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## 大豆产量形成对大气CO<sub>2</sub>浓度升高响应的基因型差异

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摘要: 为明确大气CO<sub>2</sub>浓度升高对不同品种大豆产量形成的影响差异,本研究以正常大气CO<sub>2</sub>浓度为对照,利用开顶式气候模拟大气CO<sub>2</sub>浓度升高至550 μmol·mol<sup>-1</sup>,解析了1950~2006年间推广的8个大豆品种在CO<sub>2</sub>浓度550 μmol·mol<sup>-1</sup>条件下的产量形成差异。结果表明:大气CO<sub>2</sub>浓度升高后,大豆地上生物量平均增加46.1%,产量平均增加37.8%;不同大豆品种产量增加幅度存在差异,增幅最小的品种合交4号仅为0.6%,增幅最大的品种小黄金达到95.3%;CO<sub>2</sub>浓度升高对收获指数影响不大,只有绥农9号显著增加。大豆产量构成要素在大气CO<sub>2</sub>浓度升高后也有所增加,株高平均增加15 cm,节数增加未达到显著水平(P>0.05);大豆的总荚数和粒数增加明显,分别增加了42.9%和37.0%。不同产量构成要素对大豆高CO<sub>2</sub>条件下的产量增加的贡献不同,相关分析证明三粒荚数、总荚数和粒数的增加与大豆产量增加具有显著相关关系(P<0.05)。利用逐步回归法分析发现大气CO<sub>2</sub>升高后大豆产量的增加幅度可以用粒数和产量间的回归方程进行估计y=0.175x+0.102 (P<0.05; R<sup>2</sup>=0.792)。

Abstract: The soybean yield formation in response to the elevated CO<sub>2</sub>(eCO<sub>2</sub>) was analyzed in open top chamber (OTC) simulation systems using 8 soybean cultivars which were released in 1950-2006. Results showed that above ground biomass increased by 46.1% and yield increased by 37.8% across 8 soybean cultivars when the concentrations of atmospheric CO<sub>2</sub> increased up to 550 μmol·mol<sup>-1</sup>. The yield response to eCO<sub>2</sub> varied in the 8 soybean cultivars. The minimum increase was only 0.6% in Hejiao 4 hao, while the maximum was 95.3% in Xiaohuangjin. The effect of eCO<sub>2</sub> on harvest index was not significant except for Suinong 9 hao. Yield components of soybean were also increased under eCO<sub>2</sub>. Average plant height of 8 soybean cultivars was increased by 15 cm, while the soybean node number did not change significantly (P>0.05). The pod number and seed number increased by 42.9% and 37.0% under eCO<sub>2</sub> on average, respectively. This study also found that the contribution of yield components to soybean yield increase under eCO<sub>2</sub> differed. Under eCO<sub>2</sub>, the increase of the 3-seed pod number, total pod number and seed number were significant correlated (P<0.05). Due to the significant contribution of seed number to yield, the increase of yield under eCO<sub>2</sub> could be estimated by a model of y=0.175x+0.102 (P<0.05; R<sup>2</sup>=0.792), which was obtained through stepwise regression analysis.

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