

removed were determined. Since the loss of weight in the adjustment blocks was less than 5%, it was not considered for adjustment as suggested by Bakshi (1962-67). The percentage loss of weights of the test blocks is depicted in Fig. 1, where each reading represents an average weight of three test blocks.

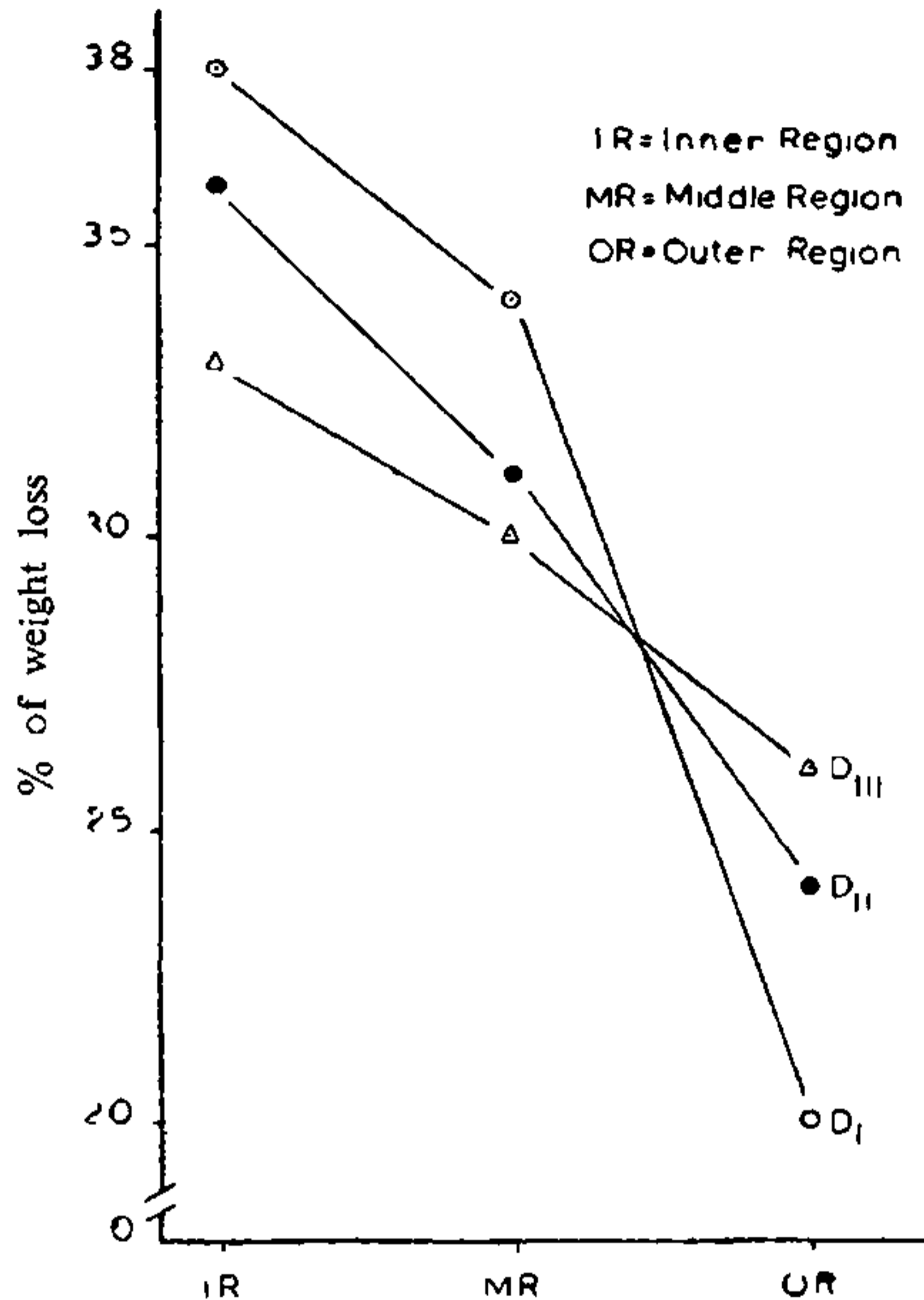


FIG. 1. Variation in decay resistance in *Betula pubescens*.

D_I : Disc No. 1; D_{II} : Disc No. 2; D_{III} : Disc No. 3.

It is evident from the figure that there are two definite trends of variation in decay resistance in the bole of birch; (1) a progressive increase in decay resistance of the wood from inner to outer regions at all the three levels in the bole, and (2) an increase in decay resistance of the inner wood from base upwards while it is the reverse in the outer region of the wood. These observations are in conformity with those of earlier workers for various types of woods, Cartwright (1942) in larch Scheffer and Duncan (1947) in certain Central American and Ecuadorian woods, Scheffer and Hopp (1949) in *Robinia pseudoacacia*, Scheffer (1957) in Western red cedar, Rudman (1964) in *Eucalyptus* and Bakshi (1962-67) in some Indian woods.

Decay resistance of wood in general depends upon the quality and quantity of the extractives present in the wood (Cartwright and Findlay, 1958, Englerth and Scheffer, 1954). The amount of the extractive

deposited in the cells of wood is less in the juvenile stages of the growth of the tree. Quality and quantity of the extractives, however, progressively increase as the tree grows older. This fact may account for the type of vertical variations that have been observed in this investigation. The wood of inner region has been found less durable than that of middle and outer region and this can be explained by the gradual detoxification of the fungitoxic extractives due to polymerisation, acid hydrolysis and oxidation (Da Costa, 1973) or by the deterioration of the resistance factor with the advancement of age and continuous outward migration of previously formed resistance factor (Scheffer and Hopp, 1949).

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DIE-BACK IN CITRUS AND ITS RELATIONSHIP TO CERTAIN CHARACTERS

GENERALLY chlorosis and shoot growth have been used to express the relative degree of die-back. Certain other characters like chlorophyll concentrations, leaf area, leaf number, dry matter, nutrient composition of the leaves are also affected adversely in trees showing die-back. An attempt has been made to estimate the die-back of citrus trees by

studying partial regression coefficient of different characters.

In this study, investigations were conducted on chlorosis, chlorophyll, leaf number, shoot growth, dry matter, nitrogen and potassium of four trees each of Excelsior and Foster grape fruit, Kinnow mandarin, Ruby orange and Sampson Tangelo in March, June and September flushes during the year 1973 and 1974. The intensity of die-back of the individual trees of the different species used in this investigation were graded from 1 to 6 on the basis of visual observations.

Correlation coefficients between die-back and other characteristics and the regression coefficients of die-back on these characters were calculated by multiple regression technique². Among the nutrients only nitrogen and potassium were included in the study as these were less than the optimum. The predictability of die-back with the help of different characters was estimated by calculating R^2 , the coefficient of determination². The correlation coefficients of die-back with all the eight characters were highly significant. However, R^2 values indicated that only three characters, viz., nitrogen, chlorosis and chlorophyll were important in predicting the die-back, as their values, ranged from 66% to 94%. For other characters, the R^2 values were comparatively low, their values ranging from 44 to 64%.

An attempt was also made to examine the predictability of die-back (as judged by R^2) when nitrogen, chlorophyll and chlorosis were not available. The regression equations for different combinations of the remaining characters and their R^2 values were calculated. The number of leaves when combined with shoot growth gave a R^2 value of 55% which rose to 57% when shoot growth was replaced by leaf area. When all the three characters, leaf area, leaf number, and shoot growth, are taken into consideration for estimation, the R^2 value rose to 66%. It is interesting to note that R^2 values of these characters when taken individually ranged from 44% to 49% only.

It is clear from above discussion that die-back can be estimated efficiently either by taking into account characters like chlorosis, chlorophyll and nitrogen or by considering characters like leaf area, leaf number and shoot growth together. However it may be noted that while the maximum value of R^2 was 94% in the first set of characters, it was only 66% in the second set of characters.

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THE INFLUENCE OF SMUT ON THE PRODUCTIVITY OF *ISEILEMA LAXUM* HACK

Iseilema laxum Hack is a prominent and promising fodder grass¹ in Ujjain. In a survey of smut diseases of graminaceous plants, a majority of flowering stalks of *I. laxum* was found to be infected by a fungal disease. Preliminary observations showed that the causal organism was a smut, the *Sphacelotheca anayati*. The infected spikelets start appearing in the last week of September. Ovaries of the infected spikelets transform into oval dark brown sacs full of spores. The present study was undertaken to analyse the effects of smut disease on the primary productivity and the energy content of the host.

Healthy and infected plants were collected and analysed during late October to assess the above parameters. The disc method^{2,3} was used to evaluate net primary production. The calorific values were determined with an oxygen bomb calorimeter, and the estimates were made by the formula proposed by Lieth⁴.

It is seen that the production rate of infected plants was reduced significantly (Table I). The reduction in the net primary productivity (NPP) of leaves may be due to the reduction in photosynthetic efficiency or due to increased breakdown due to high respiration.

TABLE I

Productivity of healthy and infected leaf mg/h

| | Healthy | Infected | Significance level |
|---------------------------------------|---------|----------|--------------------|
| Respiration (R) | 0.175 | 1.00 | 5% |
| Net primary production (NPP) | 2.445 | 0.610 | .. |
| Gross production (GP) GP = NPP + R | 2.620 | 1.610 | 1% |

The reduction in gross production (GP) of infected plant was 61.5%. Further, from Table I, it is evident that there is a proportional increase in the respiration with a decrease in the net production in the infected leaves. It appears that the infected plant was photosynthetically inefficient and at the same time catabolically overactive, leading to the significant reduction in NPP and GP of the infected plants. Lower energy content of the diseased plant parts indicate the nature of the pathogen as a consumer (Table II).