

Supporting Information

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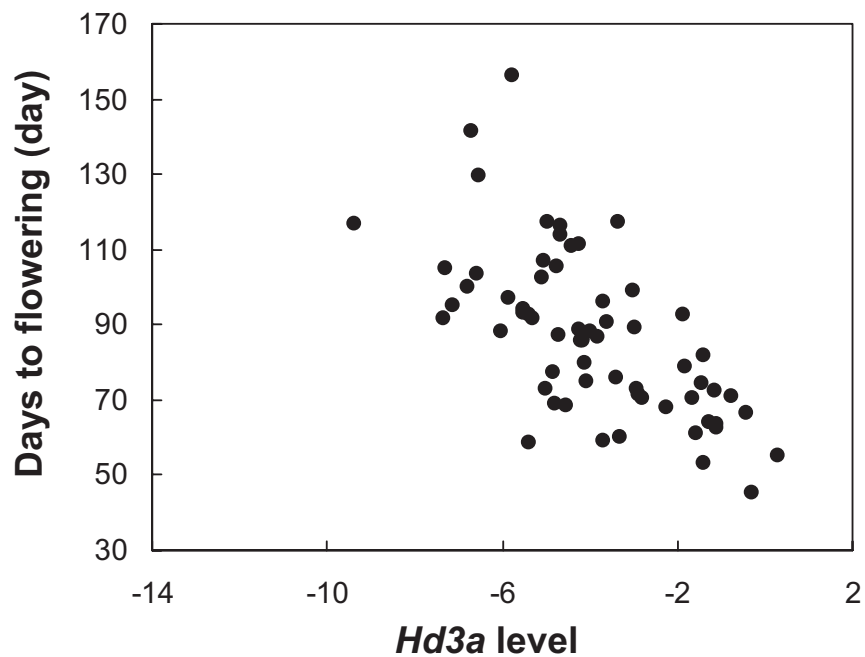


Fig. S1. Correlation of flowering times with *Hd3a* expression levels at 60 days after germination. Leaves were harvested at ZT 0 at 60 days after germination from plants grown under short-day conditions. Expression levels of *Hd3a* were normalized by those of *ubiquitin* and data are shown as natural logarithms.

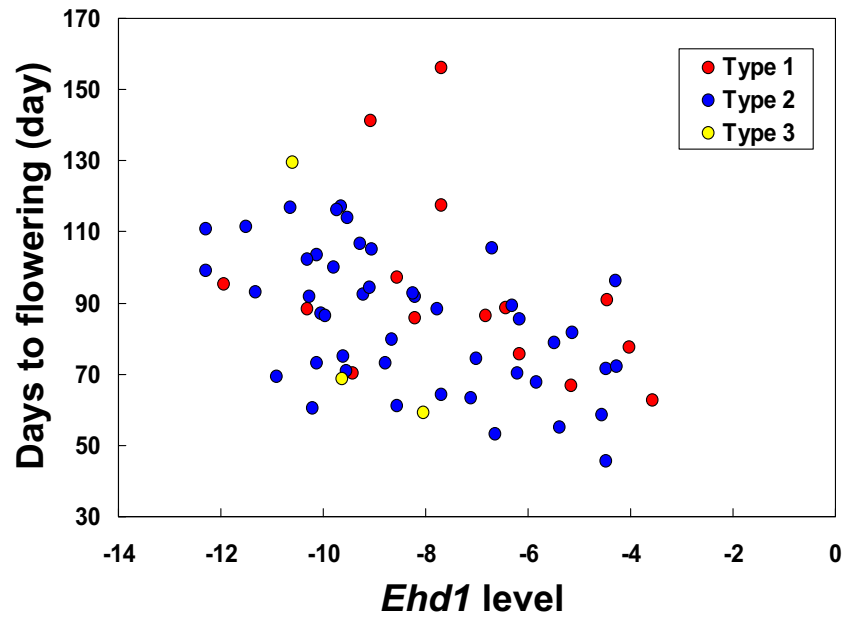
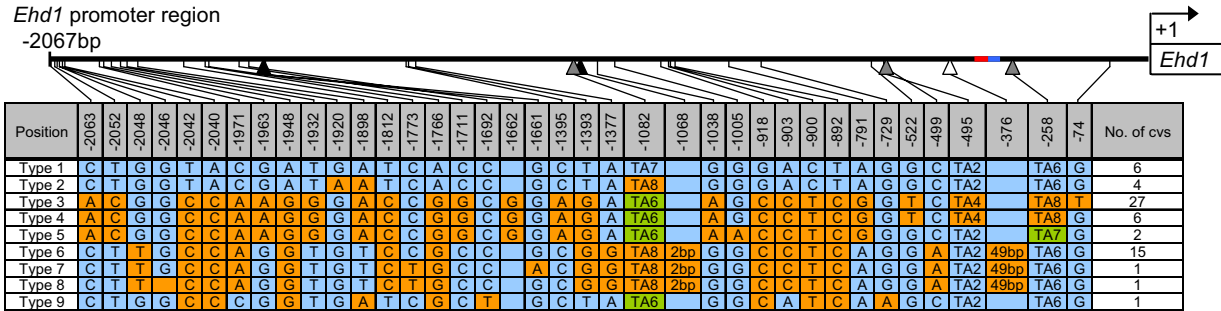


Fig. S2. Correlation of flowering times and *Ehd1* RNA levels in cultivars that carry Type 1, Type 2, and Type 3 *OsMADS51* alleles. RNA levels in leaves of 35-day-old plants grown under short-day conditions were determined by real-time RT-PCR and are shown as natural logarithms.

A

Ehd1 promoter region
-2067bp



B

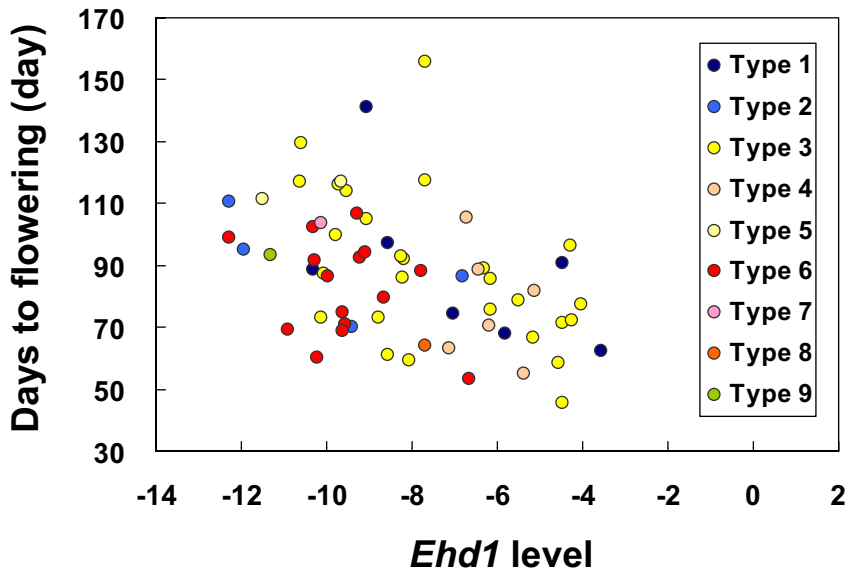


Fig. S3. The effect of allelic variation in the *Ehd1* promoter on *Ehd1* expression level. (A) Nucleotide polymorphisms in the *Ehd1* promoter region. The nucleotide sequences were compared with those of Nipponbare. Polymorphic nucleotides are indicated by different colors. Deletion and insertion sites are shown by open and closed arrowheads, respectively. Repeat sequences are indicated by gray arrowheads. TA and GA repeat regions, located at red and blue regions, were excluded from this analysis because of the difficulty of determining accurately the number of repeats. (B) Correlation of flowering times and *Ehd1* RNA levels in cultivars that carry each *Ehd1* promoter. RNA levels in leaves of 35-day-old plants grown under short-day conditions were determined by real-time RT-PCR and are shown as natural logarithm values.

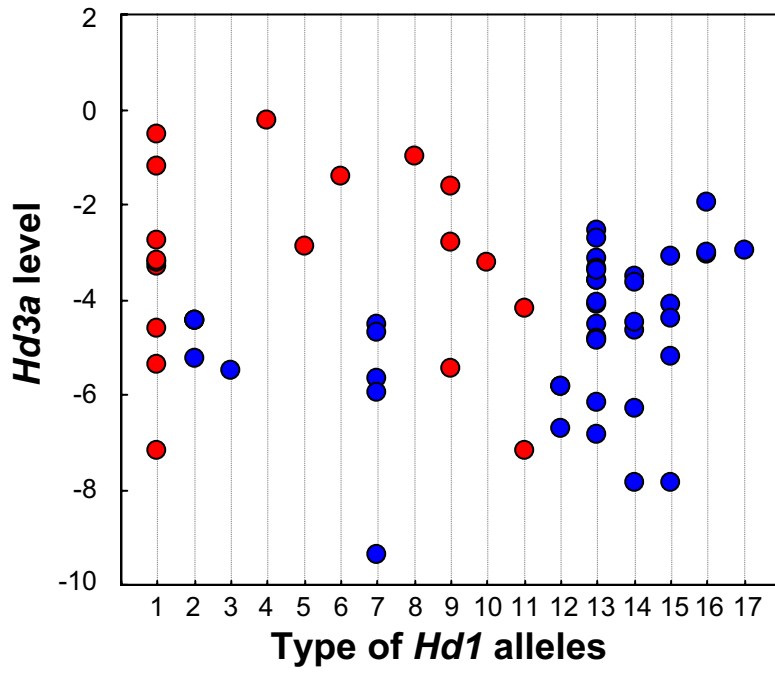


Fig. S4. The distributions of *Hd3a* expression level in each *Hd1* allele. Cultivars with functional *Hd1* alleles are shown by red dots and nonfunctional *Hd1* alleles by blue dots.

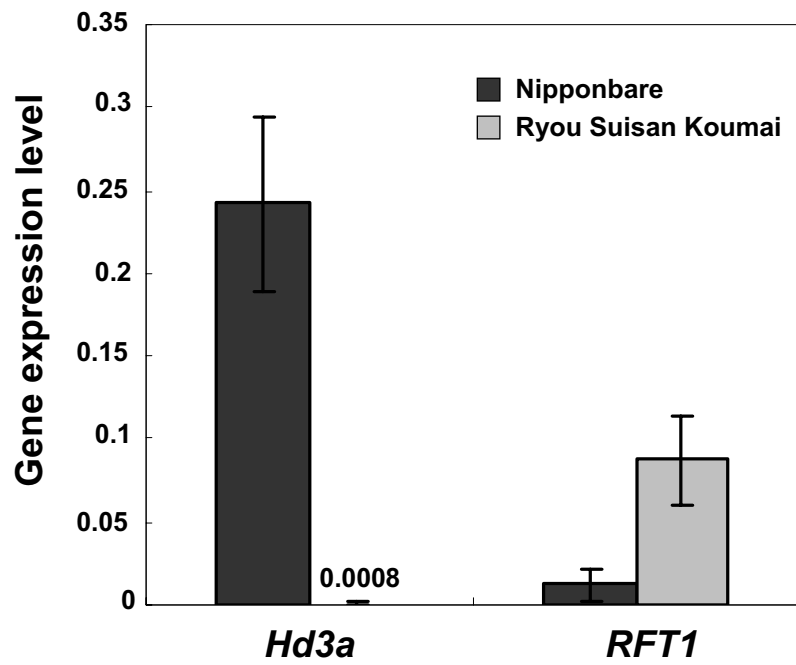


Fig. S5. RNA levels of *Hd3a* and *RFT1* in Nipponbare and cv. Ryou Suisan Koumai (RSK). Expression levels of *Hd3a* and *RFT1* were normalized by that of *ubiquitin*. Error bars represent SD; $n = 4-8$.

Table S1. Summary of polymorphisms in flowering time genes in rice

Gene	GenBank accession no.	Length (bp)	SNPs*		Indel sites	Frame shift sites	Nonsense mutation	No. of alleles
			Synonymous	Nonsynonymous				
<i>Hd3a</i>	AB052944	540	3	4	0	0	0	6
<i>Ehd1</i>	AB092506	1026	6	10	0	0	0	7
<i>OsMADS51</i>	AB003327	495	0	6	1	1	0	3
<i>Hd1</i>	AB041840	1224	1	13	8	4	1	17

*Coding sequence without indel region.

Table S2. Summary of flowering times and allele types of genes analyzed in each cultivar of the core collection

World Rice Core Collection no.	Indica / Japonica	Name	Country	Days to flowering	<i>OsMADS51</i> coding sequence	<i>Ehd1</i> promoter sequence	<i>Ehd1</i> coding sequence	<i>Hd1</i> coding sequence*	<i>Hd3a</i> promoter sequence	<i>Hd3a</i> coding sequence
1	Japonica	NIPPONBARE	Japan	62.5 ± 2.9	1	1	1	<u>6</u>	1	1
2	Indica	KASALATH	India	91.8 ± 2.8	2	3	3	<u>13</u>	3	3
3	Indica	BEI KHE	Cambodia	81.6 ± 4.1	2	4	3	<u>1</u>	5	2
4	Indica	JENA 035	Nepal	75.0 ± 3.8	2	6	7	<u>15</u>	4	3
5	Indica	NABA	India	89.1 ± 2.9	2	3	3	<u>16</u>	3	3
6	Indica	PULUIK ARANG	Indonesia	92.8 ± 10.7	2	3	3	<u>14</u>	6	3
7	Indica	DAVAO 1	Philippines	114.0 ± 11.7	2	3	3	<u>7</u>	ND	3
9	Indica	RYOU SUISAN KOUUMAI	China	58.5 ± 2.4	2	3	3	<u>1</u>	1	6
10	Indica	SHUUSOUSHU	China	87.1 ± 8.6	2	3	3	<u>3</u>	1	1
11	Indica	JINGUOYIN	China	73.1 ± 5.7	2	3	3	<u>16</u>	3	3
13	Indica	ASU	Bhutan	71.4 ± 1.8	2	3	3	<u>16</u>	6	3
14	Indica	IR 58	Philippines	85.5 ± 4.4	2	3	3	<u>7</u>	1	1
15	Indica	CO 13	India	74.3 ± 2.4	2	1	1	<u>1</u>	3	3
16	Indica	VARY FUTSI	Madagascar	129.5 ± 4.5	3	3	3	ND	7	3
17	Indica	KEIBOBA	China	100.0 ± 5.2	2	3	3	<u>15</u>	ND	3
18	Indica	QINGYU(SEIYU)	China (Taiwan)	116.8 ± 8.7	2	3	3	<u>7</u>	ND	3
19	Indica	DENG PAO ZHAI	China	72.3 ± 3.4	2	3	3	<u>1</u>	3	3
20	Indica	TADUKAN	Philippines	117.1 ± 5.3	2	5	6	<u>2</u>	6	3
21	Indica	SHWE NANG GYI	Myanmar	105.0 ± 1.3	2	3	3	<u>7</u>	1	4
22	Indica	CALOTOC	Philippines	111.5 ± 5.6	2	5	6	<u>2</u>	1	1
23	Indica	LEBED	Philippines	88.6 ± 10.4	1	4	3	<u>14</u>	1	1
24	Indica	PINULUPOT 1	Philippines	105.5 ± 14.3	2	4	6	<u>2</u>	1	1
25	Indica	MUHA	India	106.7 ± 12.8	2	6	7	<u>13</u>	3	3
26	Indica	JHONA 2	India	71.0 ± 5.3	2	6	7	ND	3	3
27	Indica	NEPAL 8	Nepal	61.0 ± 1.7	2	3	3	<u>15</u>	3	3
28	Indica	JARJAN	Bhutan	91.7 ± 6.1	2	6	7	<u>15</u>	4	3
29	Indica	KALO DHAN	Nepal	88.1 ± 2.0	2	6	7	<u>13</u>	3	3
30	Indica	ANJANA DHAN	Nepal	60.3 ± 1.5	2	6	7	<u>13</u>	3	3
31	Indica	SHONI	Bangladesh	103.5 ± 6.0	2	7	7	<u>13</u>	3	3
32	Indica	TUPA 121-3	Bangladesh	102.3 ± 14.6	2	6	7	<u>17</u>	3	3
33	Indica	SURJAMUKHI	India	79.6 ± 2.9	2	6	7	<u>13</u>	3	3
34	Indica	ARC 7291	India	78.9 ± 4.2	2	3	3	<u>13</u>	3	3
35	Indica	ARC 5955	India	92.5 ± 4.4	2	6	7	<u>15</u>	3	3
36	Indica	RATUL	India	69.1 ± 5.5	2	6	7	<u>13</u>	4	3
37	Indica	ARC 7047	India	64.1 ± 5.0	2	8	7	<u>13</u>	3	3
38	Indica	ARC 11094	India	94.2 ± 5.3	2	6	7	<u>13</u>	3	3
39	Indica	BADARI DHAN	Nepal	53.1 ± 1.1	2	6	7	<u>8</u>	4	3
40	Indica	NEPAL 555	India	86.5 ± 5.0	2	6	7	<u>13</u>	4	3
41	Indica	KALUHEENATI	Sri Lanka	68.6 ± 3.6	3	6	7	<u>13</u>	4	3
42	Indica	LOCAL BASMATI	India	99.0 ± 3.9	2	6	7	<u>13</u>	2	1
43	Japonica	DIANYU 1	China	90.7 ± 11.5	1	1	2	ND	1	1
44	Indica	BASILANON	Philippines	110.7 ± 3.8	2	2	5	<u>2</u>	1	1
45	Japonica	MA SHO	Myanmar	95.1 ± 5.0	1	2	5	<u>12</u>	1	1
46	Japonica	KHAO NOK	Laos	85.9 ± 6.9	1	3	3	<u>12</u>	1	1
47	Japonica	JAGUARY	Brazil	75.6 ± 3.3	1	3	5	<u>14</u>	1	1
48	Japonica	KHAU MAC KHO	Vietnam	88.4 ± 5.7	1	1	1	<u>12</u>	1	1
49	Japonica	PADI PERAK	Indonesia	141.3 ± 1.7	1	1	1	<u>14</u>	1	1
50	Japonica	REXMONT	USA	77.4 ± 3.4	1	3	3	<u>14</u>	3	3
51	Japonica	URASAN 1	Japan	70.3 ± 1.5	1	2	5	<u>11</u>	1	1
52	Japonica	KHAU TAN CHIEM	Vietnam	97.3 ± 4.5	1	ND	1	<u>11</u>	1	1
53	Japonica	TIMA	Bhutan	67.8 ± 2.9	2	1	1	<u>9</u>	1	5
55	Japonica	TUPA 729	Bangladesh	93.2 ± 1.8	2	9	4	<u>13</u>	1	5
57	Indica	MILYANG 23	Korea	96.1 ± 1.9	2	3	3	<u>7</u>	1	4
58	Indica	NEANG MENH	Cambodia	70.4 ± 2.1	2	4	3	<u>1</u>	5	2
59	Indica	NEANG PHTONG	Cambodia	63.4 ± 3.5	2	4	3	<u>1</u>	6	3
60	Indica	HAKPHAYNHAY	Laos	55.0 ± 2.4	2	4	3	<u>1</u>	6	3
61	Indica	RADIN GOI SESAT	Malaysia	73.0 ± 5.4	2	3	3	<u>1</u>	6	3
62	Indica	KEMASIN	Malaysia	117.5 ± 5.3	1	3	3	<u>9</u>	6	3
63	Indica	BLEIYO	Thailand	45.4 ± 1.9	2	3	3	<u>4</u>	6	3
64	Indica	PADI KUNING	Indonesia	156.0 ± 3.8	1	3	3	<u>14</u>	6	1
65	Indica	RAMBHOG	Indonesia	59.3 ± 1.6	3	3	3	<u>5</u>	6	3
66	Indica	BINGALA	Myanmar	116.3 ± 3.5	2	3	3	<u>1</u>	3	3
67	Japonica	PHULBA	India	66.6 ± 7.2	1	3	3	<u>10</u>	1	1
68	Japonica	KHAO NAM JEN	Laos	86.4 ± 3.4	1	2	1	<u>9</u>	1	1

Numbers in table indicate allele types of genes analyzed. ND: not determined.

*The *Hd1* coding sequences were cloned from the underlined cultivars.

Table S3. Pearson's correlation coefficient between *Hd3a* and *Ehd1* RNA levels

	<i>Hd3a</i> level		
	All	<i>Hd1</i> functional	<i>Hd1</i> nonfunctional
Days to flowering	-0.681**	-0.581**	-0.616**
<i>Ehd1</i> level	0.462**	0.489*	0.314*

* $P < 0.05$. ** $P < 0.01$.

Table S4. Primers used in this study

Primer name	Sequence (5'-3')
Primers for real-time PCR	
<i>Ubq</i> -F	AACCAGCTGAGGCCCAAGA
<i>Ubq</i> -R	ACGATTGATTTAACCAGTCCATGA
<i>OsGI</i> -F	ATCGTTCTGCAGGCCGAGA
<i>OsGI</i> -R	TCACCAATGCTTCTGGGCTAT
<i>OsMADS51</i> -F	GAAATCAAAGAAGATGTTGGCAAA
<i>OsMADS51</i> -R	CTTCCTCTGCCCCCTAGAG
<i>Hd1</i> -F	TCAGCAACAGCATATCTTTTCATCA
<i>Hd1</i> -R	TCTGGAATTTGGCATATCTATCACC
<i>Ehd1</i> -F	GCGCTTTTGATTTCTGCT
<i>Ehd1</i> -R	ATATGTGCTGCCAAATGTTGCT
<i>Hd3a</i> -F	GCTCACTATCATCATCCAGCATG
<i>Hd3a</i> -R	CCTTGCTCAGCTATTTAATTGCATAA
<i>RFT1</i> -F	TGACCTAGATTCAAAGTCTAATCCTT
<i>RFT1</i> -R	TGCCGGCCATGTCAAATTAATAAC
Primers for cloning full length <i>Hd1</i> coding region	
<i>Hd1</i> FLpENTR-F	CACCATGAATTATAATTTTGGTGGCAACGTG
<i>Hd1</i> FLpENTR-R	TCAGAACCATGGAACAGTACCATAGCT
Primers for cloning <i>Hd3a</i> promoter region	
<i>pHd3a</i> -Spe1F	ACTAGTCATTAATTGCCTTACCTCAAC
<i>pHd3a</i> -BamH1R	CGGGATCCCGATCTTGCAAAAAACCCCTG