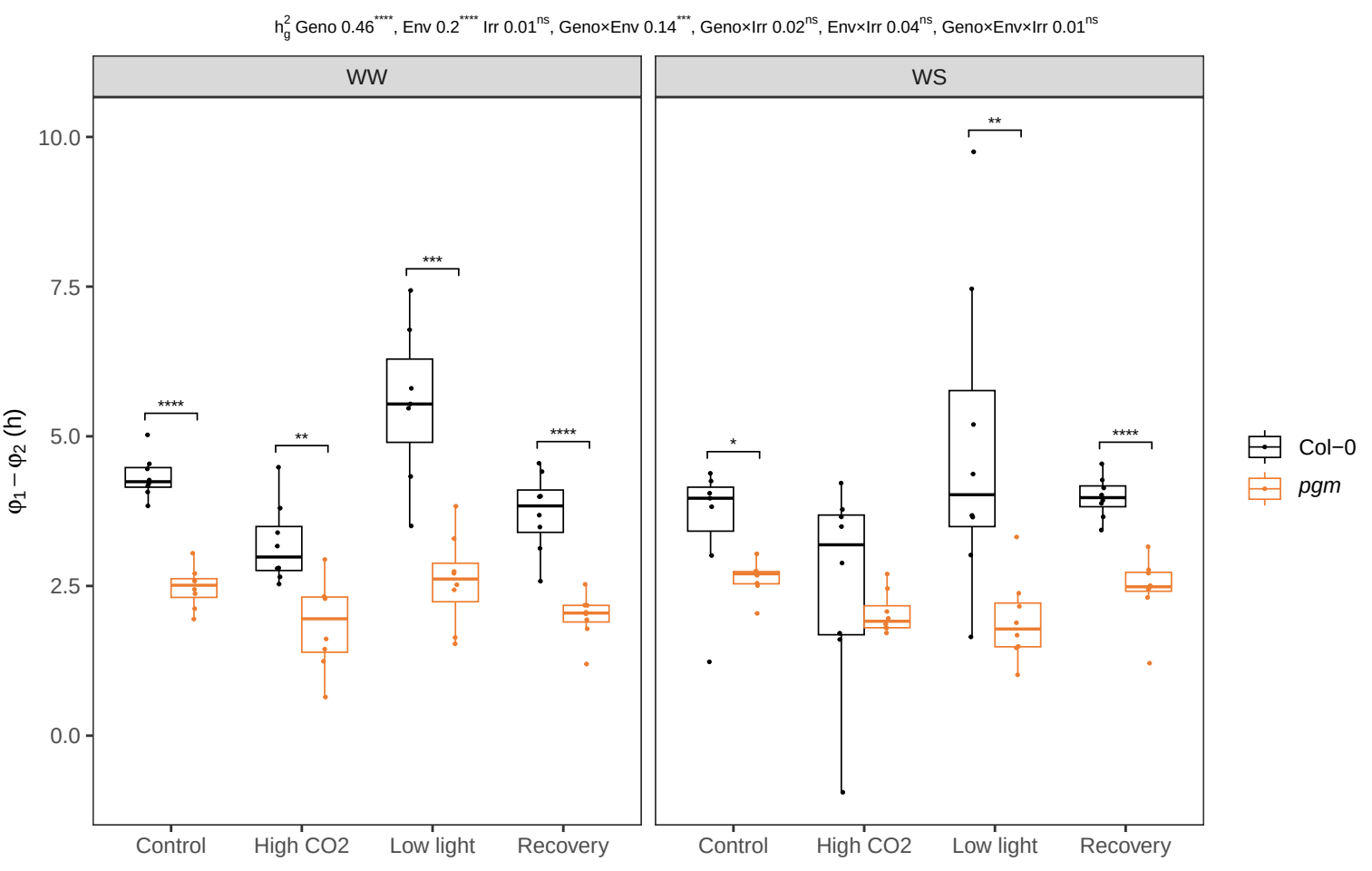

$h_g^2$ Geno 0.36$^{****}$, Env 0.44$^{****}$ Irr 0$^{ns}$, Geno×Env 0.06$^{ns}$, Geno×Irr 0.01$^{ns}$, Env×Irr 0.03$^{ns}$, Geno×Env×Irr 0.01$^{ns}$
WW
WS
$A_1$ (mmol $m^{-2}$ $s^{-1}$)
0.3
0.2
0.1
**
*
Control
High CO2
Low light
Recovery
Col−0
pgm

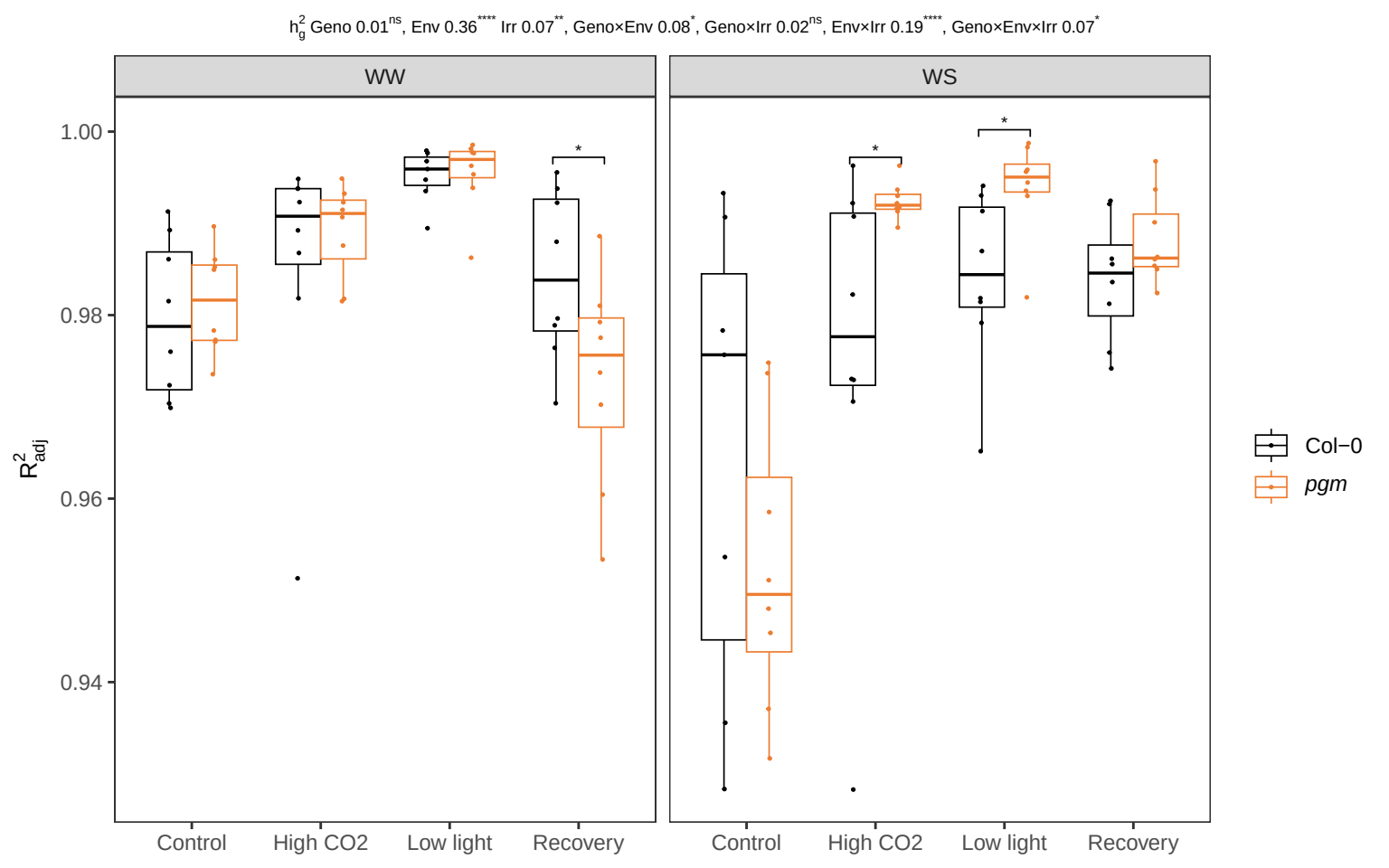

$h_g^2$ Geno 0.66$^{****}$, Env 0.37$^{****}$ Irr 0$^{ns}$, Geno×Env 0.15$^{***}$, Geno×Irr 0.03$^{ns}$, Env×Irr 0.03$^{ns}$, Geno×Env×Irr 0.05$^{ns}$
WW
WS
$\varphi_1$ (h)
7.5
5.0
2.5
0.0
****
**
Control
High CO2
Low light
Recovery
Col−0
pgm

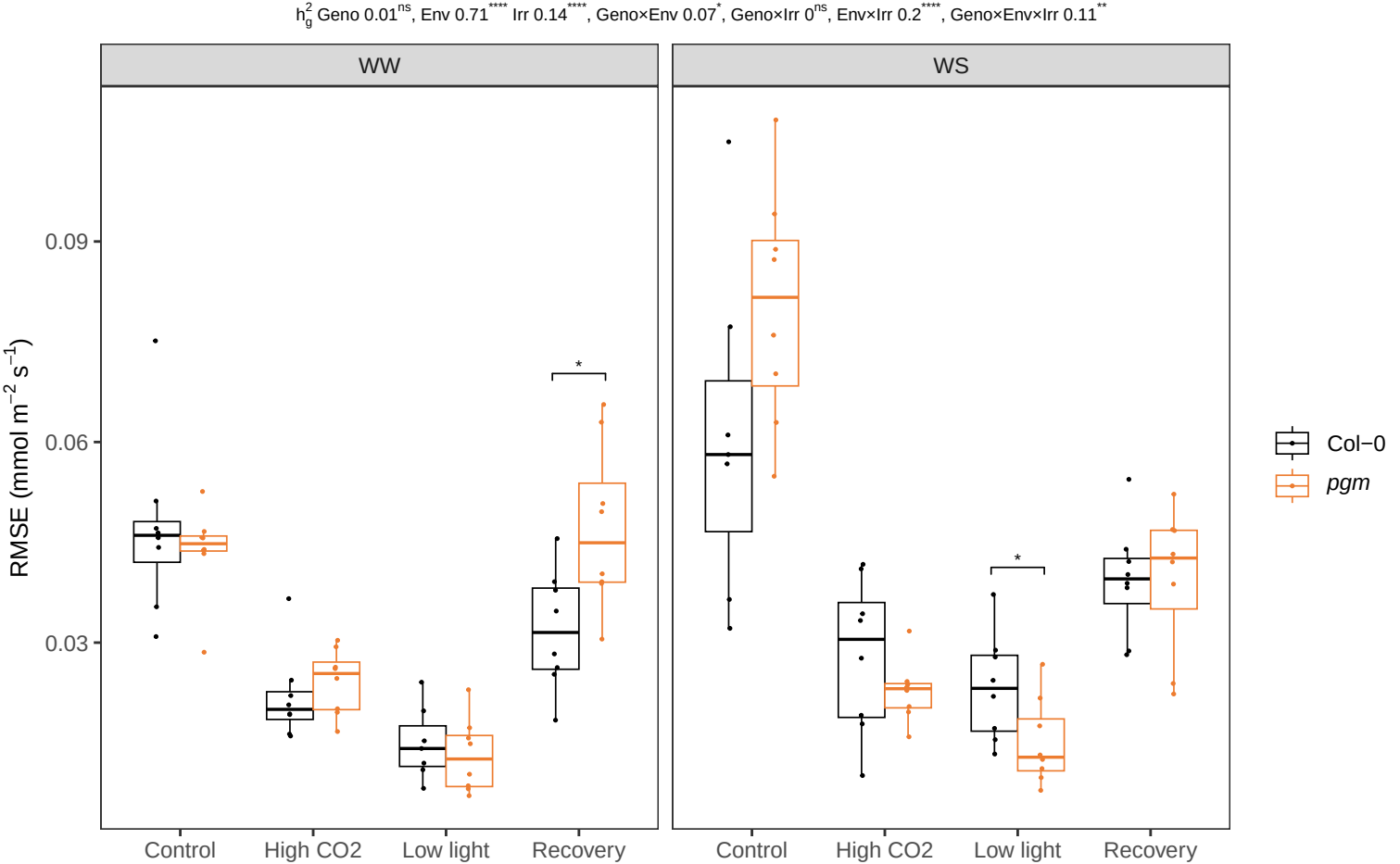

$h^2_g$ Geno 0.17$^{****}$, Env 0.15$^{***}$ Irr 0.03$^{ns}$, Geno×Env 0.04$^{ns}$, Geno×Irr 0.07$^{**}$, Env×Irr 0$^{ns}$, Geno×Env×Irr 0.01$^{ns}$
WW
WS
$A_2$ (mmol m$^{-2}$ s$^{-1}$)
0.12
0.09
0.06
0.03
0.00
**
**
**
Control
High CO2
Low light
Recovery
Control
High CO2
Low light
Recovery
Col−0
pgm

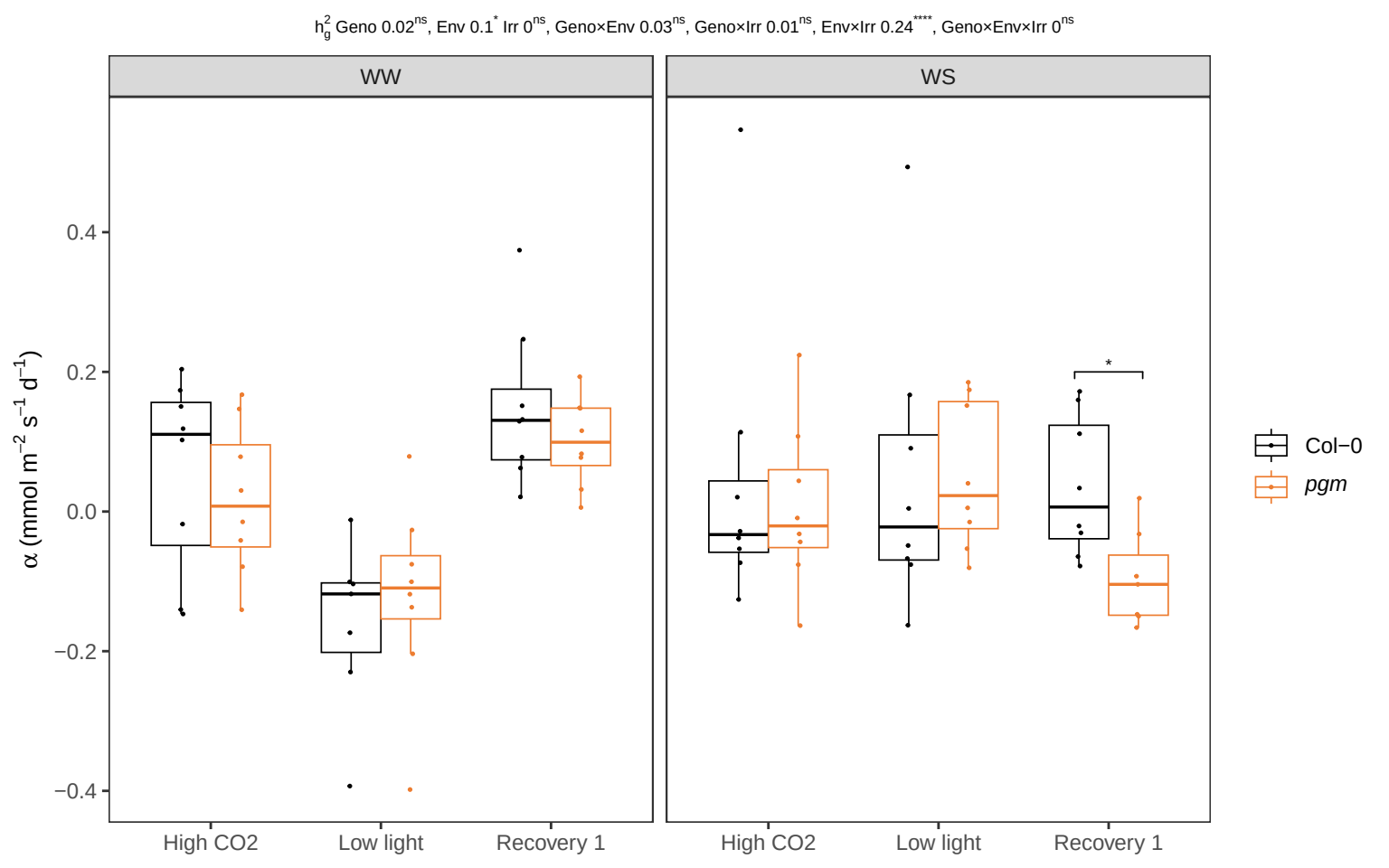

$h^2_g$ Geno 0.07$^{**}$, Env 0.19$^{****}$ Irr 0.01$^{ns}$, Geno×Env 0.05$^{ns}$, Geno×Irr 0$^{ns}$, Env×Irr 0.01$^{ns}$, Geno×Env×Irr 0.04$^{ns}$
WW
WS
0
−1
−2
−3
−4
φ2 (h)
**
*
Control
High CO2
Low light
Recovery
Col−0
pgm

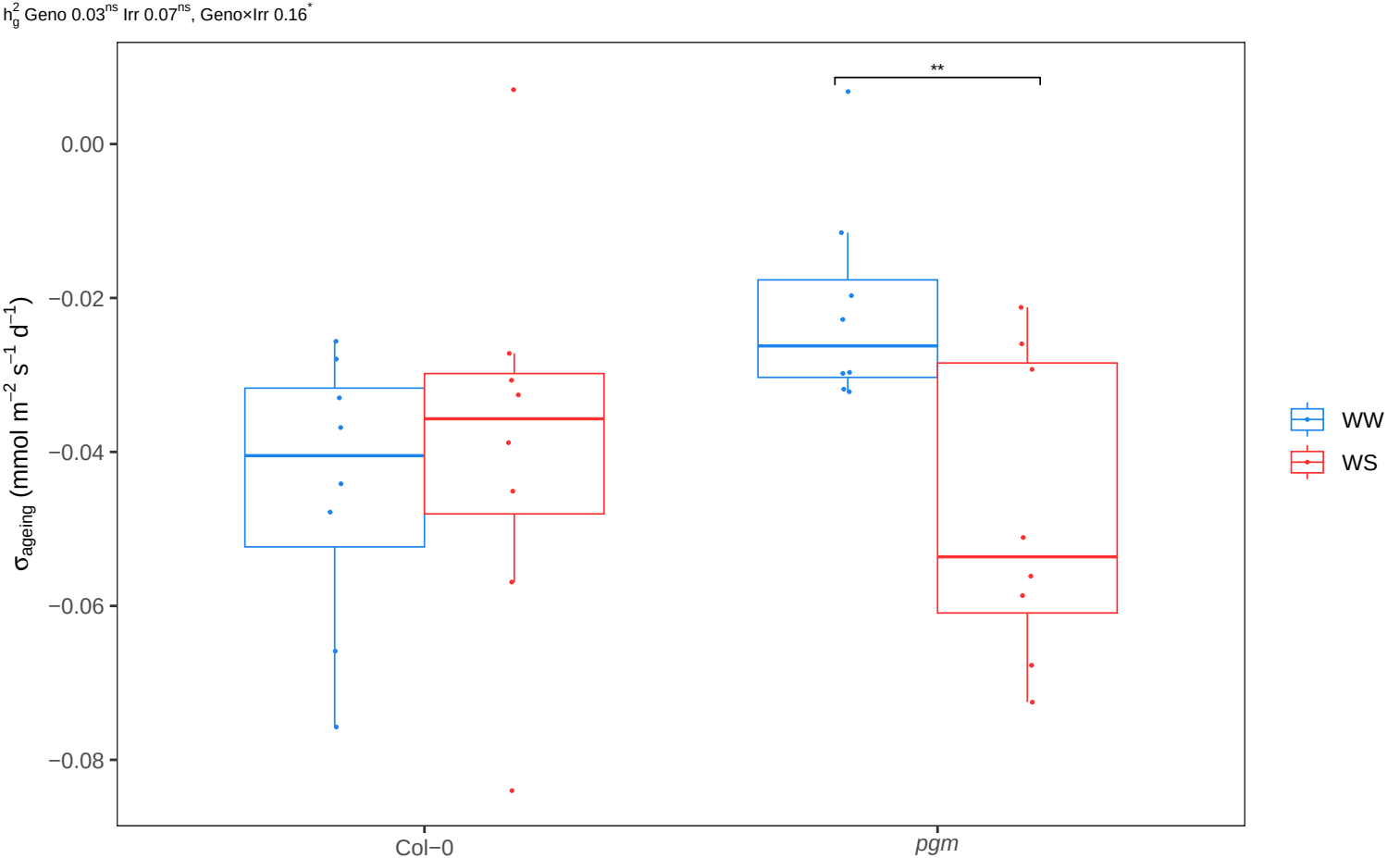

$h^2_g$ Geno 0.37$^{****}$, Env 0.42$^{****}$ Irr 0$^{ns}$, Geno×Env 0.06$^{ns}$, Geno×Irr 0.03$^{ns}$, Env×Irr 0.02$^{ns}$, Geno×Env×Irr 0$^{ns}$
WW
WS
$A_1 + A_2$ (mmol $m^{-2}$ $s^{-1}$)
0.4
0.3
0.2
0.1
**
**
**
**
***
*
*
**
Control
High CO2
Low light
Recovery
Control
High CO2
Low light
Recovery
Col−0
pgm


$h_g^2$ Geno 0.46$^{****}$, Env 0.2$^{****}$ Irr 0.01$^{ns}$, Geno×Env 0.14$^{***}$, Geno×Irr 0.02$^{ns}$, Env×Irr 0.04$^{ns}$, Geno×Env×Irr 0.01$^{ns}$
WW
WS
$\varphi_1 - \varphi_2$ (h)
10.0
7.5
5.0
2.5
0.0
****
**
***
****
*
**
****
Control
High CO2
Low light
Recovery
Col−0
pgm


$h^2_g$ Geno 0.01$^{ns}$, Env 0.36$^{****}$ Irr 0.07$^{**}$, Geno×Env 0.08$^{*}$, Geno×Irr 0.02$^{ns}$, Env×Irr 0.19$^{****}$, Geno×Env×Irr 0.07$^{*}$
WW
WS
$R^2_{adj}$
1.00
0.98
0.96
0.94
*
Control
High CO2
Low light
Recovery
Col−0
pgm


$h^2_g$ Geno 0.01$^{ns}$, Env 0.71$^{****}$ Irr 0.14$^{****}$, Geno×Env 0.07$^{*}$, Geno×Irr 0$^{ns}$, Env×Irr 0.2$^{****}$, Geno×Env×Irr 0.11$^{**}$
WW
WS
RMSE (mmol m$^{-2}$ s$^{-1}$)
0.09
0.06
0.03
*
*
Control
High CO2
Low light
Recovery
Control
High CO2
Low light
Recovery
Col−0
pgm


$h^2_g$ Geno 0.02$^{ns}$, Env 0.1$^{*}$ Irr 0$^{ns}$, Geno×Env 0.03$^{ns}$, Geno×Irr 0.01$^{ns}$, Env×Irr 0.24$^{****}$, Geno×Env×Irr 0$^{ns}$
WW
WS
α (mmol m$^{-2}$ s$^{-1}$ d$^{-1}$)
0.4
0.2
0.0
−0.2
−0.4
*
High CO2
Low light
Recovery 1
High CO2
Low light
Recovery 1
Col−0
pgm


$h^2_g$ Geno 0.03$^{ns}$ Irr 0.07$^{ns}$, Geno×Irr 0.16$^{*}$
**
0.00
−0.02
−0.04
−0.06
−0.08
$\sigma_{ageing}$ (mmol m$^{-2}$ s$^{-1}$ d$^{-1}$)
Col−0
pgm
WW
WS