

## Supplementary Materials

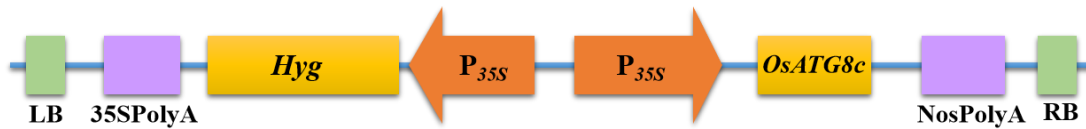
# 1 *OsATG8c*-mediated increased autophagy increases 2 the yield and nitrogen use efficiency (NUE) in rice

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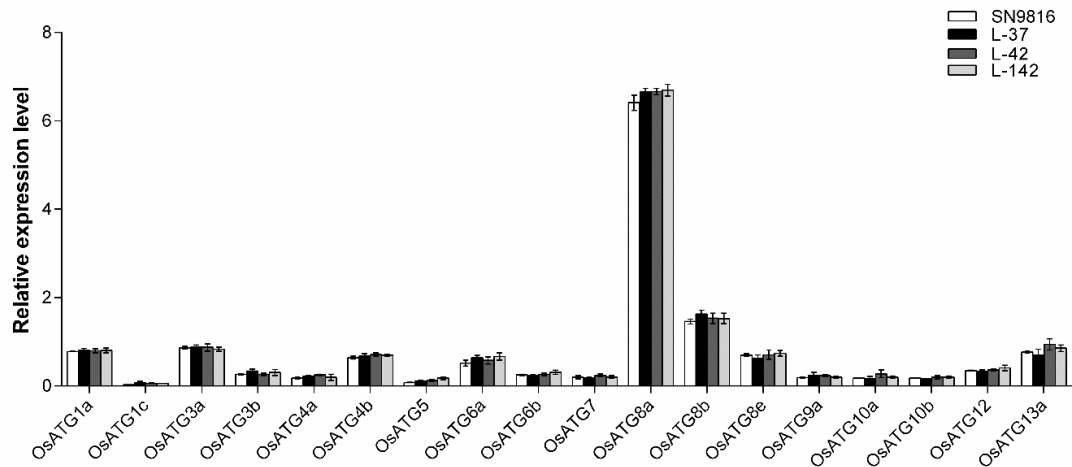
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11 **Supplementary Figure 1.** Schematic diagram of 35S-*OsATG8c* construction. P<sub>35S</sub>, CaMV 35S  
 12 promoter; *Hyg*, hygromycin; 35SPolyA; CaMV 35S terminator polyA signal; NosPolyA,  
 13 nopaline synthase terminator polyA signal; RB and LB, right and left border of Ti plasmid.

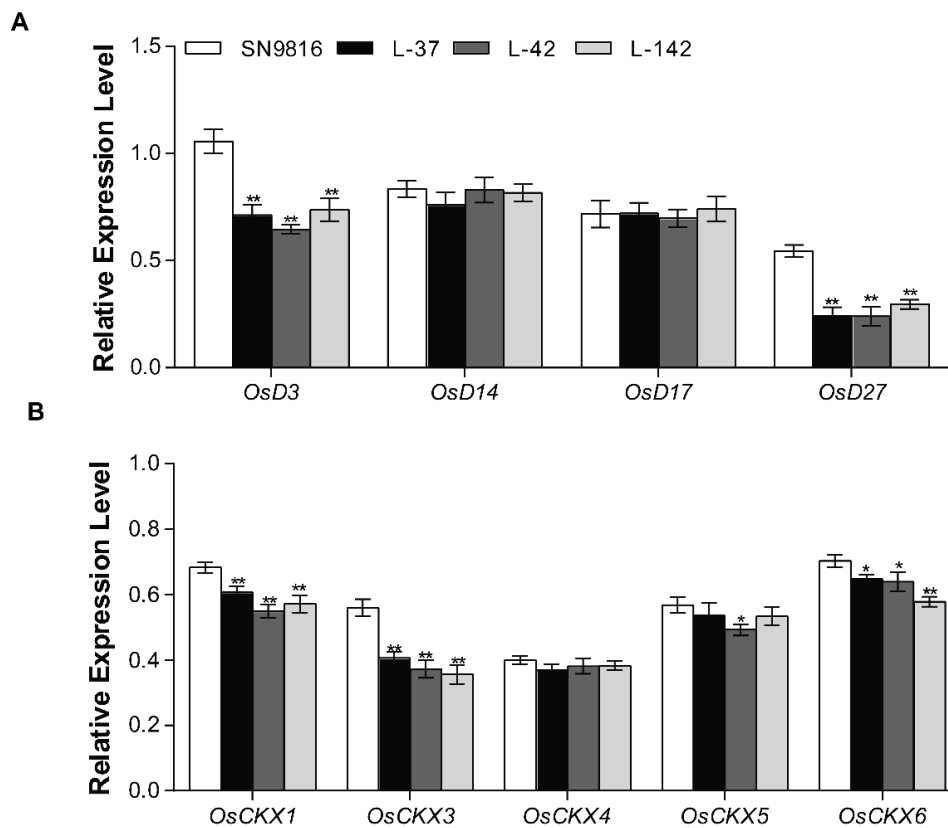
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16 **Supplementary Figure 2.** Real-time RT-PCR analysis of the transcript levels of *OsATGs* in 21-  
 17 day-old seedlings of SN9816 and 35S-*OsATG8c* transgenic rice under N sufficient condition.

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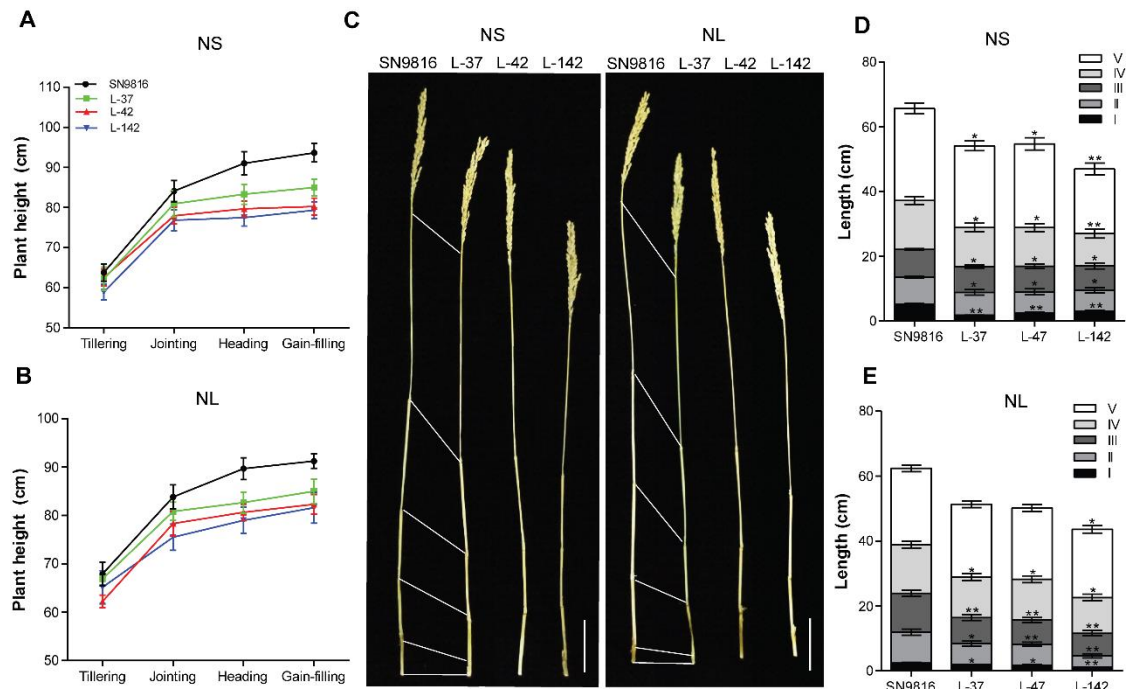


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20 **Supplementary Figure 3.** Overexpression of *OsATG8c* affected the expression of the tiller  
 21 related genes. Expression level of (A) genes involved strigolactones pathway and (B) cytokinin

22 oxidase/dehydrogenase (CKXs) genes in tiller buds of 32-day-old SN9816 and transgenic rice  
 23 seedlings. Values are means  $\pm$  SD (n = 10), \* $P$  < 0.05, \*\* $P$  < 0.01 (t-test).

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 26 **Supplementary Figure 4.** Overexpression of *OsATG8c* lowered plant height. (A) and (B) The  
 27 plant height curve of SN9816 and transgenic lines under NS (225 kg·ha<sup>-1</sup>) and NL (75 kg·ha<sup>-1</sup>)  
 28 conditions at various growth stage, values are means  $\pm$  SD (n = 12). (C) Comparisons of culm  
 29 length in SN9816 and transgenic lines under NS (225 kg·ha<sup>-1</sup>) and NL (75 kg·ha<sup>-1</sup>) conditions at  
 30 ripening stage. I, II, III, IV and V indicate the first, second, third, fourth and fifth internode,  
 31 respectively. Scale bars, 10 cm. (D) and (E) Quantification of the internode length in panel C,  
 32 values are means  $\pm$  SD (n = 12), asterisks indicate significant differences of each internode length  
 33 between SN9816 and the transgenic lines, \* $P$  < 0.05, \*\* $P$  < 0.01 (t-test).

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**Supplementary Table 1** The information of primers used in this study.

Primer name	Sequence (5' → 3')	Functions
cOsATG8c-F	CCATGGATGGCGAGGAGCTCGTTCAAGC	Gene cloning
cOsATG8c-R	GGTGACCTCAGACAAACAGGCCGAAGGTGT	Gene cloning
cpOsATG8c-F	AAGCTTCGTGGCTGTGTATGCCTTGC	Gene cloning
cpOsATG8c-R	CCATGGCGCCCTGCCTTGCTTTCTT	Gene cloning
rtOsATG8c-F	GACCTCACGGTTGGACAGTT	Real-time RT-PCR
rtOsATG8c-R	TGGAAGCGTGTCTTGACGA	Real-time RT-PCR
rtOsATG1a-F	CCAAACGAGGGCGTGTAAGA	Real-time RT-PCR
rtOsATG1a-R	CACCGAGCTCACGTTACAGT	Real-time RT-PCR
rtOsATG1c-F	TGCTCCTGCACACGGTTATT	Real-time RT-PCR
rtOsATG1c-R	TCCATAGGGGACATGAGCA	Real-time RT-PCR
rtOsATG3a-F	AGCCAAGATCATGCACGGAA	Real-time RT-PCR

rtOsATG3a-R	ACAGCAGCATGTTTGCATGG	Real-time RT-PCR
rtOsATG3b-F	CTGCCCCCTCTCTTGCAAAAT	Real-time RT-PCR
rtOsATG3b-R	CCAAATACAGGCATGCGACC	Real-time RT-PCR
rtOsATG4a-F	GCCGTGACAAAGGTGAACTG	Real-time RT-PCR
rtOsATG4a-R	CTCAGAGGCCCGAGAACAGA	Real-time RT-PCR
rtOsATG4b-F	GCACTGTCTCGATACCCAG	Real-time RT-PCR
rtOsATG4b-R	CGCTGTAACATGGTAACAGAACG	Real-time RT-PCR
rtOsATG5-F	CAGCTCGAAGGCATCACGTA	Real-time RT-PCR
rtOsATG5-R	TGCCTTGCACCCTTACTAGC	Real-time RT-PCR
rtOsATG6a-F	GTGACAAGGTAGGGAGCCAC	Real-time RT-PCR
rtOsATG6a-R	GATTGCGCTGCACACAAAGA	Real-time RT-PCR
rtOsATG6b-F	TGCAGCTCTGGTTAGGTGAG	Real-time RT-PCR
rtOsATG6b-R	TCTCAAGTATGTGTTGCTGAAGAC	Real-time RT-PCR
rtOsATG7-F	AGCCTGCGTTGGAAGATTGA	Real-time RT-PCR
rtOsATG7-R	GGAAATGATGCTTCGCCGAC	Real-time RT-PCR
rtOsATG8a-F	ATAGCATGTCCCTGTGCTGG	Real-time RT-PCR
rtOsATG8a-R	CGCCCAATCACACTTCAGAC	Real-time RT-PCR
rtOsATG8b-F	GCTGATCTTACCGTTGGGCA	Real-time RT-PCR
rtOsATG8b-R	ATCAGAGCAGCTGTTGGTGG	Real-time RT-PCR
rtOsATG8e-F	CCTCCGTGGAGATCTGCTTT	Real-time RT-PCR
rtOsATG8e-R	GGTGGGATAATTAAGTTCGGTATG	Real-time RT-PCR
rtOsATG9a-F	ATGGCGATGAAACGTCCGAT	Real-time RT-PCR
rtOsATG9a-R	CTGTCCTTCTGAGGGGCATC	Real-time RT-PCR
rtOsATG10a-F	GTGAGGGATGGACTCTGTC	Real-time RT-PCR
rtOsATG10a-R	TGGAACTCCCATCTTGCAGC	Real-time RT-PCR
rtOsATG10b-F	TTCCAGGCTCCACTGCTCT	Real-time RT-PCR
rtOsATG10b-R	CAAACACAGGATTTGATGGCTC	Real-time RT-PCR
rtOsATG12-F	AGTCCAAGTTCAAGATTGGTGA	Real-time RT-PCR
rtOsATG12-R	GTTGCCCGTCGATTCCAAAG	Real-time RT-PCR
rtOsATG13a-F	GTCAACCGGCGCTTGTTATG	Real-time RT-PCR
rtOsATG13a-R	ATCCGGTTGGTTTTGCTTGC	Real-time RT-PCR
rtOsD3-F	TCCAAACTTGCCGGACATGCAGTT	Real-time RT-PCR
rtOsD3-R	CCATTGCACAGTGGAGCAATGGCA	Real-time RT-PCR
rtOsD10-F	CTGTACAAGTTCGAGTGGCACC	Real-time RT-PCR
rtOsD10-R	CCTCGTCCGTCTCCTCGTAC	Real-time RT-PCR
rtOsD14-F	GTGCTGTGCGATGGCTTC	Real-time RT-PCR
rtOsD14-R	GCAGGTGCTCGACGTAGG	Real-time RT-PCR

rtOsD17-F	GAGGATGGTGGCTATGTTCT	Real-time RT-PCR
rtOsD17-R	AGACTGGATCTGATGCTTGCT	Real-time RT-PCR
rtOsD27-F	TCTGGGCTAAAGAATGAAAAGGA	Real-time RT-PCR
rtOsD27-R	AGAGCTTGGGTCACAATCTCG	Real-time RT-PCR
rtOsD53-F	TGGGTTCTGAGTGCATGTTG	Real-time RT-PCR
rtOsD53-R	GTGTCCTCACAGGCCACTAG	Real-time RT-PCR
rtOsCKX1-F	TCAACAAATCCAAGTGGGATGCGG	Real-time RT-PCR
rtOsCKX1-R	TCGCAGAACCTCAGTATCCTCTGT	Real-time RT-PCR
rtOsCKX2-F	GTCAGTGGAGGGGCGGTA	Real-time RT-PCR
rtOsCKX2-R	CGTTGGAAATCTGGGGGC	Real-time RT-PCR
rtOsCKX3-F	ATGAGCAATCCCTTCACAGCTCCT	Real-time RT-PCR
rtOsCKX3-R	TGACTTCCACGACCTGTCCACAT	Real-time RT-PCR
rtOsCKX4-F	GACCGACTACCTCCATCTCACA	Real-time RT-PCR
rtOsCKX4-R	GGTTGACATTGCTGACCTGC	Real-time RT-PCR
rtOsCKX5-F	AGGGCCTAATCAACAACCTGGAGGT	Real-time RT-PCR
rtOsCKX5-R	GGTGGAGTCGTCGTAATTCTTGGT	Real-time RT-PCR
rtOsCKX6-F	ACAAGTCCAGCTCAATCGGACACT	Real-time RT-PCR
rtOsCKX6-R	TCCCGCAAGCCTATCAATGTCGAA	Real-time RT-PCR
rtOsSPL14-F	GATGGATTGGTCTCTGTAGAGG	Real-time RT-PCR
rtOsSPL14-R	TTGAACACAAAATAAGGGCAGG	Real-time RT-PCR
rtOsFC1-F	GCTTGGAGCAGTGTACTATACT	Real-time RT-PCR
rtOsFC1-R	CTATGTCGATGCACACATTCAG	Real-time RT-PCR
rtOsMOC1-F	GTACCTGGCGTTCAACCA	Real-time RT-PCR
rtOsMOC1-R	TCGAGGTCGAGGATGTGGA	Real-time RT-PCR
rtOsSta2-F	GCTTGGAGCAGTGTACTATACT	Real-time RT-PCR
rtOsSta2-R	CTATGTCGATGCACACATTCAG	Real-time RT-PCR
rtOsNPF7.2-F	TGCAAGTGCCACTCCTCAAGG	Real-time RT-PCR
rtOsNPF7.2-R	AGGACGGTCTCCAGGTACACCACC	Real-time RT-PCR
rtOsIAGLU-F	TGCTCTTCAACTCGTTTCGAC	Real-time RT-PCR
rtOsIAGLU-R	GACAACCCAGCCAAAACATTA	Real-time RT-PCR
rtOsActin1-F	ACCATTGGTGCTGAGCGTTT	Real-time RT-PCR
rtOsActin1-R	CGCAGCTTCCATTCTATGAA	Real-time RT-PCR