

SUPPLEMENTAL DATA. Leivar and Monte. Plant Cell.

Supplemental Table 1. Summary of a selection of PIF-targets that have established or potential regulatory morphogenic functions downstream of the PIFs.

AGI	Short Name	PIF-Regulation	PIFq-Bound ^l	Biological/Molecular Function ^{pq}
PIF-induced genes				
AT5G39860	PRE1	bce	4,5	(+) Hypocotyl growth in Rc; Inhibits PAR1; BR/GA response ^{1,2}
AT5G15160	PRE2	bc	4	(+) Hypocotyl growth in Rc; Binds PAR1; BR/GA response ^{1,2}
AT4G16780	ATHB2	abcde	3,4,5	(+) Hypocotyl growth in light and diurnal; TF ^{3,4}
AT2G44910	ATHB4	bd	1,3,4,5	(+) Hypocotyl growth in shade; TF ⁵
AT5G47370	HAT2	ce	3,4,5	(+) Hypocotyl growth in light and shade; TF ⁵
AT3G60390	HAT3	b	3,4	(+) Hypocotyl growth in shade; TF ⁵
AT1G18400	BEE1	abcde	3,4,5	(+) Hypocotyl growth in light and shade; TF; BR response ⁶
AT1G69010	BIM2	b	1,3,4,5	(+) Hypocotyl growth in D, light, shade and diurnal; TF; BR response ^{6,7}
AT1G03790	SOM	a	1,4,5	(-) Seed germination downstream of PIF1; TF ⁸
AT4G14130	XTR7/ XTH15	abcd	3,4,5	(+) Petiole elongation in shade; Cell wall loosening ⁹
AT1G02340	HFR1	abcde	1,3,4,5	(-) Hypocotyl growth in shade and FRc by inhibiting PIF4/5 ^{10,11}
AT1G14920	GAI	b	1,3,4,5	(-) Hypocotyl growth in light and shade by inhibiting PIF3/4; GA signaling ¹²⁻¹⁴
AT2G42870	PAR1	bd	1,3,4,5	(-) Hypocotyl growth in light and shade by inhibiting PIF4 ^{2,15}
AT2G46970	PIL1	defg	1,3,4,5,7	(-) Hypocotyl growth in shade, FRc and Rc; Clock gating of SAS; TF ^{16,17}
AT3G62090	PIL2/ PIF6	abd	1,3,4,5	(-) Hypocotyl growth in Rc; (+) Seed dormancy; TF ¹⁸
AT2G43060	IBH1	ad	1,3,4,5	(-) Growth; TF; BR response ¹⁹
AT5G02200	FHL	abd	1,4,5	(-) Hypocotyl growth in FRc; phyA nuclear import; TF ^{20,21}
AT2G37678	FHY1	ad	4	(-) Hypocotyl growth in FRc; phyA nuclear import; TF ^{20,21}
AT1G52830	IAA6/ SHY1	bcde	5	(-) Hypocotyl growth in light; (-) Hook formation in D; TF; Auxin signaling ²²
AT1G04250	AXR3/ IAA17	ad	4	(-) Hypocotyl growth in D; (+) SAS; TF; Auxin signaling ^{23,24}
AT1G09570	PHYA	b	1,4	(+) Photomorphogenesis by inducing PIF degradation ²⁵
AT4G28720	YUC8	bce	3,4,5,7	(+) Hypocotyl growth in shade and high temperature; Auxin biosynthesis ^{26,27}
AT1G04180	YUC9	be	3,7	(+) Hypocotyl growth in shade; Auxin biosynthesis ²⁶
AT1G70560	TAA1	h	1,4,5 ^k	(+) Hypocotyl growth in high temperature and shade; Auxin biosynthesis ^{28,29}
AT4G39950	CYP79 B2	h	k	(+) Hypocotyl growth; Auxin biosynthesis ²⁸
AT4G27260	GH3.5/ WES1	c	1,4	(-) Hypocotyl growth in Rc, diurnal and EOD-FR; Auxin inactivation ³⁰
AT1G70940	PIN3	c	3,4,5	(+) Hook formation in D; (+) Hypocotyl growth in shade; (+) Phototropism in B; Auxin transport ^{31,32}
AT3G14370	WAG2	ac	3,4	(+) Hook maintenance in D and Cotyledon development in light; Auxin transport ^{33,34}
AT5G18010	SAUR- 19	dfh	4,5	(+) Hypocotyl growth in high temperature; Auxin response ²⁸
AT4G37770	ACS8	bcde	4 ^l	(+) Hook formation; Ethylene biosynthesis ^{35,36}
AT5G65800	ACS5	ad	4,5	(+) Hook formation; (-) Hypocotyl growth in light; Ethylene biosynthesis ^{35,36}
AT1G02400	GA2- OX6	bd	3,4,5	(-) Growth; GA inactivation ³⁷
AT5G07010	ST2A	abcd	1,3,4,5	JA metabolism ³⁸
AT5G07000	ST2B	bce	4	JA metabolism ³⁸

AT1G75450	CKX5	ab	1,3,4,5	(-) Reproductive meristems; Cytokinin breakdown ³⁹
AT4G10240	MIDA-10/ BBX23	ad	4	(+) Hook maintainance in D; Branching of PIF3 Signaling; TF ⁴⁰
AT4G32280	IAA29	abcde	3,4,5	(-) Phototropism in B; TF; Auxin signaling ⁴¹
AT3G15540	IAA19/ MSG2	abcde	3,4,5	(-) Phototropism in B; (-) Hypocotyl gravitropism and hook formation in D; TF; Auxin signaling ^{41,42}
AT5G04190	PKS4	c	4,5	(+) Phototropism; (-) phyA and phyB signaling; Binds phototropins and NPH3 ^{43,44}
AT4G25470	CBF2/ DREB-1C	b	3,4,5 ^m	Cold acclimation and freezing tolerance; TF ^{45,46}

PIF-repressed genes

AT1G06040	STO/ BBX24	a	4	(+) Hypocotyl growth in Rc, FRc and Bc; (+) Salt tolerance; TF ^{47,48}
AT5G44190	GLK2	a	4	(+) Chloroplast development and photosynthetic apparatus; TF ⁴⁹
AT4G26150	GNL/ CGA1	bdi	n	(-) GA signaling downstream PIFs/DELLA; (+) Chloroplast development; TF ^{50,51}
AT5G56860	GNC	i	4 ⁿ	(-) GA signaling downstream PIFs/DELLA; (+) Chloroplast development; TF ^{50,51}
AT5G13630	GUN5/ CHLH	ad	o	Chlorophyll biosynthesis; Photobleaching ^{52,53}
AT1G70700	JAZ9/ TIFY7	c	4	(+) Hypocotyl and petiole growth in light; (-) JA-signaling; TF ⁵⁴
AT1G05010	EFE/ ACO	a	4,5	Ethylene biosynthesis ⁵⁵
AT5G67030	ABA1	a	4	(+) Long-term skotomorphogenic growth; ABA biosynthesis ⁵⁶
AT1G01060	LHY	a	4	Circadian clock; (+) Hypocotyl growth in light; TF ⁵⁷
AT2G46830	CCA1	a	4	Circadian clock; (+) Hypocotyl growth in light; TF ⁵⁷

Complex regulation

AT5G11260	HY5	ad	4	(+) Photomorphogenesis; Antagonistic interaction with PIFs; (+) Anthocyanins in FRc; TF ^{58,59}
AT5G02760	MIDA9 / PP2C	acd	4,5	(+) Hook maintainance in D; Branching of PIF3 Signaling ⁴⁰

Column heading definitions:

PIF-Regulation:

^a Light-responsive PIFq-dependent by ATH1 arrays (Leivar et al., 2009).

^b Shade-responsive PIFq-dependent by ATH1 arrays (Leivar et al., 2012).

^c Growth-responsive PIF4/5-dependent by ATH1 arrays (Nozue et al., 2011).

^d PIFq-regulated in darkness by RNAseq (Zhang et al., 2013).

^e Shade-responsive PIF7-dependent by RNAseq (Li et al., 2012).

^f Not in ATH1 array.

^g See Figure 2A.

^h High temperature-induced PIF4-dependent (Franklin et al., 2011).

ⁱ PIFq-regulated in darkness (Richter et al., 2010).

PIFq-Bound:

^j PIFs that bind to potential regulatory regions by chip-chip (PIF1), chip-seq (PIF3, 4, 5) or chip-qPCR (PIF7) experiments (Oh et al., 2009; Hornitschek et al., 2012; Li et al., 2012; Oh et al., 2012; Zhang et al., 2013).

^k PIF4-bound by chip-qPCR (Franklin et al., 2011).

^l PIF5-bound by chip-qPCR (Gallego-Bartolome et al., 2011).

^m PIF7-bound by chip-qPCR (Lee and Thomashow, 2012).

ⁿ PIF3-bound by chip-qPCR (Richter et al., 2010).

^o PIF3-bound by chip-qPCR (Liu et al., 2013).

Biological/Molecular Function:

^p (+) Promotion; (-) Inhibition; TF: Transcription Factor-related function; D: Dark; Rc: Constant red-light; FRc: constant far-red light; Bc: constant blue light; SAS: Shade avoidance syndrome; EOD-FR: End-of-day-far-red.

^q List of references:

1. (Oh et al., 2012); 2. (Hao et al., 2012); 3. (Steindler et al., 1999); 4. (Kunihiro et al., 2011); 5. (Sorin et al., 2009); 6. (Cifuentes-Esquivel et al., 2013); 7. (Yin et al., 2005); 8. (Kim et al., 2008); 9. (Sasidharan et al., 2010); 10. (Lorrain et al., 2009); 11. (Hornitschek et al., 2009); 12. (Djakovic-Petrovic et al., 2007); 13. (de Lucas et al., 2008); 14. (Feng et al., 2008); 15. (Roig-Villanova et al., 2007); 16. (Roig-Villanova et al., 2006); 17. (Salter et al., 2003); 18. (Penfield et al., 2010); 19. (Bai et al., 2012); 20. (Genoud et al., 2008); 21. (Yang et al., 2009); 22. (Kim et al., 1996); 23. (Leyser et al., 1996); 24. (Sellaro et al., 2012); 25. (Franklin and Quail, 2010); 26. (Li et al., 2012); 27. (Sun et al., 2012); 28. (Franklin et al., 2011); 29. (Tao et al., 2008); 30. (Park et al., 2007); 31. (Zadnikova et al., 2010); 32. (Grebe, 2011); 33. (Willige et al., 2012); 34. (Cheng et al., 2008); 35. (Khanna et al., 2007); 36. (Gallego-Bartolome et al., 2011); 37. (Wang et al., 2004); 38. (Gidda et al., 2003); 39. (Bartrina et al., 2011); 40. (Sentandreu et al., 2011); 41. (Sun et al., 2013); 42. (Tatematsu et al., 2004); 43. (Lariguet et al., 2006); 44. (Schepens et al., 2008); 45. (Kidokoro et al., 2009); 46. (Lee and Thomashow, 2012); 47. (Nagaoka and Takano, 2003); 48. (Yan et al., 2011); 49. (Waters et al., 2009); 50. (Richter et al., 2010); 51. (Chiang et al., 2012); 52. (Liu et al., 2013); 53. (Shin et al., 2009); 54. (Yang et al., 2012); 55. (Iqbal et al., 2013); 56. (Barrero et al., 2008); 57. (Ito et al., 2007); 58. (Chen et al., 2013); 59. (Shin et al., 2007).

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