**Two competing NAC transcription factors regulate rice grain traits**

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Rice, being an inexpensive staple food crop, is not only a source of energy in the form of carbohydrates but also of dietary proteins. Our study focusses on the competition between two NAC transcription factors, N24 and N25 in regulation of rice grain traits. N24 is an activator while N25 is a repressor. The seed-preferential over expression and knock down rice lines of N24 show that it is a positive regulator of grain length by regulating both husk cell size and number. It negatively regulates grain weight and plant yield. N24 positively controls amylose (resistant starch) and total protein production. N24 has three spliced forms (A, B and C) leading to a change in its transcriptional regulatory region. The use of Chimeric REpressor gene Silencing Technology (CRES-T) to characterize these indicates regulatory variations amongst these.

Seed-preferential over expression rice lines for N25 show that it has a negative influence over grain length, width and weight, but leads to a significant increase in plant yield. The grains have decreased amylose but increased protein content. In addition to the almost opposite phenotypes exhibited by N24 and N25 grains, both bind to the same downstream NAC binding site (NBS). This NBS was present in the promoters of two seed storage protein encoding genes, and N24 and N25 competed to regulate the two genes in an opposite manner. The data leads to the conclusion that a equilibrium between N24 and N25 is essential for proper rice grain development.