Materials and Methods
3.1 Plant material

The different clones of tea (*Camellia sinensis*) selected for various experiments in the study were TTL-1, TTL-2, TTL-4, TTL-5, TTL-6, SMP-1, SM-OM-54, (developed by Tata Tea Limited, Munnar, Kerala) UPASI-2, UPASI-3, UPASI-9 (developed by United Planters’ Association of Southern India-UPASI, Valparai, Tamil Nadu), TRI-2025 (developed by Tea Research Institute of Sri Lanka) and CR-6017. The clones TTL-1, TTL-2, TTL-4, TTL-5 and TTL-6 are newly released and their capabilities/ adaptability with regard to their stress tolerance potential and nutrient requirements have not been studied. All the plants were of three years age and were planted at a spacing of 1.2 metres × 0.75 metre along a single hedge with a plant population of 10760 plants per hectare.

3.2 Nutrient studies

The clones selected for the nutrient studies were TTL-1, TTL-2, TTL-5 and TTL-6. The fertilizers were applied in five split doses in a tea field with the above mentioned clones in their third year from planting during the months of April, May, August, September and November. For providing Nitrogen and Potassium to plants, Ammonium Sulphate and Muriate of
Potash mixture was applied during April and Urea and Muriate of Potash mixture was applied in May, August, September and November. Phosphorus was applied in the form of Rock Phosphate and was only a one-time application (Verma and Palani, 1997).

3.2.1 Preparation of different concentrations of nutrients

The three different concentrations of fertilizers applied to various clones of tea (*Camellia sinensis*) were 50%, 100%, and 150%, in which 100% is the UPASI recommended levels of fertilizer for tea plantations.

3.2.1.1 Preparation of N and K mixture

(1) For preparing 50% of the actual concentration (considered as half dose of the UPASI recommended concentration) - 150 kg of N and 225 kg of $K_2O$ per hectare in the form of Ammonium Sulphate and Muriate of Potash in April and Urea and Muriate of Potash in May, August, September and November respectively was applied. This is equivalent to 13.94 g of Ammonium Sulphate and 6.94 g of Muriate of Potash mixture per bush in April and 6.13 g of Urea and 6.94 g of Muriate of Potash mixture per bush for the months of May, August, September and November.

(2) For preparing 100% - 300 kg of N and 450 kg of $K_2O$ per hectare in the form of Ammonium sulphate and Muriate of potash in April and Urea and Muriate of Potash in May, August, September and November respectively was applied (Verma and Palani, 1997). This is equivalent to 27.88 g of Ammonium sulphate and 13.88 g of Muriate of Potash mixture per bush in April and 12.26 g of Urea and 13.88 g of Muriate of Potash mixture per bush for the months of May, August, September and November.

(3) For preparing 150% of the actual concentration (considered as 50% more than the UPASI recommended concentration) - 450 kg of N and 675 kg
of K₂O per hectare in the form of Ammonium Sulphate and Muriate of Potash in April and Urea and Muriate of Potash in May, August, September and November respectively was applied. This is equivalent to 41.82 g of Ammonium Sulphate and 20.82 g of Muriate of Potash mixture per bush in April and 18.40 g of Urea and 20.82 g of MOP mixture per bush for the months of May, August, September and November.

3.2.1.2 Preparation of P fertilizer

One application of P at 50% (considered as half dose of the UPASI recommended concentration) - 40 kg of P₂O₅ per hectare in the form of Rock Phosphate, which is equivalent to 12.26 g of Rock Phosphate per bush was applied.

One application of P at 100% (this represents the UPASI recommended level of P) - 80 kg P₂O₅ per hectare in the form of Rock Phosphate (Verma and Palani, 1997) which is equivalent to 24.53 g of Rock Phosphate per bush was applied.

One application of P at 150% (considered as 50% more than the UPASI recommended concentration) - 120 kg P₂O₅ per hectare in the form of Rock Phosphate, which is equivalent to 36.80 g of Rock Phosphate per bush was applied.

3.2.2 Application of nutrients

For the application of fertilizers (N, K and P) to tea bushes the method proposed by Verma and Palani (1997) was followed. The fertilizer containing N and K was applied by broadcasting Ammonium Sulphate and Muriate of Potash mixture in April and as Urea and Muriate of Potash mixture for the remaining four applications namely as May, August, September and November. The P application was done once a year by placement method at
15-25 cm depth in the month of November. The P application was done separately and not along with the N and K application.

The experiment was laid out in randomized block design with seven replications. Each plot consisted of 20 bushes established at 1.2 metres x 0.75 metre. The data presented in later chapters are an average of the five different NK applications and one P application done during the years 2002, 2003 and 2004.

The various parameters monitored at 5-day intervals for thirty days after each fertilizer application were NPK content in leaves, single shoot weight, chlorophyll and carotenoid content, chlorophyll fluorescence and net photosynthetic rate.

3.2.3 Analysis of N, P and K

The shoots consisting of three leaves and a bud were plucked from different clones of tea such as TTL-1, TTL-2, TTL-5 and TTL-6 treated with 50, 100 and 150% NPK fertilizer. The shoots collected from ten different bushes of a clone of a treatment were pooled together and brought to the laboratory for further studies.

The shoots were first washed in tap water and then in distilled water. The samples were then kept in a hot air oven for drying. The temperature of the oven was adjusted to 65°C and the samples were kept in the oven for 48 hours till constant weight was obtained. Dry grinding of the sample shoot was done using a sample mill as suggested by Tandon (1993). After grinding, the powder was put in a clean dry bottle and placed in a hot air oven at 65°C for 24 hours for additional drying to remove moisture accumulated during grinding. The N, P and K content were analysed according to Tandon (1993).
3.2.3.1 Analysis of N content

Following the method of Tandon (1993), the nitrogen content was estimated using 2200 Kjeltec Auto Distillation Unit, manufactured by Foss Tecator, Sweden. Five hundred milligram of the dried sample was taken in a dry digestion tube and 20 ml of concentrated sulphuric acid was added to it. The same was digested at 400°C to obtain a clear solution in a fume chamber. The clear solution obtained was placed in the 2200 Kjeltec Auto Distillation Unit and 150 ml of 40% sodium hydroxide was added to the solution. The ammonia evolved was collected in a conical flask containing 20 ml of 0.1 N sulphuric acid and a few drops of Methyl Red indicator. To determine the excess unreacted acid remaining in the conical flask, the collected samples were subjected to titration against 0.1N sodium hydroxide. The colour change from pink to golden yellow was taken as the end point. A blank was prepared by mixing 0.1 N sulphuric acid and a few drops of Methyl Red indicator and the mixture was titrated against 0.1N sodium hydroxide. The end point was noted and the difference in end points of the blank and the sample was used for the calculation of percentage of N in the samples, adopting the following formula:

$$\text{Percentage of N} = \frac{\text{Titre value of (blank - sample) } \times \text{ Normality of NaOH} \times 0.014 \times 100}{\text{Weight of sample}}$$

Where 0.014 is the milli equivalent of nitrogen.

3.2.3.2 Analysis of P content

The phosphorus content was estimated by using vanado-molybdo phosphoric yellow colour method (Tandon, 1993). Five hundred milligram of the dried leaf sample was digested with 20 ml of diacid mixture (Nitric acid
(HNO₃): Perchloric acid (HClO₄) – mixed in 9:4 ratio) at a temperature of 400°C till a clear solution was obtained. The digested sample was quantitatively transferred to a 100 ml volumetric flask using distilled water and made up to the volume. From this solution, 5 ml was pipetted out and transferred to a 25 ml volumetric flask and 5 ml of ammonium metavanadate was added. The volume was made up to 25 ml with distilled water and the absorbance of the solution was measured at 430 nm after keeping for 30 minutes (for the colour to stabilise) using U-2000 (Hitachi) Spectrophotometer. The standard solution was prepared by dissolving 4.4 g of potassium dihydrogen phosphate (KH₂PO₄) in 1 litre of distilled water, which is equivalent to 1000 ppm solution. From this 1000 ppm solution 5 ml was pipetted out and made up to 100 ml with distilled water to get 50 ppm solution. The concentration of the sample was obtained from a standard graph, which was developed by feeding different solutions of known P concentration such as 0, 0.5, 1.0, 2.5, 5, 7.5 and 10 ml of 50 ppm solution of phosphate standard, each of them containing 5 ml of ammonium metavanadate, and measured at 430 nm after keeping for 30 minutes (for the colour to stabilise). The percentage of P content was calculated using the following formula:

\[
\text{Percentage of P} = \frac{\text{O.D. at 430 nm} \times \text{volume made up} \times \text{volume made up} \times 100}{\text{Weight of sample taken} \times \text{Aliquot taken} \times 10^6}
\]

3.2.3.3 Analysis of K content

Five hundred mg of the dried leaf sample was digested with 20 ml of diacid mixture (Nitric acid (HNO₃): Perchloric acid (HClO₄) – mixed in 9:4 ratio) at a temperature of 400°C till a clear solution was obtained. The same was quantitatively transferred to a volumetric flask and made up to 100 ml using distilled water. From this five ml of the sample solution was taken and
made up to 25 ml. The standard solution was prepared by dissolving 0.191 g of KCl in 1 litre of distilled water from which 0, 1, 2, 3, 4 and 5 ppm solutions were prepared and fed into the flame photometer (Model CL 22D, Elico Limited, Hyderabad, India). After adjusting the needle of the flame photometer to zero by feeding blank, the needle was adjusted to 100 by feeding the highest concentration of K solution. Then the other standards were fed to obtain the flame photometer readings. The flame photometer readings were plotted against the concentration of the standards to obtain the standard curve. Then the sample solution was fed into the flame photometer and the reading was recorded. The K content in the sample was calculated using the following formula:

\[
\text{Percent of K} = \frac{\text{K concentration from graph} \times \text{volume made up} \times 100}{\text{Weight of sample taken} \times \text{Aliquot taken} \times 10^6}
\]

3.2.4 Weight of shoots

The shoots consisting of three leaves and a bud from ten different bushes of a clone were collected. Immediately after collection the samples were brought to the laboratory. Fresh weight of individual shoots were determined separately by using an electronic balance (Shimadzu) and average values were recorded.

3.2.5 Estimation of photosynthetic pigments

The photosynthetic pigments like chlorophyll and carotenoids were estimated according to the method of Arnon (1949).

3.2.5.1 Extraction

For estimating total chlorophyll and carotenoid pigments, young tea leaf samples (shoots consisting of three leaves and a bud) were collected from ten different bushes of a clone subjected to a treatment selected randomly.
The leaves were cut into small pieces and thoroughly pooled together. One gram material was weighed and homogenized in 10 ml of 80% chilled acetone using a clean mortar and pestle. The homogenate was transferred to centrifuge tubes and centrifuged at 12000 xg for 10 minutes at 4°C. The supernatant was collected and the sediments were re-extracted with 80% chilled acetone until a clear supernatant was obtained. The supernatant collected after re-extraction was mixed together and used for estimation.

3.2.5.2 Estimation

From the combined supernatant 1 ml was pipetted out and added to 9 ml of 80% chilled acetone, which was used for quantification of the pigments. Absorbance of the resultant supernatant was measured against 80% acetone as blank at 645, 646, 663 and 750 nm using a U-2000 (Hitachi) Spectrophotometer. The amount of chlorophyll a, chlorophyll b and total chlorophyll were calculated using the following formula (Arnon, 1949):

\[
\text{Chl a (\mu g/g tissue)} = \frac{12.69 \times (A_{663} - A_{750}) - 2.96 \times (A_{645} - A_{750})}{W} \times V
\]

\[
\text{Chl b (\mu g/g tissue)} = \frac{22.9 \times (A_{645} - A_{750}) - 4.68 \times (A_{663} - A_{750})}{W} \times V
\]

\[
\text{Chl a+b (\mu g/g tissue)} = \frac{20.12 \times (A_{646} - A_{750}) + 8.02 \times (A_{663} - A_{750})}{W} \times V
\]

For estimation of carotenoids the absorbance of the supernatant was measured against 80% acetone as blank at 750, 663, 646 and 470 nm using a U-2000 (Hitachi) Spectrophotometer. The carotenoid content was calculated by using the following formula (Arnon, 1949):
Carotenoids (µg /g tissue) = \frac{(1000xA_{470})-(3.27xChl \text{ a})-(104xChl \text{ b})}{229 \times W} \times V

Where A represents absorbance of the pigments at suffixed wavelength.

Chl a = 12.69 (A_{663}.A_{750}) - 2.96 (A_{646}.A_{750})

Chl b = 22.9 (A_{646}.A_{750}) - 4.68 (A_{663}.A_{750})

W = weight of the extracted material

V = Volume of the extraction medium

3.2.6 Measurement of chlorophyll fluorescence

Chlorophyll fluorescence of leaves of various tea clones treated with different concentrations of fertilizers (50, 100 and 150%) was monitored with a portable Fluorescence induction monitor, FIM 1500 (Analytical Development Company Ltd., England) equipped with data transfer software (TAGA 1.02 & DATS 1.02 Versions). The light level used was 100% LED at 650 nm. To measure the fluorescence, the third leaf from the young bud of a shoot in the centre of the tea bush was dark adapted for a duration of 30 minutes prior to the measurement of Fv/Fm with a small, light weight leaf clip. The clip has a small shutter, which was closed over the leaf, when the clip was attached, so that light is excluded and dark-adaptation takes place. The portion of the dark adapted leaf was illuminated after 30 minutes with a flash of saturated light, the initial fluorescence (F0) and maximum fluorescence (Fm) were measured. The variable fluorescence yield (Fv) is the difference between Fm-F0. The PS II activity was measured in terms of the Fv/Fm ratio. The photochemical yield of PS II is equal to the ratio between Fv and Fm (Fv/Fm). The readings were repeated on ten different leaves in different bushes, which were randomly selected for each treatment.
3.2.7 Measurement of CO₂ exchange

Net photosynthetic rate of different clones of tea subjected to various concentrations of fertilizer application, such as 50, 100 and 150% was measured by a closed system infrared gas analyser (portable photosynthesis system, Cl-301 PS, CID, Inc., U.S.A.). All the measurements were taken under natural sunlight. The third leaf from the bud fully exposed to incident sunlight was used for taking measurements and the readings of photosynthetic rate were measured between 9.00 am and 11.00 am. The instrument had internal programmes to calculate the rate of net photosynthesis from the measurements taken. The net photosynthetic rate was expressed in \( \mu \text{mol m}^{-2} \text{sec}^{-1} \). The readings were repeated on ten different leaves in different bushes, which were randomly selected for each treatment.

3.3 Drought studies

3.3.1 Method of creation of drought

The drought studies were carried out during the summer months in the years 2002, 2003 and 2004. Two rows of tea plants (20 each), which were three years old, of the clones TTL-1, TTL-2, TTL-4, TTL-5, TTL-6, UPASI-2 and UPASI-3 were maintained for the study. One row was uniformly irrigated at one litre per plant according to Verma and Palani (1997) using drip irrigation and the other row was maintained as non-irrigated starting from the month of December to March.

Various parameters such as weight of shoots, soil moisture status, leaf water potential, relative water content, chlorophyll and carotenoid content, chlorophyll fluorescence, net photosynthetic rate, proline and malondialdehyde (MDA) content of plants grown under both irrigated and non-irrigated conditions were monitored on the 0, 20\(^{th}\), 60\(^{th}\) and 100\(^{th}\) day from the beginning of the study. The non-irrigated plants after 100 days
were irrigated uniformly using drip irrigation and the same parameters in non-irrigated condition were monitored on the 7th and 14th day after re-irrigation.

3.3.2 Weight of shoots

The shoots (ten each of a clone selected randomly) consisting of three leaves and a bud were collected from the clones subjected to irrigated and non-irrigated conditions. The collected shoot samples were immediately brought to the laboratory and fresh weight of each shoot was determined separately by using an electronic balance (Shimadzu) and average values were recorded.

3.3.3 Soil moisture status

The soil moisture of the experimental plot was determined as per the method proposed by Rajasekar et al. (1998). The soil samples were collected at a depth of zero to nine inches and nine to eighteen inches, using a crowbar, from ten different locations in the irrigated and non-irrigated plots on the 0, 20th, 60th, 100th day and on the 7th and 14th day after re-irrigation. The samples collected during each interval from the irrigated and non-irrigated plots were pooled and taken immediately to the laboratory. From this 100 gram was weighed and kept in a hot air oven and the temperature was maintained at 100° C. The dry weight was determined until constant weight was obtained. The soil moisture content was determined as follows:

\[
\text{Soil moisture content} = \frac{\text{Fresh weight} - \text{Dry weight}}{} 
\]

3.3.4 Measurement of leaf water potential

The leaf water potential is a measure of the water content inside the leaf and was determined by using HR 33T Dew Point Microvoltmeter supplied by Wescor Inc., USA. A small circular portion of green leaf
sample (leaf disc) taken from the third leaf from the young bud in the centre of the bush was enclosed in the leaf chamber and leaf water potential was monitored and these were expressed in megapascals (MPa). The readings were repeated on ten different leaves in different bushes, which were randomly selected for each treatment.

3.3.5 Measurement of relative water content of leaves

To determine the relative water content of leaves of plants grown under irrigated and non-irrigated conditions, fresh weight of third leaf from bud was collected and determined. After determining the fresh weight the samples were kept in a hot air oven, the temperature of which was maintained at 80°C for 48 hours. The dry weight of the samples was found out until constant weight was obtained. All the weights were taken using an electronic balance. By using this data, the relative water content of leaves was calculated as per the formula suggested by Johnson et al. (1997) and the values were expressed in percentage.

\[
\text{Relative Water Content} = \frac{\text{Fresh weight} - \text{Dry weight}}{\text{Fresh weight}}
\]

3.3.6 Estimation of photosynthetic pigments

For estimation of photosynthetic pigments, shoots consisting of three leaves and a bud of each clone under the non-irrigated and irrigated conditions were collected from randomly selected ten plants of each clone. The leaves were cut into small pieces and thoroughly pooled together and one gram was weighed out from the pooled mixture. The extraction and estimation of chlorophyll a, chlorophyll b, chlorophyll a+b and carotenoids was done according to the method of Arnon (1949) as described earlier.
3.3.7 Measurement of chlorophyll fluorescence

For determination of chlorophyll fluorescence, the clones of tea (Camellia sinensis) such as TTL-1, TTL-2, TTL-4, TTL-5, TTL-6, UPASI-2 and UPASI-3 maintained in irrigated and non-irrigated conditions were used. The measurement of chlorophyll fluorescence was done at a regular interval on the 0, 20th, 60th and 100th day of irrigation and non-irrigation. After 100 days of non-irrigation the plants were irrigated as mentioned earlier and the chlorophyll fluorescence of leaves of these re-irrigated plants along with the irrigated plants were monitored on the 7th and 14th day. The chlorophyll fluorescence was measured as per the method described in nutrient studies.

3.3.8 Measurement of CO₂ exchange

Net photosynthetic rate, stomatal conductance and transpiration of leaves of tea clones selected for the study were measured on the 0, 20th, 60th and 100th day of irrigation and non-irrigation and thereafter on the 7th and 14th day of irrigation of non-irrigated plants by a closed system infrared gas analyser (portable photosynthesis system, CI-301 PS, CID, Inc., U.S.A.). All the measurements were taken under natural sunlight. The third leaf from the bud fully exposed to incident sunlight was used for taking measurements. In the present study photosynthetic rate was measured between 9.00 am and 11.00 am. The instrument had internal programmes to calculate the rate of net photosynthesis, transpiration and stomatal conductance from the measurements taken. The net photosynthetic rate was expressed in \( \mu \text{mol} \cdot \text{m}^{-2} \cdot \text{second}^{-1} \), the transpiration rate and stomatal conductance were expressed in millimol\( \cdot \text{m}^{-2} \cdot \text{second}^{-1} \). The readings were repeated on ten different leaves in different bushes, which were randomly selected for each treatment.
3.3.9 Estimation of proline

Proline was estimated in different clones of tea growing under irrigated and non-irrigated conditions during the intervals mentioned above. Leaf samples (consisting of three leaves and a bud) were collected from ten randomly selected plants of a clone under each treatment. The samples were pooled together, brought to the laboratory and cut into small pieces. Proline estimation was done based on the method of Bates et al. (1973).

3.3.9.1 Extraction

One gram of leaf material was weighed and homogenized in 10 ml of 3% aqueous sulphasalicylic acid (w/v) using a clean mortar and pestle. The homogenate was transferred to centrifuge tubes, centrifuged at 15000 xg for 10 minutes at room temperature and the supernatant was collected.

3.3.9.2 Estimation

Two ml of the supernatant was pipetted out to a clean test tube and reacted with 2 ml of acid ninhydrin (prepared by warming 1.25 g ninhydrin salt in 30 ml glacial acetic acid and 20 ml of 6 M orthophosphoric acid with agitation until dissolved) and 2 ml of glacial acetic acid. The resultant mixture was incubated in a boiling water bath maintained at 100° C for 1 hour and the reaction was terminated by placing the test tubes in an ice bath. Subsequently 4 ml of toluene was added to each reaction mixture. The solution was then mixed vigorously, using a cyclomixer for 15-20 seconds to facilitate quick diffusion/movement of chromophore from aqueous phase to non-aqueous phase. The toluene layer was separated from the aqueous layer using a separating funnel and the absorbance was measured at 520 nm using a U-2000 (Hitachi) Spectrophotometer. All the above mentioned materials except the plant material was used as the blank. Concentration of proline in
the sample was computed from a standard curve of L-proline and expressed in μg g⁻¹ fresh weight (Bates et al., 1973).

3.3.10 Estimation of malondialdehyde (MDA)

As described above, the leaf samples were collected, cut into small pieces and pooled together. The malondialdehyde content was estimated according to the method of Heath and Packer (1968).

3.3.10.1 Extraction

One gram of leaf material was taken and homogenized in 5 ml of 5% trichloroacetic acid (TCA) using a clean mortar and pestle. The homogenate was transferred to centrifuge tubes and centrifuged at 12000 xg for 15 minutes at 25°C and the supernatant was collected.

3.3.10.2 Estimation

Malondialdehyde content was estimated according to the method of Heath and Packer (1968). From the supernatant two ml was pipetted out and mixed with an equal volume of 0.5% thiobarbituric acid (TBA) in 20% trichloroacetic acid (TCA). The mixture was heated at 95°C for 25 minutes in a water bath, cooled to the level of the room temperature and then centrifuged for 2 minutes to obtain a clear solution. The supernatant was collected and the absorbance was measured at 532 nm using a U-2000 (Hitachi) Spectrophotometer. The absorbance value at 532 nm was corrected for nonspecific turbidity by subtracting absorbance value at 600 nm. The amount of MDA was calculated by using an extinction coefficient of 155 mM⁻¹ cm⁻¹ and expressed in μmol g⁻¹ fresh weight.

3.4 Frost studies

The frost studies were carried out during the winter months of 2002, 2003 and 2004. Ten different clones selected for the low temperature stress
studies were -TTL-1, TTL-2, TTL-4, TTL-5, TTL-6, SMP-1, SM-OM-54, UPASI-9, CR-6017 and TRI-2025. The observations relating to plant response against low temperature like chlorophyll and carotenoid content, chlorophyll fluorescence, proline and malondialdehyde (MDA) content of leaves were recorded at two-and-a-half-hour intervals starting from 6.30 am to 7 pm. The observations were repeated on different days in the months of December to February when low temperatures/frost occurred.

3.4.1 Estimation of photosynthetic pigments

Three leaves and a bud were collected from randomly selected ten plants of a clone at the intervals mentioned above. The leaves were brought to the laboratory, cut into small pieces and pooled together. These leaf samples were used for the estimation of chlorophyll a+b and carotenoid contents according to the method of Arnon (1949) as described earlier.

3.4.2 Measurement of chlorophyll fluorescence

The above mentioned clones were selected and the chlorophyll fluorescence was measured at a regular interval of 2.5 hours from 6.30 am to 7 pm. The chlorophyll fluorescence was measured as described in the nutrient studies.

3.4.3 Estimation of proline

The above mentioned clones were subjected to the estimation of proline content at the same intervals specified. The extraction and estimation was done as per the method of Bates et al. (1973) which was described in drought studies.
3.4.4 Estimation of malondialdehyde (MDA) content

The malondialdehyde in the above mentioned clones during the same intervals was estimated according to the method proposed by Heath and Packer (1968) which was described in detail in the drought studies.

3.5 Statistical analysis

For all physiological studies ten samples were collected and mean values were recorded. The biochemical analysis was carried out in duplicate and repeated thrice and the mean values were recorded. The standard deviation and standard error were calculated and data was analysed using ‘t’ test of significance.
Table 3.1: Weather data for the period of study

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<th>Month &amp; Year</th>
<th>Mean Min. Temp. (°C) 8 a.m.</th>
<th>Mean Max. Temp. (°C) 8 a.m.</th>
<th>Mean RH (%) 2 p.m.</th>
<th>Mean Wind Run (km/day)</th>
<th>Mean Sunshine (hours/day)</th>
<th>Total Evaporation Loss (mm/month)</th>
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