The following two experiments were undertaken to study the resistance to wilting of four varieties of barley, grown under two photoperiods, in relation to their growth, yield and metabolism.

I. This experiment was carried out with barley cultivars - N.P. 21 and Spartan - 6027 to study the effect of long and normal photocycles as well as presowing hardening treatment on their resistance to a period of wilting, (which was given after 20 and 40 days respectively of growth). Criteria of resistance were growth, yield and metabolism. The seeds were 'pretreated' with distilled water and ascorbic acid. Plants were exposed to two photoperiodic cycles, namely LD and ND. Moreover, the adult plants were subjected to wilting of six days after 20 and 40 days of growth.
Differences in soil moisture were well marked in ND plants during drought because of significant differences in temperature during the two drought treatments. On the other hand there was very little difference in the soil moisture of LD plants during both the drought treatments because of insignificant differences in their temperature. Values of drought intensity during the early period of drought did not vary significantly both for ND and LD plants because the temperature prevailing during this drought treatment was more or less the same for plants of both the photocycles.

Pretreatment had an enhancing effect upon growth of the plant. In most of the cases, AA treated plants showed greater height and increase in dry matter production in comparison with the untreated plants both of normal and drought series. Wilting treatment reduced the number of tiller and leaves in ND plants. On the other hand data of height
and dry matter production showed an uneven trend. In comparison to LD plants, ND ones had greater number of leaves and tillers as well as greater dry weight.

Wilting had no effect on the length of main spike and number of spikelets per ear of plants under both the photocycles. Spike of ND plants was longer than that of LD ones. Total grain weight per plant in N.P. 21 was not affected by photocycles, but the late variety Spartan - 5027 gave higher grain weight under long day condition in comparison with that under normal day. Total grain weight per plant increased due to pretreatment with ascorbic acid and distilled water in both the ND and LD plants.

AA content was higher in ND plants compared to that in LD ones. The reverse trend was observed for AA utilization. In most cases, wilted plants under both the photocycles had lower concentration of AA in comparison with that of normally watered ones. Ascorbigen
content registered a higher level in plants under normal day than in long day. Both ASC and MB were found to be more in the plants wilted at 20 days of growth than at 40 days of growth.

-SH content was higher in ND plants. Plants wilted after 20 days of growth surpassed in -SH content those wilted after 40 days. Comparing the normally watered plants with those subjected to wilting the former had a higher -SH content than the latter.

Concentrations of reducing and nonreducing sugars were higher in LD plants compared to those of ND ones. Concentration of reducing sugar was higher in 20-day wilted plants under both the photocycles compared to that in 40-day wilted ones. Nonreducing sugar content was found to be higher in 40-day wilted plants.
The experiment was carried out to evaluate the effect of long and normal photocycles as well as of presowing hardening and wilting treatments on growth, yield and metabolism. Barley cultivars - N.P. 20 and Peatland were used for this experiment. The seeds were 'pretreated' with distilled water and ascorbic acid. The plants were subjected to LD and ND conditions and they were given wilting treatments at the shooting and the anthesis stages.

Soil moisture level was found to be higher under long day condition than under normal day one at comparable growth stages of the plant. Soil moisture was higher and mean temperature lower during the shooting stage compared to that during the anthesis stage.

LD plants had lesser number of tillers and leaves compared to those of normal day plants. Wilting at shooting stage adversely affected height, tiller and leaf number.
Length of main spike was not affected by long day treatment and wilting treatments. Grain number and weights of main and extra spikes as well as total grain number and total grain weight per plant were reduced under long day condition compared to those of normal day plants. Under long day condition, wilting treatments did not affect these characters adversely. Plants raised from pretreated seeds were better in performance than those raised from untreated seeds, under both the photoperiodic treatments.

AA and ASC contents were lower in wilted leaves compared to those of unwilted ones. Further, these contents were higher in the leaves of plants under long day condition in comparison with the normal day ones. Leaves of plants wilted at the anthesis stage had lesser amount of AA than those subjected to wilting at the shooting stage. However, reverse was the position in the
case of AGG content. AA utilization was higher in the leaves of ND plants compared to that in LD ones. Leaves wilted at the shooting stage showed higher AA utilization than those wilted at the anthesis stage.

Catalase activity was higher in the leaves of ND plants than that of LD ones. Leaves of wilted plants showed lower catalase activity compared to that of the unwilted ones. Leaves of plants wilted at the anthesis stage had higher activity than those wilted at the shooting stage.

General peroxidase activity was higher in wilted leaves than that in unwilted ones. Leaves had higher peroxidase activity after revival compared to that during wilting. Leaves of ND plants had higher activity compared to those of LD ones. Leaves of plants wilted at the anthesis stage possessed higher peroxidase activity compared to those wilted at shooting stage.
AA-FR peroxidase activity was higher in the leaves of plants under long day condition than in ND plants. The leaves of plants wilted at the shooting stage had higher AA-FR peroxidase activity compared to those of plants wilted at the anthesis stage.

Invertase activity was higher in the leaves under long day condition compared to that in the leaves of plants under normal day. Leaves of plants wilted at the shooting stage had higher invertase activity than those at the anthesis stage.

Reducing sugar content of LD plants was higher than that of ND ones. The content was higher in the leaves of plants wilted at the shooting stage compared to that of plants wilted at the anthesis stage. After revival leaves had lesser amount of reducing sugar than during wilting.

The leaves of ND plants had greater amount of non-reducing sugar than those of LD ones. Wilting at the anthesis stage enhanced the non-reducing sugar content over that found in
plants wilted at the shooting stage. The revived leaves contained more nonreducing sugar compared to those of wilted ones.

Under normal day there was higher protease activity than that under long day. Wilting at anthesis stage increased protease activity to a greater extent than that in plants, wilted at the shooting stage.

The leaves of normal day plants had greater protein content than in those of long day plants. Unwilted leaves had higher protein content than the wilted ones. Leaves wilted at anthesis stage had more protein than those wilted at the shooting stage.

The content of leaves of long day plants was higher than that of leaves of plants under normal day. Wilted leaves had lesser protein content in comparison with that in unwilted ones. The leaves of plants wilted at the
Shooting stage contained more -SH compared to that in plants wilted at anthesis stage.

RNase activity was higher in wilted leaves compared to that in unwilted ones. The activity was also higher in the leaves wilted at anthesis stage than in those wilted at the shooting stage.

The RNA content of wilted leaves was lower than that of unwilted ones. There was however, reduction in RNA content of leaves after revival. Leaves of ND plants possessed greater amount of RNA than those of long day ones. Wilting at the shooting showed higher RNA content in leaves compared to the wilting at anthesis stage.

Unwilted and revived leaves showed higher DNA content than wilted ones. Wilting at the shooting stage had enhanced DNA content in comparison to that in leaves wilted at anthesis stage.