

Letters To The Editor

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A PRELIMINARY STUDY ON FROST FORMATION AT NANJANAD (NILGIRIS DISTRICT)

1. The Agricultural Research Station, Nanjanad, is situated eleven miles to the southwest of Ootacamund in the Nilgiris district at a height of 7000 ft above mean sea level. The occurrence of frost in this area is usually associated with severe damage to the standing crops in this Agricultural Farm. It has been reported that frost occurring during November affects the second crop (August-January) of potatoes (*Solanum tuberosum* L) and consequently scarcity of even seed material was felt for February-March (third crop) planting. Heavy fall of frost during the months of December-January is said to cause severe damage to the second crop of potatoes. Heavy frosts in December spoil also crops like Samai (*Panicum miliare*, LAM) and lupin (*Lupinus*, spp.). On several occasions frosts occurring during February have proved detrimental for the growing of third crop of potatoes (February-June).

2. The observational data collected on frost formation during the period 1930 to 1954 were compiled along with the available meteorological data on rainfall, maximum temperature and minimum temperature from the station records. An examination of frost data indicates that frost usually occurs during the period, November to March, and that December and January are the months when maximum formation is usually observed. Table 1 contains the summarised monthly details of the frosty days at Nanjanad.

3. The difference between maximum temperature of the previous afternoon and minimum temperature on the day of occurrence of frost was computed for the whole data and a frequency table was constructed. The range of the difference between these temperatures

TABLE 1
No. of frosty days at Nanjanad (1930-1954)

Serial No.	Month	Total number of days of frost	Mean number of days of frost per year
1	November	83	4
2	December	227	9
3	January	273	12
4	February	169	7
5	March	65	3

and the value of the highest frequency, that is, 'the most frequent range of temperature' were noted for the months on which there was incidence of frost. Table 2 gives the details gathered in this connection.

It is seen from Table 2 that on an average the least difference between previous afternoon's maximum and morning minimum temperatures on the days of occurrence of frost is 28 degrees with the exception of November and the maximum difference observed ranges from 32 to 37 degrees. The value of the highest frequency happens to be on an average 33 degrees. Similar values of fall of temperature on *non-frosty* days was found to be appreciably less during the same period as will be seen in Table 3.

4. Frost is essentially a radiation phenomenon occurring during clear nights about the epoch of minimum temperature. Hence to see whether the occurrence of frost formation is preceded by any considerable drop in the minimum temperature from that of the previous day, at Nanjanad, the data on the difference in minimum temperature on the day previous to frost formation and on the day of actual frost formation were compiled for the months of November, December, January, February and March for 25 years. The range of fall and the most frequent range of drop in temperature appear to be of the pattern as indicated in Table 4.

TABLE 2

Range of the difference between the previous afternoon maximum (X) and morning minimum temperature (N) on frost days

Serial No.	Month	Range of the difference between X and N on frosty days (°F)	Most frequent range of temperature (°F)
1	November	26 — 32	28
2	December	28 — 36	34
3	January	28 — 37	34
4	February	28 — 36	32
5	March	28 — 34	32

TABLE 3

Diurnal range of temperature on non-frosty days

Serial No.	Month	Range of the difference between X and N on frosty days (°F)	Most frequent range of temperature (°F)
1	November	16 — 24	20
2	December	14 — 28	26
3	January	20 — 32	30
4	February	20 — 32	30
5	March	20 — 32	30

TABLE 4

Range of drop in the minimum temperature

Serial No.	Month	Range of fall (°F)	Most frequent range of drop in temperature (°F)
1	November	2 — 3	2
2	December	0 — 5	2
3	January	0 — 6	4
4	February	0 — 4	2
5	March	0 — 4	2

From Table 4 it is seen that at Nanjanad there is no appreciable drop in minimum temperature on the day of occurrence of frost, from that of the previous day.

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