

Supplementary Table S4. Gene structure conformation of PGHF32 genes in monocotyledonous and dicotyledonous species, *Agave tequilana*, asparagus (*Asparagus officinalis*), goatgrass (*Aegilops tauschii*), wheat (*Triticum aestivum*), barley (*Hordeum vulgare*), *Arabidopsis thaliana*, carrot (*Daucus carota*), beetroot (*Beta vulgaris*), maize (*Zea mays*) and rice (*Oryza sativa*). The mini-exon is located in Exon II in PGHF32 genes.

Species	Enzyme	No. Exon	No. Intron	Mini-exon	Mini-exon length (nt)	Mini-exon sequence (nt)	Translated sequence (aa)
<i>A. tauschii</i>	Ata6SFT-like	4	3	Yes	9	GATCCCAAC	DPN
<i>A. tauschii</i>	Ata1FEH-like	7	6	Yes	9	GATCCATCT	DPS
<i>A. tauschii</i>	Ata1FFT-like	4	3	Yes	9	GATCCCAAC	DPN
<i>A. tauschii</i>	Ata1SST-like	4	3	Yes	9	GATCCCAAC	DPN
<i>A. tauschii</i>	AtaInv1-like	3	2	No	---	---	---
<i>A. tauschii</i>	AtaVinv1-like	4	3	Yes	9	GATCCCAAC	DPN
<i>A. tauschii</i>	AtaCwinv1-like	7	6	Yes	9	GATCCCAAC	DPN
<i>H. vulgare</i>	Hv1FFT	4	3	Yes	9	GATCCCAAC	DPN
<i>H. vulgare</i>	Hv6FEH	6	5	No	---	---	---
<i>H. vulgare</i>	HvInv1	4	3	Yes	9	GATCCAAAC	DPN
<i>H. vulgare</i>	HvCwinv1-like	7	6	Yes	9	GATCCAAAT	DPN
<i>H. vulgare</i>	Hv1FEH	7	6	Yes	9	GATCCATCT	DPS
<i>H. vulgare</i>	HvInv2	4	3	Yes	9	GATCCCAAC	DPN
<i>H. vulgare</i>	Hv1SST	4	3	Yes	9	GATCCCAAC	DPN
<i>H. vulgare</i>	Hv6SFT	4	3	Yes	9	GATCCCAAC	DPN
<i>A. officinalis</i>	Ao1SST	8	7	Yes	8	<u>ATCCAAAT</u>	PN
<i>A. officinalis</i>	Ao1FFT1	8	7	Yes	9	GATCCTAGC	DPS
<i>A. officinalis</i>	Ao6GFFT	8	7	Yes	9	GATCCCAGC	DPS
<i>A. officinalis</i>	Ao6FEH	6	5	No	---	---	---
<i>A. officinalis</i>	AoCwinv1-like	6	5	No	---	---	---
<i>A. officinalis</i>	AoCwinv2-like	7	6	Yes	9	GATCCTAAT	DPN
<i>O. sativa</i>	OsInv1	5	4	Yes	9	GATCCGAAT	DPN

<i>O. sativa</i>	OsInv2	7	6	Yes	9	GATCCGAAC	<b>DPN</b>
<i>O. sativa</i>	OsInv3	3	2	No	---	---	---
<i>O. sativa</i>	OsInv4	7	6	Yes	9	GATCCGAAC	<b>DPN</b>
<i>O. sativa</i>	OsCwinv1	7	6	Yes	9	GATCCGAAC	<b>DPN</b>
<i>O. sativa</i>	OsCwinv2	7	6	Yes	9	GATCCGAAC	<b>DPN</b>
<i>O. sativa</i>	OsCwinv4	7	6	Yes	9	GATCCGAAC	<b>DPN</b>
<i>O. sativa</i>	OsCwinv6	6	5	Yes	9	GATCCGAAT	<b>DPN</b>
<i>Z. mays</i>	ZmInv1	7	6	Yes	9	GATCCGAAC	<b>DPN</b>
<i>Z. mays</i>	ZmInv2	7	6	Yes	9	GATCCGAAC	<b>DPN</b>
<i>Z. mays</i>	ZmCwinv1	7	6	Yes	9	GACCCCAAC	<b>DPN</b>
<i>Z. mays</i>	ZmCwinv2	7	6	Yes	9	GATCCCAAC	<b>DPN</b>
<i>Z. mays</i>	ZmCwinv3	6	5	Yes	9	GATCCAAAT	<b>DPN</b>
<i>Z. mays</i>	ZmCwinv4	6	5	Yes	9	GATCCGAAT	<b>DPN</b>
<i>Z. mays</i>	Zm6,1-FEH	7	6	Yes	9	GATCCCAAC	<b>DPN</b>
<i>A. thaliana</i>	AthVinv1	7	6	Yes	9	GATCCTAAT	<b>DPN</b>
<i>A. thaliana</i>	AthVinv2	7	6	Yes	9	GATCCTAAC	<b>DPN</b>
<i>A. thaliana</i>	AthCwinv1	7	6	Yes	9	GATCCTAAT	<b>DPN</b>
<i>A. thaliana</i>	AthCwinv2	5	4	Yes	9	GATCCGAAT	<b>DPN</b>
<i>A. thaliana</i>	AthCwinv4	6	5	Yes	9	GATCCAAAT	<b>DPN</b>
<i>A. thaliana</i>	AthCwinv5	4	3	No	---	---	---
<i>A. thaliana</i>	AthCwinv3 (6-FEH)	7	6	Yes	9	GATCCTAAT	<b>DPN</b>
<i>A. thaliana</i>	AthCwinv6 (6,1-FEH)	7	6	Yes	9	GATCCAAAC	<b>DPN</b>
<i>B. vulgaris</i>	Bv6FEH	7	6	Yes	8	<u>ATCCTAAT</u>	<b>PN</b>
<i>B. vulgaris</i>	BvVinv	8	7	Yes	9	GATCCAAAC	<b>DPN</b>
<i>B. vulgaris</i>	BvCwinv	7	6	Yes	9	GATCCTAAT	<b>DPN</b>
<i>T. aestivum</i>	Ta1FEHw2	7	6	Yes	9	GATCCATCT	<b>DPS</b>
<i>T. aestivum</i>	Ta1FFTA	4	3	Yes	9	GATCCCAAC	<b>DPN</b>

<i>T. aestivum</i>	Ta1FFTB	4	3	Yes	9	GATCCCAAC	<b>DPN</b>
<i>T. aestivum</i>	Ta1SST	4	3	Yes	9	GATCCCAAC	<b>DPN</b>
<i>T. aestivum</i>	Ta6FEH	6	5	Yes	9	GATCCGAAC	<b>DPN</b>
<i>T. aestivum</i>	Ta6SFT	4	3	Yes	9	GATCCCAAC	<b>DPN</b>
<i>T. aestivum</i>	Ta6,1FEH	9	8	Yes	9	GATCCATGT	<b>DPC</b>
<i>T. aestivum</i>	Ta1FEHw1	7	6	Yes	9	GATCCATCT	<b>DPS</b>
<i>T. aestivum</i>	Ta6KEHw1	9	8	Yes	9	GATCCATGT	<b>DPC</b>
<i>T. aestivum</i>	Ta6KEHw2	9	8	Yes	9	GATCCATGT	<b>DPC</b>
<i>T. aestivum</i>	Ta1FEHw3	7	6	Yes	9	GATCCATCT	<b>DPS</b>
<i>T. aestivum</i>	TaInv1-like	3	2	No	---	---	---
<i>T. aestivum</i>	TaVinv2-like	4	3	Yes	9	GATCCCAAC	<b>DPN</b>
<i>T. aestivum</i>	TaVinv3-like	4	3	Yes	9	GATCCCAAC	<b>DPN</b>
<i>T. aestivum</i>	TaCwinv1-like	7	6	Yes	9	GATCCCAAC	<b>DPN</b>
<i>T. aestivum</i>	TaCwinv2-like	7	6	Yes	9	GATCCCAAC	<b>DPN</b>
<i>T. aestivum</i>	TaCwinv3-like	7	6	Yes	9	GATCCCAAC	<b>DPN</b>
<i>D. carota</i>	DcCwinv1-like	7	6	Yes	9	GATCCTAAT	<b>DPN</b>
<i>D. carota</i>	DcCwinv2-like	7	6	Yes	9	GATCCAAAT	<b>DPN</b>
<i>D. carota</i>	DcCwinv3-like	7	6	Yes	9	GATCCCAAT	<b>DPN</b>
<i>D. carota</i>	DcVinv1-like	8	7	Yes	9	GATCCTAAT	<b>DPN</b>
<i>D. carota</i>	DcVinv2-like	7	6	Yes	9	GATCCTAAC	<b>DPN</b>
<i>D. carota</i>	DcVinv3-like	7	6	Yes	9	GATCCTAAT	<b>DPN</b>
<i>A. tequilana</i>	Atq1SST-1	8	7	Yes	9	GATCCCAAT	<b>DPN</b>
<i>A. tequilana</i>	Atq1SST-2	8	7	Yes	9	GATCCTAAT	<b>DPN</b>
<i>A. tequilana</i>	Atq1SST-3	8	7	Yes	9	GATCCCAAT	<b>DPN</b>
<i>A. tequilana</i>	Atq6GFFT-1	8	7	Yes	9	GATCCATGT	<b>DPC</b>
<i>A. tequilana</i>	Atq6GFFT-2	8	7	Yes	9	GATCCAAGT	<b>DPS</b>
<i>A. tequilana</i>	Atq1FFT	8	7	Yes	9	GATCCCAGC	<b>DPS</b>

<i>A. tequilana</i>	AtqVinv1	6	5	Yes	9	GATCCCAAC	<b>DPN</b>
<i>A. tequilana</i>	AtqVinv2	8	7	Yes	9	GATCCCAAT	<b>DPN</b>
<i>A. tequilana</i>	AtqVinv3-like	8	7	Yes	9	GATCCCAAC	<b>DPN</b>
<i>A. tequilana</i>	AtqVinv4-like	8	7	Yes	9	GATCCCAAT	<b>DPN</b>
<i>A. tequilana</i>	AtqVinv5-like	8	7	Yes	9	GATCCCAAC	<b>DPN</b>
<i>A. tequilana</i>	AtqInv1	7	6	Yes	9	GATCCTGAC	<b>DPD</b>
<i>A. tequilana</i>	AtqInv2	6	5	Yes	8	<u>ATCCTAAT</u>	<b>PN</b>
<i>A. tequilana</i>	AtqCwinv-1	7	6	Yes	9	GATCCAAAT	<b>DPN</b>
<i>A. tequilana</i>	AtqCwinv-2	7	6	Yes	9	GATCCTAAT	<b>DPN</b>
<i>A. tequilana</i>	AtqFEH-1	6	5	No	---	---	---
<i>A. tequilana</i>	AtqFEH-2	6	5	No	---	---	---
<i>A. tequilana</i>	AtqFEH-3	5	4	No	---	---	---
<i>A. tequilana</i>	AtqFEH-4	6	5	No	---	---	---