Supplementary Information

Figure S1 The research site was plowed with a cultivator in July 2018 and then divided into three experimental units of 46 m × 10 m each. Each experimental unit was further divided into four blocks of 10 m × 10 m, separated by 2-m buffer strips and one block was kept as the control while the other three were treated with biochar and PGPR. Each block consisted of 25 plots, each measuring 2 m × 2 m. To ensure no contamination in the blocks, a minimum distance of 2 m was kept between any two blocks.

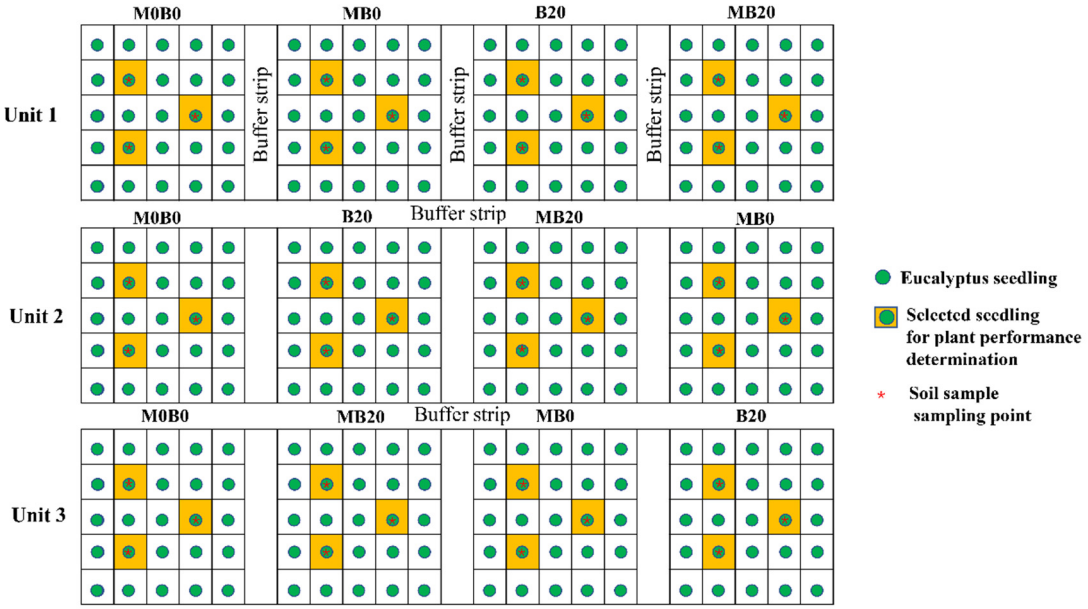
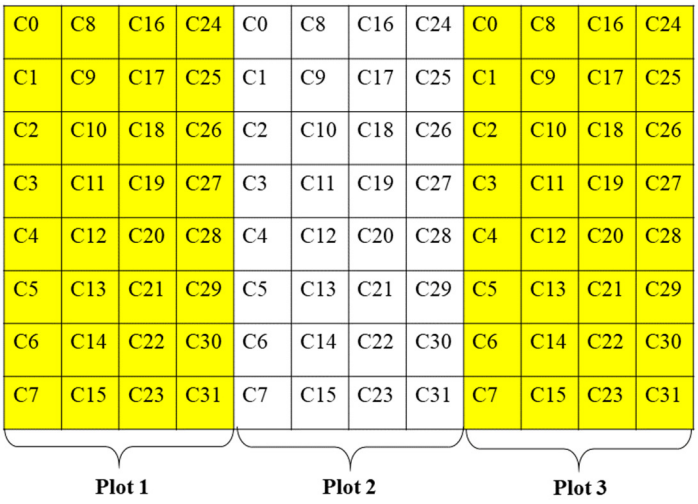


Figure S2 Carbon source type in the Biolog-Eco plate. There are 96 wells in the Biolog-Eco plate, and further divided into 3, 32 well plots. The plot is considered the unit of replication, and the first well of each plot is set as the blank control without carbon source, while other 31 wells contain tetrazolium blue and specified carbon sources.



C0: Blank control
C1: Methyl pyruvate
C2: Tween 40
C3: Tween 80
C4: a-cyclodextrin
C5: Glycogenin
C6: D-cellose
C7: a-D-lactose
C8: ß- methyl D- glycoside
C9: D-xylose
C10: L-erythritol
C11: D-mannitol
C12: N-acetyl-D-gluosamine
C13: D-glucosaminicacid
C14: Glucose-1-phosphate
C15: D, L-a-glycerol
C16: D-glactonicacid γ lactone
C17: D-galactose
C18: 2-hydroxy-benzoic acid
C19: 4-hydroxy-benzoic acid
C20: r-hydroxybutyric acid
C21: Itaconic acid
C22: a-ketobutyric acid
C23: D-malic acid
C24: L-arginine
C25: L-asparagine
C26: L-phenylalanine
C27: L-serine
C28: L-threonine
C29: Glycyl-L-glutamate
C30: Phenylethylamine
C31: Putrescine

Formula S1: $AWCD = \sum(C_i - R_i)/n$; C_i is the absorbance value of each carbon source well, R_i is the absorbance value of each blank control well, n is the number of carbon source wells.

Formula S2: Simpson index (D) = $1 - \sum P_i^2$; $P_i = (C_i - R_i)/\sum(C_i - R_i)$.

Formula S3: **S**hannon index (H) = $-\sum P_i \times \ln(P_i)$;

Formula S4: McIntosh index (U) = $\sqrt{\sum(C_i - R_i)^2}$.