



Figure S1. Total phosphorus (total P) and phytic acid contents in brown rice harvested from plants grown at Lingshui, Hainan. Data are the mean of three biological repeats. Error bars represent standard deviation. Data with an asterisk(s) are significantly different from wild type (Duncan's test, * $P < 0.05$).

Table S1. Differentially expressed Lysophospholipids in wild-type and mutant rice seeds.

Gen.	OMI.	RT.	Formula	Adducts	ID	Lipid Class	PHI.	T.T
X1	560.31	1.31	C26H52NO7P	M+K	LMGP01050138	LPC(18:1)	55527.46	0.03
X1	560.31	1.31	C26H52NO7P	M+K	LMGP01050029	LPC(18:1)	53469.16	0.03
X1	560.31	1.31	C26H52NO7P	M+K	LMGP01050080	LPC(18:1)	52310.36	0.03
X1	518.3	1.10	C24H50NO6P	M+K	LMGP01070006	LPC(16:0)	55891.42	0.05
X1	518.3	1.10	C24H50NO6P	M+K	LMGP01070006	LPC(16:0)	55299.38	0.05
X1	518.3	1.10	C24H50NO6P	M+K	LMGP01070006	LPC(16:0)	53361.89	0.05
X1	506.26	0.98	C22H46KNO7P	M+K	LMGP01050012	LPC(14:0)	28282.94	0.03
X1	506.26	0.98	C22H46KNO7P	M+K	LMGP01020009	LPC(14:0)	28286.39	0.03
X1	506.26	0.98	C22H46KNO7P	M+K	LMGP01050073	LPC(14:0)	27017.38	0.03
M1-1	560.31	1.31	C26H52NO7P	M+K	LMGP01050138	LPC(18:1)	59916.89	0.03
M1-1	560.31	1.31	C26H52NO7P	M+K	LMGP01050029	LPC(18:1)	58085.49	0.03
M1-1	560.31	1.31	C26H52NO7P	M+K	LMGP01050080	LPC(18:1)	61088.15	0.03
M1-1	518.3	1.10	C24H50NO6P	M+K	LMGP01070006	LPC(16:0)	43704.22	0.02
M1-1	518.3	1.10	C24H50NO6P	M+K	LMGP01070006	LPC(16:0)	42033.29	0.02
M1-1	518.3	1.10	C24H50NO6P	M+K	LMGP01070006	LPC(16:0)	44832.18	0.02
M1-1	506.26	0.98	C22H46KNO7P	M+K	LMGP01050012	LPC(14:0)	25076.14	0.03
M1-1	506.26	0.98	C22H46KNO7P	M+K	LMGP01020009	LPC(14:0)	25861.8	0.03
M1-1	506.26	0.98	C22H46KNO7P	M+K	LMGP01050073	LPC(14:0)	24935.91	0.03
M1-2	560.31	1.31	C26H52NO7P	M+K	LMGP01050138	LPC(18:1)	60642.04	0.03
M1-2	560.31	1.31	C26H52NO7P	M+K	LMGP01050029	LPC(18:1)	59412.83	0.03
M1-2	560.31	1.31	C26H52NO7P	M+K	LMGP01050080	LPC(18:1)	58852.29	0.03
M1-2	518.3	1.10	C24H50NO6P	M+K	LMGP01070006	LPC(16:0)	43784.39	0.02
M1-2	518.3	1.10	C24H50NO6P	M+K	LMGP01070006	LPC(16:0)	43902.42	0.02
M1-2	518.3	1.10	C24H50NO6P	M+K	LMGP01070006	LPC(16:0)	43573.99	0.02
M1-2	506.26	0.98	C22H46KNO7P	M+K	LMGP01050012	LPC(14:0)	24879.69	0.03
M1-2	506.26	0.98	C22H46KNO7P	M+K	LMGP01020009	LPC(14:0)	25694.23	0.03
M1-2	506.26	0.98	C22H46KNO7P	M+K	LMGP01050073	LPC(14:0)	25394.21	0.03
X1	452.27	0.95	C21H44NO7P	M-H	LMGP02050002	LPE(16:0)	64521.47	0.03
X1	452.27	0.95	C21H44NO7P	M-H	LMGP02050036	LPE(16:0)	64159.24	0.03
X1	452.27	0.95	C21H44NO7P	M-H	LMGP02050002	LPE(16:0)	63890.41	0.03
X1	478.29	1.30	C23H46NO7P	M-H	LMGP02050064	LPE(18:0)	72410.26	0.01
X1	478.29	1.30	C23H46NO7P	M-H	LMGP02050039	LPE(18:0)	72329.13	0.01
X1	478.29	1.30	C23H46NO7P	M-H	LMGP02050004	LPE(18:0)	79469.16	0.01
X1	424.24	1.0	C19H40NO7P	M-H	LMGP02050033	LPE(14:0)	19786.42	0.04
X1	424.24	1.0	C19H40NO7P	M-H	LMGP02050003	LPE(14:0)	20972.25	0.04
X1	424.24	1.0	C19H40NO7P	M-H	LMGP02050033	LPE(14:0)	21057.28	0.04
M1-1	452.27	0.95	C21H44NO7P	M-H	LMGP02050002	LPE(16:0)	79784.51	0.03
M1-1	452.27	0.95	C21H44NO7P	M-H	LMGP02050036	LPE(16:0)	77113.08	0.03
M1-1	452.27	0.95	C21H44NO7P	M-H	LMGP02050002	LPE(16:0)	79022.22	0.03
M1-1	478.29	1.30	C23H46NO7P	M-H	LMGP02050064	LPE(18:0)	88906.87	0.02
M1-1	478.29	1.30	C23H46NO7P	M-H	LMGP02050039	LPE(18:0)	86185.09	0.02

M1-1	478.29	1.30	C23H46NO7P	M-H	LMGP02050004	LPE(18:0)	87088.37	0.02
M1-1	424.24	1.0	C19H40NO7P	M-H	LMGP02050033	LPE(14:0)	27166.23	0.02
M1-1	424.24	1.0	C19H40NO7P	M-H	LMGP02050003	LPE(14:0)	27981.68	0.02
M1-1	424.24	1.0	C19H40NO7P	M-H	LMGP02050033	LPE(14:0)	26855.73	0.02
M1-2	452.27	0.95	C21H44NO7P	M-H	LMGP02050002	LPE(16:0)	78484.14	0.01
M1-2	452.27	0.95	C21H44NO7P	M-H	LMGP02050036	LPE(16:0)	79201.06	0.01
M1-2	452.27	0.95	C21H44NO7P	M-H	LMGP02050002	LPE(16:0)	77993.84	0.01
M1-2	478.29	1.30	C23H46NO7P	M-H	LMGP02050064	LPE(18:0)	87642.17	0.04
M1-2	478.29	1.30	C23H46NO7P	M-H	LMGP02050039	LPE(18:0)	86791.83	0.04
M1-2	478.29	1.30	C23H46NO7P	M-H	LMGP02050004	LPE(18:0)	88268.99	0.04
M1-2	424.24	1.0	C19H40NO7P	M-H	LMGP02050033	LPE(14:0)	26858.17	0.02
M1-2	424.24	1.0	C19H40NO7P	M-H	LMGP02050003	LPE(14:0)	28012.49	0.02
M1-2	424.24	1.0	C19H40NO7P	M-H	LMGP02050033	LPE(14:0)	27152.32	0.02

Gen: Genotypes, X1: Xidao#1, M1-1: Ospld α 1-1mutant, M1-2: Ospld α 1-2, wild-type OMI: Observed m/z of molecular ion, RT: Retention time, ID: Lipid ID of identified compound, PHI: Peak height intensity, T.T: T-test p-value.

Table S2. Primers for QPCR analysis

Sn	Primer ID	Description	Primer Sequence (5'-3')
1	OsPLD α 1-F OsPLD α 1-R	Phospholipase D α 1	TGGGTAACCGTGAGGTGAAGCAG CCATGGCGATCTCAGAGTCCCTAG
2	OsPLC1-F OsPLC1-R	Phospholipase C	TGAGTACTCCACCCACCACA CAGCTCATCATCAAGCCAACA
3	OsPLA2-F OsPLA2-R	Phospholipase A2	CCTCCATCATCTCACCGGG TAGGGAGGAAGGGAGATCGAG
4	OsPAP2-F OsPAP2-R	Phosphatidate phosphatase	CAACCCTGGTCCCGAGCTA GAGTCGATTCAGGCGGACG
5	OsEPT1-F OsEPT1-R	Ethanolaminephosphotransferase	GTTGGCCGGAGTTCTTGTCT TAGCACAAGGCCTTACCACA
6	OsPDCT-F OsPDCT-R	Phosphatidylcholine:diacylglycerol cholinephosphotransferase 1	TGCCGTAAGCTACGGTCAAT CATCAGTTTCGCGTGTGCTC