**Supporting Information**

**Table S12. E. Tri-factor orthogonal rotary design**

|  |  |  |
| --- | --- | --- |
| Experimental Factor | Delta (∆) | (r = 2) Level-code-of-orthogonal-design (r = 2)–1.682 –1 0 1 1.682 |
| Density manipulation (X1) | shoots hm-2 | 1/2 BD  | 2/3 BD  | BD  | BD  | BD  |
| Applied N (X2) | 30 (kg hm-2) | 99.5 | 120 | 150 | 180 | 200.5 |
| Plant regulator (PP333)Paclobutrazol (PP333)\*(X3) | a.i.0.08kg ha-1 | 0.085 | 0.14 | 0.22 | 0.30 | 0.355 |

\*Total of 23 blocks, each with a 28 m2 area. Paclobutrazol (PP333) was sprayed during stem elongation, twice with a week break.

BD, Basic Density.