# BUCKWHEAT PLANT RESPONSE TO TROPICAL ENVIRONMENT OF WEST JAVA, INDONESIA

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## ABSTRACT

*Buckwheat produces high carbohydrate and it can be used as complement and healthy food. The plant is grouped as a subtropical crops but based on preliminary experiment it can be grown well at upland plain in tropical region of Indonesia, which has cooler air temperature. Air temperature is one of the most important factors that influence the growth of buckwheat which related to sowing date and the site of planting. An attempt has been done to study the response of buckwheat plant to tropical climate in West Java, Indonesia.*

*The experiment was done in two years, in 2000, two sites have been chosen which are located at 1150 m ($T_1$) and 500 m ($T_2$) above sea level, respectively. A cultivar of kitawasesoba was grown at three population densities, viz 130, 160 and 200 plants $m^{-2}$. Then, the experiment in 2001 has been planted two cultivars of kitawasesoba and hitachi-akisoba at two population densities, viz 100 and 150 plants $m^{-2}$. The plant growth were observed weekly and yield were sampled at harvesting. Whilst, thermal unit were calculated through the growing season till harvest, the photosynthetic rate at stage of full canopy has been measured at the experiment in 2000.*

*Difference in elevation caused adiabatical process, the higher the place above sea level was the cooler the air temperature. Climatic parameters along research period are shown at Table 1.*

*Table 1. Climatic parameters of sites along research period in 2000*

| Sites | Air Temperature (°C) | | | Rainfall (mm) | Daily Wind Velocity ($ms^{-1}$) | Total Radiation (cal $cm^{-2}$) | Daily Radiation (cal $cm^{-2}$) |
|---|---|---|---|---|---|---|---|
| | Max | Min | Avg | | | | |
| $T_1$ (1150 m) | 25.0 | 16.6 | 20.5 | 254.0 | 3.99 | 16 641 | 300.7 |
| $T_2$ (500 m) | 27.2 | 20.3 | 23.7 | 114.4 | 2.57 | 19 237 | 430.9 |

*The experiment results indicated that growth and yield of buckwheat plant were great influenced by climatic difference between two sites. At $T_1$ the buckwheat plant matured at accumulated thermal unit level of 847 – 909 degree days for kitawasesoba*

*and 901 degree days for Hitachi-akisoba. While at $T_2$, the plant matured at 849 – 914 degree days for kitawasesoba and 975 degree days for hitachi-akisoba. The harvest period at $T_1$ was took about 55 days, while that of $T_2$ was only about 45 – 50 days. The photosynthetic rate has been measured at level of 20 mmol $CO_2$ $m^{-2}$ $s^{-1}$ and 12 $CO_2$ $m^{-2}$ $s^{-1}$ for exposed leaf to sunlight at $T_1$ and $T_2$, respectively.*

*As consequences of climatic difference, the results revealed that the cooler the site was, the higher the growth, dry matter production and yield (Fig 1 and Fig 2). The highest average yield per hectare in the first year was reached at $T_1$ , those were 2.849 ton $ha^{-1}$ ,while at the lower place ($T_2$) the average yield just reached 1.466 ton $ha^{-1}$. The experiment in second year showed the same result that $T_1$ gave the highest average yield, those were 5.320 ton $ha^{-1}$ for kitawasesoba and 3.766 ton $ha^{-1}$ for Hitachi-akisoba. While at the lower place ($T_2$) the average yield were 3.345 ton $ha^{-1}$ for kitawasesoba and 3.260 ton $ha^{-1}$ for Hitachi-akisoba.*

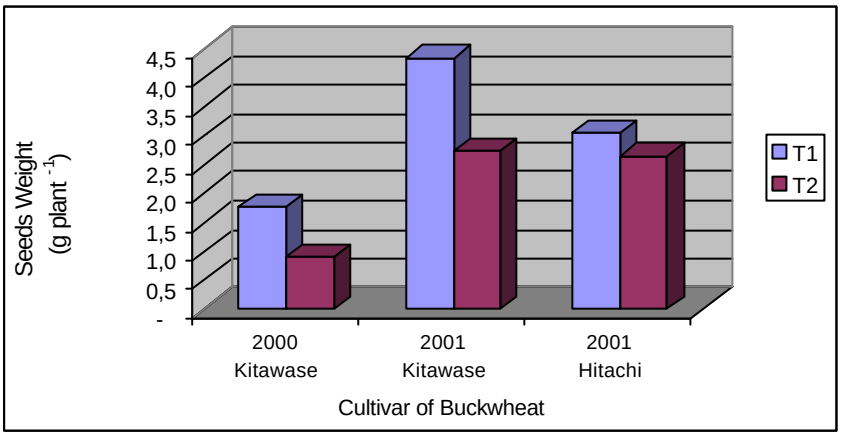


*Fig 1. The yield per plant at different sites*

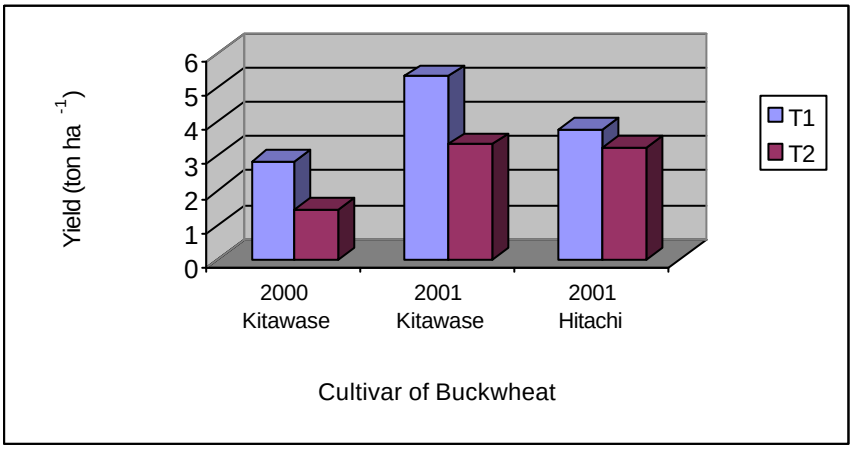


*Fig 2. The yield per land unit at different sites*