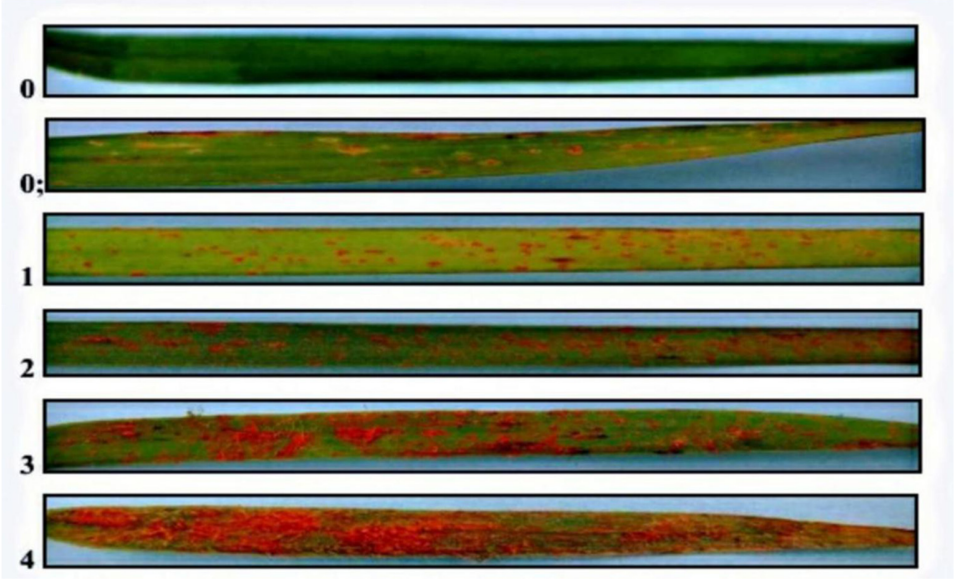
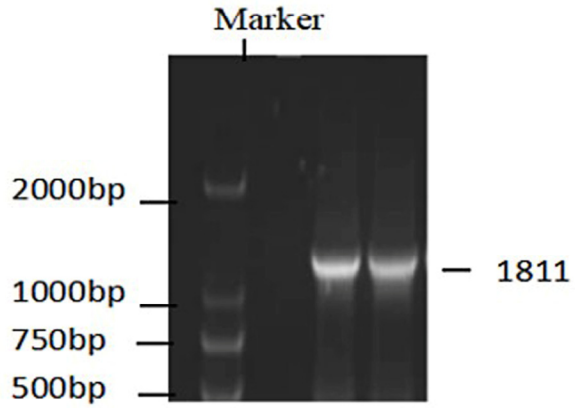


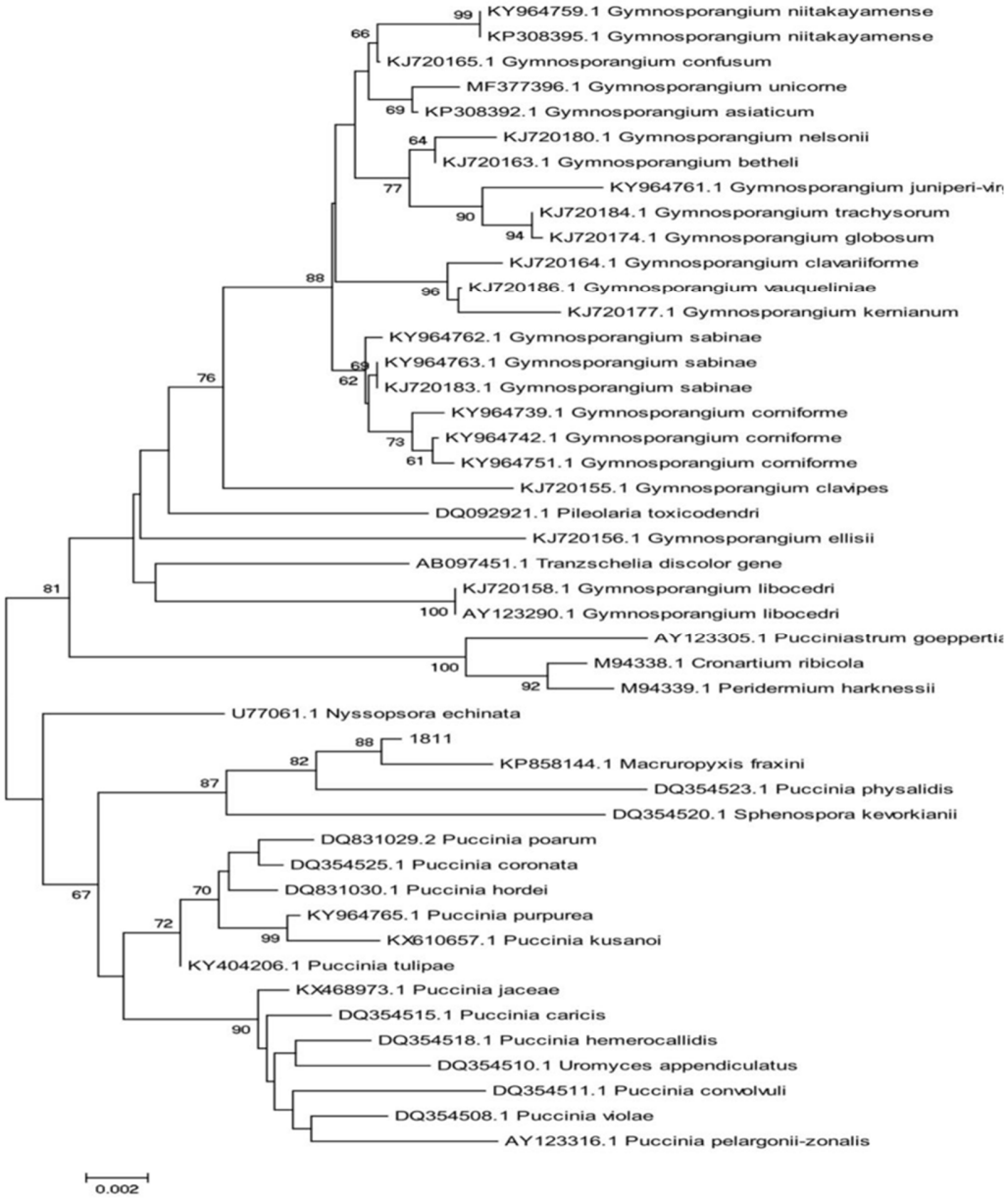
Supplemental Figure S1. The classification standard of rust disease severity in *Zoysia japonica* (Gu 2013).



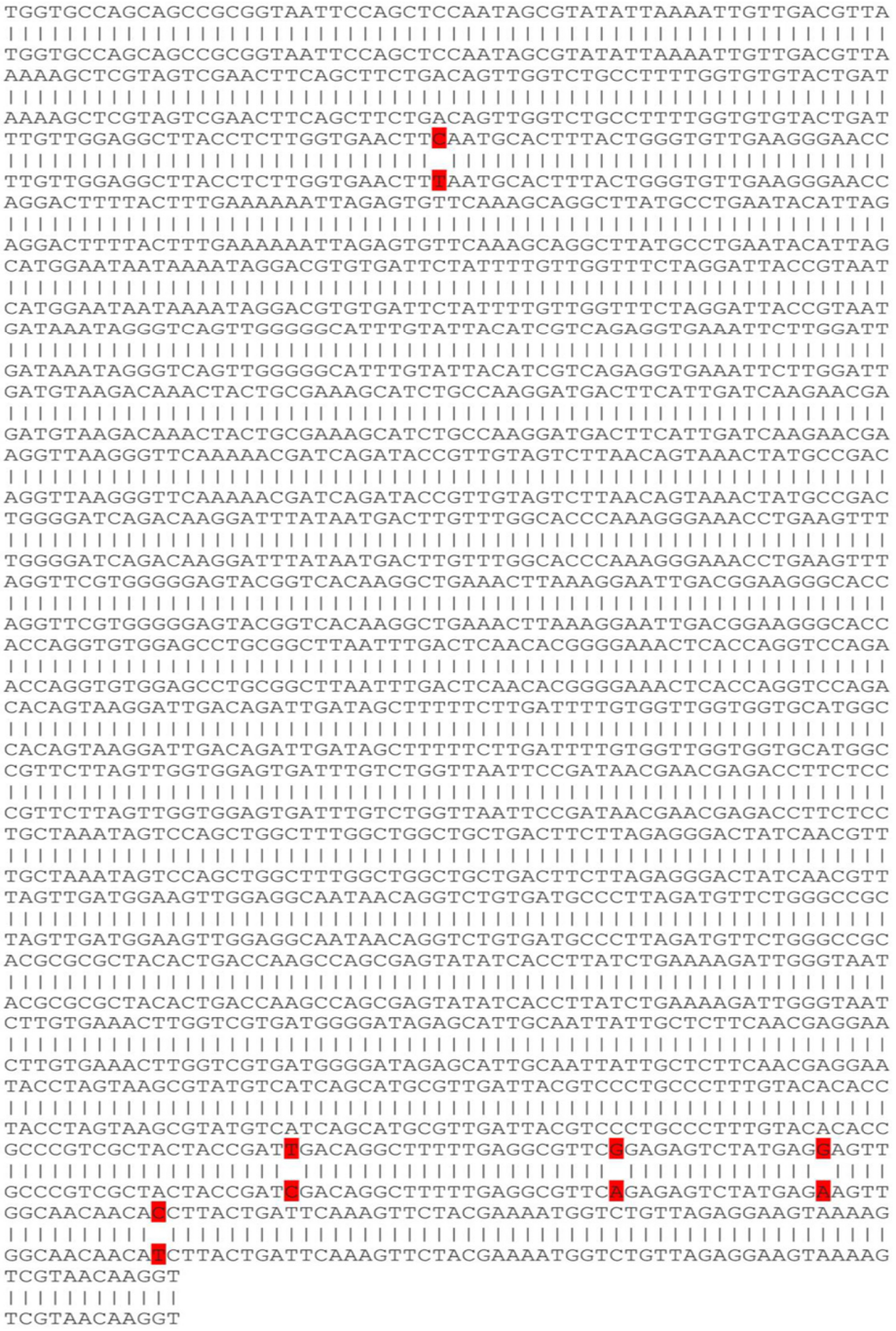
Supplemental Figure S2. The classification standard of the infection type of rust diseases in *Zoysia japonica* (Gu 2013).



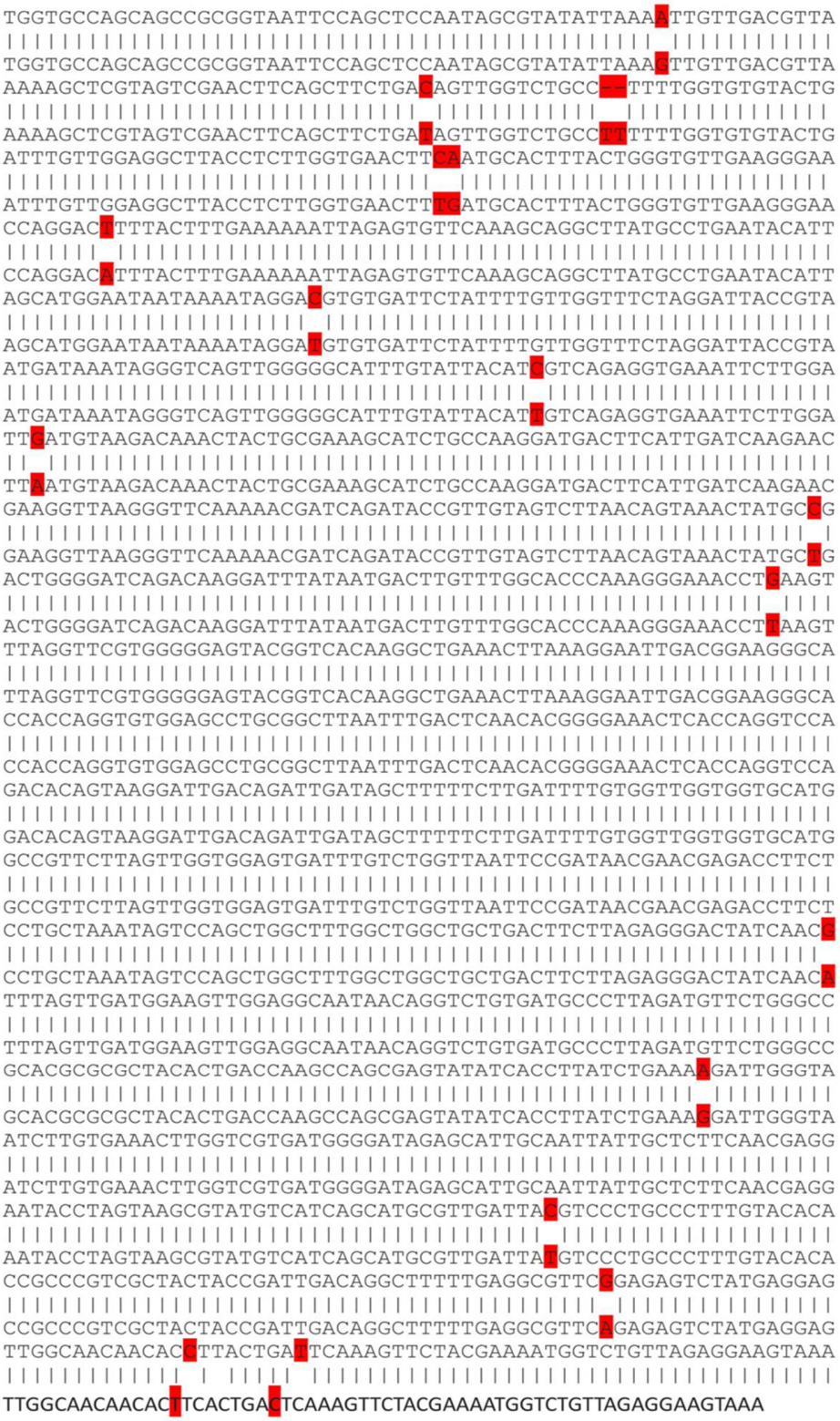
Supplemental Figure S3. PCR amplification of 18S ribosomal DNA (rDNA).



Supplemental Figure S4. Diagram of comparative evolution between 1811 and other rust fungi of Pucciniales based on the 18S ribosomal DNA (rDNA) sequence.



Supplemental Figure S5. Alignment of 18S ribosomal DNA (rDNA) gene sequence between 1811 and *Macruropyxis fraxini* (99%). The red-highlighted letters represent differences between *Macruropyxis fraxini* and 1811.



Supplemental Figure S6. 18S ribosomal DNA (rDNA) gene sequence alignment between 1811 and *Puccinia physalidis* (98%). The red-highlighted letters represent differences between *Puccinia physalidis* and 1811.

Supplemental Table S1. Primer sequences for polymerase chain reaction.

Primer	Sequence
18N5	5-TGGTGCCAGCAGCCGCGGTA-3
18N11R	5-CTCAGTAAGCTTGATCCTTCCGCAGGTTCACC-3

Supplemental Table S2. Observation indexes of rust diseases in zoysiagrass (Gu 2013).

Severity degree	Incidence rate (%)	Symptom description
0	-	No symptoms
1	0–5%	Mild symptoms, with a few scattered urediniospores
2	5–10%	Mild symptoms, low density of urediniospores
3	10–20%	Moderate symptoms, evenly distributed urediniospores
4	20–40%	Moderately severe symptoms, abundant urediniospores
5	40–60%	Moderately severe symptoms, urediniospores in large numbers and higher densities
6	60–80%	Severe symptoms, urediniospores in piles
7	80–100%	Extremely severe symptoms; urediniospores almost covering the entire leaf

Supplemental Table S3. The infection type classification standard of rust diseases in zoysiagrass.

Grade	Rust severity	Representative value
1	No uredinia on the leaves or any other symptoms, resistant	0
2	No uredinia on the leaves, but spots were present, partially resistant	0
3	Sparse uredinia on the leaf, covering 10% of the leaf surface area, resistant	1
4	Uredinia had a medium density on the leaf, covering 10–30% of the leaf surface area, moderately resistant	2
5	Many uredinia, covering 30–60% of the leaf surface area; tip of the leaves turned yellow and withered, moderately susceptible	3
6	Densely distributed uredinia on the leaf, covering 60% of the leaf surface area; most leaves turned yellow, susceptible	4

Supplemental Table S4. Primer sequences for qRT-PCR

Gene	Forward primer (5'-3')	Reverse primer (5'-3')	Accession number
POD	ACCGCATCTACAACGACAC	TTCACTTTGGAGCAGGTGAG	BCLF01000044.1
CAT	GGCGTCAACACGTACAC	TCCATGGTCTGGATGTAGAG	BCLF01000002.1
APX	CCTTCGGTACCATGAAGAAC	CAAAGACCTGCCTGAGATG	BCLF01000001.1
MnSOD	ACGCTGGCATCGAAGAA	CCGCCGTTGAACTTGATG	BCLF01000075.1
ChlCu/ZnSOD	GAAGTGTATCTGGCCTCAAG	CTCCTGGGTGAAGAAGATTG	BCLF01005187.1
ZjActin	GCTCAGTCCAAGAGAGGTATTC	TGATGCCAGATCTTCTCCATATC	GU290546