Pre-transplanting Phosphate Application for Fertilizer Reduction in Java, Indonesia

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INTRODUCTION

To mitigate environmental pollution and economic load on farmers in java, Indonesia, applicability of Pre-transplanting Phosphate Application (PTPA) to crop cultivation was examined in there. PTPA is expected to maintain or increase crop yields or growth with reducing the input amount of phosphate fertilizer. Four experiments were conducted to investigate effects of PTPA on initial growth and crop yield of cabbage and initial growth of tomato in there.

MATERIALS AND METHODS

The treatments in the experiment included conventional treatment (C) and PTPA treatment (P), and both of PTPA and conventional treatment (P+C). Cabbage and tomato cultivation experiments were conducted in 2015 and 2016. A part of the treatment conditions is shown in Table. Plant and soil samples were collected from the field during cultivation period. Measurement items of the plant sample were total phosphorus and dry weight. The measurement item of the soil sample was available phosphate.

RESULTS AND DISCUSSION

The effect of PTPA treatment may not be clearly seen if the available phosphate contained in soil in the experimental field continues to be high content before trans-planting. On the other hand, in the tomato cultivation experiment in 2015, the fertilization method that combined fertilization by PTPA treatment and conventional fertilization promoted the growth of plants with reducing the application amount of phosphate fertilizer by 60% at 21 days after trans-planting. The results of field experiment is show in Fig 1. In addition, it maintained the comparable growth at 42 days after trans-planting. Therefore, PTPA was thought to be an economically and environmentally friendly fertilization method for farmers who are difficult to cast large amounts of money for agricultural materials and facilities, although there are something that we need to consider such as the content of available phosphate in soil and the selection of crops.

Table Applied fertilizers (Tomato experiment in 2015)

	Urea	SP36	KCl	KH_2PO_4 Solution
	N ($g\,plot^{-1}$)	P ($g\,plot^{-1}$)	K ($g\,plot^{-1}$)	P ($ml\,plot^{-1}$)
C0	78	0	135	0
	(100)	(0)	(100)	(0)
C100	78	68	135	0
	(100)	(100)	(100)	(0)
P40	78	0	135	1229
	(100)	(0)	(100)	(40)
P20+C20	78	14	135	614
	(100)	(20)	(100)	(20)

* Percentage to the recommended amount in the experimental field is shown in the parenthesis.

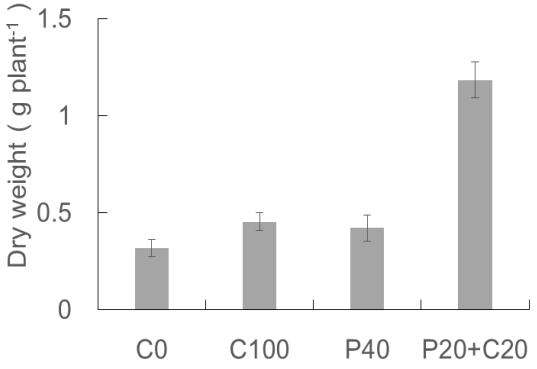

Fig. 1 Dry weight of tomato (21 days)

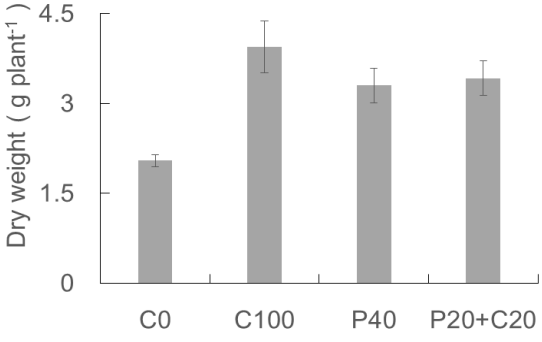

Fig. 2 Dry weight of tomato (42 days)