



**Supplementary Figure S1.** Foreground selection in introgression lines in IC<sub>4</sub>F<sub>6</sub> generation for targeted genes *xa13*, *Xa21*, *xa5*, *Pi54* and *Bph20* in the background of Krishna Hamsa. DP-Donor parent, RP-Recurrent parent.

**Supplementary Table S1.** Selection of polymorphic markers between recurrent parents and donors for foreground selection

Gene/QTL	Markers screened for FS	Selected Markers	References
<i>xa5</i>	RM122, RM159, RM13, RM17795, RM4777, RM122, xa5R, xa5S, RM13,		[58]
<i>xa13</i>	xa13 pro, RM6765, RM6070, SR6	xa13 pro	[14]
<i>Xa21</i>	pTA248, <i>Xa21</i>	pTA248	[59]
<i>Pi2</i>	RM 527	RM 527	[28]; [60]
<i>Pi9</i>	S29742c, S53395c, RM 136, RM7311, PI9STS2	PI9STS2	[59]
<i>Pi54</i>	PiKh MAS	PiKh MAS	[28]; [60]
<i>Bph20</i>	RM 28570, B42, B44	RM 28570	[31]
<i>Bph21</i>	RM 28491, S12094AF, RM2857OF, B122	RM 28491	[31]
<i>qDTY1.1</i>	RM11943, RM212, RM315, RM3825, RM12091, RM12023, RM431,	RM431, RM11943	[61]
<i>qDTY3.1</i>	RM15736, RM15738, RM15926, RM15924, RM16032, RM15914, RM15925, RM55, RM168, RM186, RM293, RM468, RM571, RM16030, RM16049, RM416, RM520	RM168	[37]
<i>qDTY2.1</i>	Hvssr2-31	HvSSR2-31	[62]
<i>qDTY12.1</i>	RM 511 , RM 28166,	RM511/28158, RM28166	[35]

**FS- foreground selection**

**Supplementary Table S2** Analysis of Variance for days to fifty percent flowering and grain yield (g/m<sup>2</sup>) traits under control conditions (*kharif* 2019)

Source of Variation	d.f	DFF			GY (g/m <sup>2</sup> )		
		Mean Squares	F-Calculated	Significance	Mean Squares	F-Calculated	Significance
Blocks (eliminating 4	4	0.50	0.24	0.91	36910	2.12	0.13

treatments)							
Treatment (ignoring blocks)	199	65.17	31.79	0.00	122242	7.01	0.00
Control	4	78.30	38.20	0.00	13582	0.78	0.56
Treatments	194	64.37	31.41	0.00	124637	7.15	0.00
Control <i>Vs</i> Treatment	1	166.80	81.37	0.00	92278	5.29	0.04
Error	16	2.05			17437		
Total	219						

Treatment refers to 196 introgression lines, control to five checks in Augmented block design. d.f.- degrees of freedom, DFF- days to fifty percent flowering, GY- grain yield in g/m<sup>2</sup>. F value indicates significant differences among the ILs and checks under non-stress conditions across different sources of variation except 'blocks' and 'control'.

**Supplementary Table S3 Analysis of Variance for days to fifty percent flowering and grain yield (g/m<sup>2</sup>) traits under reproductive stage drought stress conditions (*kharif* 2019)**

Source of Variation	d.f.	DFF			GY (g/m <sup>2</sup> )		
		Mean Squares	F-Calculated	Significance	Mean Squares	F-Calculated	Significance
Blocks (eliminating treatments)	4	30863	0.98	0.45	7726	1.11	0.39
Treatment (ignoring blocks)	101	1692	0.05	1.00	22713	3.25	0.01
Control	4	35508	1.13	0.38	93420	13.38	0.00
Treatments	96	44	0.00	1.00	15129	2.17	0.04
Control <i>Vs</i> Treatment	1	24602	0.78	0.39	467992	67.02	0.00
Error	16	31542			6983		
Total	121						

Treatment refers to 196 introgression lines, control to five checks in Augmented block design. d.f.- degrees of freedom, DFF- days to fifty percent flowering, GY- grain yield in g/m<sup>2</sup>. F value indicates significant differences among the ILs and checks under reproductive stage drought stress conditions across different sources of variation except 'blocks' and 'treatment'.

**Supplementary Table S4 Descriptive statistics and heritability for days to fifty percent flowering and grain yield (g/m<sup>2</sup>) traits under control conditions (*kharif* 2019)**

	Control		Reproductive stage drought stress	
	DFF	GY (g/m <sup>2</sup> )	DFF	GY (g/m <sup>2</sup> )
Mean	98.77	574	99.51	403
Standard Error	0.52	22.66	7.36	12.85
Standard Deviation	7.71	336.17	81.26	141.94
Range	32	2889	911	624
Minimum	86	108	76	98
Maximum	118	2998	106	722
<b>h<sup>2</sup>(bs)</b>	96.81	86.00	49.96	70.73

DFF- days to fifty percent flowering, GY- grain yield in g/m<sup>2</sup>.

**Supplementary Table S5 Critical differences (CD) for days to fifty percent flowering and grain yield (g/m<sup>2</sup>) traits under reproductive stage drought stress conditions (*kharif* 2019)**

Comparison type	Control				Reproductive stage drought stress			
	DFF		GY (g/m <sup>2</sup> )		DFF		GY (g/m <sup>2</sup> )	
	C.D. at 5 %	C.D. at 1 %	C.D. at 5 %	C.D. at 1 %	C.D. at 5 %	C.D. at 1 %	C.D. at 5 %	C.D. at 1 %
Between two Control Mean	1.92	2.65	238	328	112	154	177	244
Between two treatments in same block	4.29	5.91	532	734	251	345	396	545
Between two treatments not in same block	4.70	6.48	583	804	274	378	434	598
Between treatment and control	3.64	5.02	452	622	213	293	336	463

DFF- days to fifty percent flowering, GY- grain yield in g/m<sup>2</sup>, C.D. Critical difference

**Supplementary Table S6 Phenotypic evaluation for yield under control conditions (*kharif* 2019)**

Entry No	DFF	GY (g/m <sup>2</sup> )
<b>PC I: BLB + blast + drought</b>		
19174	99	737
19193	97	374
19196	90	544
19246	93	561
19247	112	598
<b>PC II: BLB+ blast</b>		
19019	97	610
19030	92	1010
19471	93	543
19007	89	489
19020	98	716
19025	90	766
19031	88	872
19406	95	311
19039	88	644
19378	92	567
<b>PC III: BLB + drought</b>		
19232	99	550
19233	111	395
19238	94	600
19239	108	507
19240	109	565
19241	107	693
19244	110	418
19245	101	475
19248	113	628
<b>PC IV: Blast + drought</b>		
19176	105	603
19177	92	433
19178	99	570
19181	97	407
19182	99	341
19183	99	301
19185	92	1736
19189	93	501
19190	92	345
19191	99	721
19192	98	298
19194	100	446
19195	88	586
19197	92	243
19198	109	334
19199	110	402
19200	88	449
19201	92	666
19203	111	296
19204	114	343
19205	101	372
19206	92	330
19208	94	349
19211	101	1289
19214	98	552
19215	96	404
19221	107	858

Entry No	DFF	GY (g/m <sup>2</sup> )
19237	97	642
19249	100	891
19250	112	522
19253	109	315
19254	111	180
19261	109	359
19262	109	368
19263	111	655
19264	112	567
19267	113	655
19268	108	342
19271	109	524
19273	100	875
19274	111	585
19275	93	413
19279	107	284
<b>PC V: BLB</b>		
19046	92	2244
19460	103	631
19379	118	350
<b>PC VI: Blast</b>		
19035	92	941
19004	93	915
19053	92	908
19013	87	850
19403	99	831
19048	92	823
19021	95	808
19005	92	800
19006	93	794
19056	92	761
19027	86	760
19024	88	757
19028	92	746
19026	112	744
19243	92	743
19001	108	737
19022	93	726
19413	88	712
19415	99	675
19402	98	649
19175	100	646
19023	93	628
19401	99	628
19018	110	588
19032	95	575
19421	101	564
19014	88	548
19050	96	547
19043	89	539
19015	96	522
19409	89	513
19044	89	506
19397	88	501
19470	92	498

Entry No	DFF	GY (g/m <sup>2</sup> )
19466	98	496
19410	92	482
19468	101	469
19464	103	467
19052	89	449
19045	88	449
19210	89	434
19459	98	433
19180	92	433
19469	101	428
19408	93	427
19392	99	424
19387	93	415
19412	93	413
19463	103	395
19467	101	388
19462	99	385
19465	97	382
19386	99	372
19396	88	357
19411	92	353
19461	103	345
19049	97	342
19400	99	316
19033	95	315
19054	88	305
19008	92	303
19037	93	292
19420	101	284
19389	93	272
19038	92	264
19417	99	217
19399	89	216
19407	93	201
19416	101	197
19034	93	180
19394	88	141
19405	88	108
19167	88	147
19172	98	362
19186	89	206
19188	92	324
19202	109	1174
19207	113	606
19270	112	567
19272	111	2706
<b>PC VII: Drought</b>		
19209	99	1282
19218	87	1221
19213	100	1023

Entry No	DFF	GY (g/m <sup>2</sup> )
19227	109	983
19231	101	957
19281	95	820
19242	93	818
19277	95	799
19219	102	786
19226	97	759
19280	88	746
19234	98	734
19228	106	722
19251	113	704
19255	111	684
19173	100	656
19257	110	654
19184	92	588
19217	88	582
19252	110	573
19265	113	565
19220	114	560
19230	99	551
19269	99	544
19235	97	528
19168	90	522
19216	95	522
19222	109	484
19229	100	481
19278	88	475
19166	92	462
19179	110	450
19169	90	449
19170	107	429
19187	90	417
19224	105	416
19236	96	407
19266	113	391
19223	108	373
19171	98	364
19259	112	336
19258	110	326
19225	108	282
Krishna	98.4	486.4
Hamsa		
MTU	98.8	473.8
1010		
IR 64	99	575.6
Saha	102	476.4
bhagidhan		
IR81896	107.8	571.6

DFF- days to fifty percent flowering, GY- grain yield in g/m<sup>2</sup>.

**Supplementary Table S7 Phenotypic evaluation for yield under reproductive stage drought stress (*kharif* 2019)**

Entry No	DFF	GY (g/m <sup>2</sup> )
<b>PC I: BLB + blast + drought</b>		
19246	100	538

Entry No	DFF	GY (g/m <sup>2</sup> )
19247	98	444
19196	76	423

Entry No	DFF	GY (g/m <sup>2</sup> )
19174	95	350
19193	90	323

Entry No	DFF	GY (g/m <sup>2</sup> )	Entry No	DFF	GY (g/m <sup>2</sup> )	Entry No	DFF	GY (g/m <sup>2</sup> )
<b>PC III: BLB + drought</b>								
19233	95	638	19183	95	411	19281	94	479
19245	93	635	19214	98	410	19242	95	473
19248	101	452	19194	91	387	19266	101	472
19232	97	436	19250	87	381	19252	95	451
19240	87	433	19200	98	380	19216	95	451
19238	95	333	19189	81	351	19170	95	450
19241	91	307	19191	98	347	19259	90	439
19239	93	307	19208	85	332	19258	86	414
19244	99	251	19190	82	324	19236	95	408
19273	94	694	19176	90	324	19166	90	404
19198	98	691	19237	95	313	19228	99	390
19178	106	685	19203	76	299	19213	99	387
19254	95	618	19197	76	298	19218	95	368
19215	97	597	19271	92	293	19209	86	360
19274	97	581	19182	95	281	19169	83	353
19201	95	574	19206	87	273	19217	95	351
19177	85	560	19205	81	224	19257	87	344
19268	95	554	19185	83	221	19227	99	314
19262	90	535	<b>PC VII: Drought</b>			19184	91	287
19199	101	514	19226	94	722	19187	81	275
19267	102	508	19278	94	660	19220	99	254
19181	97	506	19251	95	608	19229	96	254
19264	91	490	19231	96	605	19171	83	248
19261	77	488	19280	99	584	19168	83	243
19195	77	487	19234	95	582	19255	95	238
19279	94	477	19224	98	557	19230	96	237
19275	94	467	19277	94	547	Krishna		
19249	76	461	19225	94	546	Hamsa	88	192
19211	99	451	19219	95	523	MTU 1010	88	238
19192	83	448	19223	93	512	IR 64	92	347
19263	100	440	19222	93	508	Sahabhagi		
19253	95	434	19235	95	503	dhan	89	144
19221	93	412	19173	95	489	IR81896	102	485
			19269	89	487			

DFF- days to fifty percent flowering, GY- grain yield in g/m<sup>2</sup>.

**Supplementary Table S8. Polymorphic markers between pairs of parents for use in background selection**

Chr. No.	Total No. of markers analyzed	Polymorphism between Krishna Hama and each of the donor parent					
		IRBB60	Tetep	DSB2	IR74371	IR81896	IR96321
1	44	RM3341	RM10074	RM594	RM10074	RM10074	RM10074
		RM488	RM243	RM11068	RM595	RM3627	RM243
		RM11377	RM3627	RM11191	RM3341	RM595	RM3627
		RM212	RM10963	RM3341	RM488	RM3341	RM595
		(4)	RM3341	RM488	RM11377	RM488	RM3341
			RM11391	RM11377	RM11943	RM11377	RM5853
			RM1244	RM11391	RM12276	RM11943	RM2318
			RM11569	RM297	(7)	(7)	RM488
			RM3825	RM11943			RM11377
			RM11943	(9)			RM11391
			RM12276				RM1117
			(11)				RM297
							RM3825
							RM11943
							(14)
2	34	RM6378	RM12433	RM12433	RM3549	RM12307	RM13384
		RM2468	RM6378	RM6378	RM1234	RM12434	RM3515

Chr. No.	Total No. of markers analyzed	Polymorphism between Krishna Hama and each of the donor parent					
		IRBB60	Tetep	DSB2	IR74371	IR81896	IR96321
		RM3549 RM1234 RM3515 RM13607 RM1942 RM13863 (8)	RM3549 RM1234 RM3515 RM13607 RM1942 RM13863 (8)	RM2468 RM3549 RM6374 RM4499 RM13393 RM13607 RM1942 RM3316 RM208 (11)	RM6374 RM13384 RM13393 RM3515 RM13863 RM3316 (8)	RM279 RM6378 RM3549 RM13384 RM3515 RM208 (8)	RM13607 RM13863 RM3316 RM14170(6)
3	35	RM15223 RM8072 (2)	RM15488 RM15803 RM520 RM8072 (4)	RM8072 (1)	RM3350 RM520(2)	RM15191 RM16 RM15488 RM3350 RM520(5)	RM15488 RM520 RM8072 (3)
4	41	RM16591 RM16864 RM551 RM8213 RM 8072 (5)	RM16262 RM16591 RM17022 RM17104 RM17305 RM551 RM8213 RM 8072 (8)	RM16459 RM16591 RM16642 RM17022 RM8213 RM 8072 (6)	RM 80729(1)	RM16262 RM16591 RM17022 RM551 RM8213 (5)	RM8213 RM551 RM17022 RM16591 (4)
5	26	RM1248 RM17855 RM18394 RM3381 RM18933(5)	RM17855 RM18018 (2)	RM17855 RM18018 (2)	--	--	--
6	45	RM588 RM206 RM439 (3)	RM588 RM19642 (2)	RM589 RM19642 (2)	--	RM588 RM253 RM19642 RM18405 RM3437 RM206 RM19056(7)	RM588 RM253 RM19642 RM3437 RM206 RM19056(6)
7	37	RM20794 RM20896 RM21445 RM20917 (4)	RM 20794 RM20896 RM21445 RM22100 (4)	RM1135 RM21445 RM20917 (3)	RM1135 RM20794 RM 144 (3)	RM 144 RM20794 RM209179(3)	--
8	23	RM407 RM1235 (2)	RM 38 RM22551 RM22710 RM407 RM 447 (5)	RM22685 (1)	RM38 RM22709 RM22710 RM2251 RM515 (5)	RM515 RM22710 RM22709(3)	RM2251 RM22709 RM22710 RM515(4)
9	19	--	--	RM24715 RM7481 (2)	--	--	--
10	23	RM25187 RM6100 RM332 (3)	RM25124 RM25187 RM25658 RM25846 RM216 RM25581	RM24899 RM25187 RM25472 RM25846 RM6100 RM 216	--	RM24899 RM25124 RM6100 RM25581 (4)	RM25124 RM25472 RM332(3)

Chr. No.	Total No. of markers analyzed	Polymorphism between Krishna Hama and each of the donor parent					
		IRBB60	Tetep	DSB2	IR74371	IR81896	IR96321
			RM332 (7)	RM 258 (7)			
11	25	RM206 RM26200 RM332 RM4112 (4)	RM224 RM26119 RM26200 RM27322 (4)	RM202 RM26200 RM26315 RM27322 RM332 RM27367 (6)	--	RM26200 RM27322 RM332 (3)	RM206 RM26200 RM27322 (3)
12	23	RM28199 RM28488 RM3331 RM28570 RM235 RM17 (6)	RM224 RM17 RM27289 (3)	RM28199 RM28357 RM28488 RM3331 (4)	--	RM7102 RM28357 RM28488 RM28570 RM28166 (5)	RM26200 RM27322 RM332 (3)
<b>Total</b>	<b>375</b>	<b>47</b>	<b>58</b>	<b>54</b>	<b>26</b>	<b>50</b>	<b>47</b>