

DJW/JP/79

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20th February, 1981

LEAF STEERING COMMITTEE

VISIT BY MR. D.J. WOOD TO DELHI RESEARCH
STATION, ONTARIO, 5th-6th FEBRUARY, 1981

Mr. Wood, accompanied by Dr. G.W. Boswall, visited Delhi for discussions on matters of mutual interest.

General

Many members of the staff were away, including Dr. C.F. Marks, the Director.

We were received by Mr. J.M. Elliot who took us to see tobacco in the auction warehouse, explained the auction system including the operation of the "Dutch clock" (no auction was in progress), and arranged visits to various staff members. During the course of the visit, D.J.W. gave an informal talk which included a brief history of B.A.T, the problems of F/C tobacco production in certain parts of the world, and an outline of selected areas of research at GR&DC.

Dr. N. Rosa (Plant Physiology)

Dr. Rosa talked principally about the changes which occur during flue-curing, and his attempts to explain the biochemical and enzymic mechanisms underlying the very marked changes among the carbohydrates. As starch decreases there is a build-up of free sugars, but whereas glucose and fructose reach a peak before the end of curing followed by a decrease, sucrose rises steeply at the very end of the cure. This is difficult to explain by any known mechanism. Water-soluble acids increase due to release from some bound form, as yet unidentified. There is considerable dry weight loss in curing, as much as 20-30% depending on stalk position. The more mature the tobacco, the less the percentage loss in weight.

Dr. Rosa briefly mentioned three other areas of interest:

- (1) Sucker control chemicals.
- (2) Seedling production and hardiness.
- (3) Gases evolved in pole rot in barns.

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Dr. W.A. Court (Chemistry)

The following reports, specially prepared for Delhi, were handed to Dr. Court:

RD.1711-A: Sources of Cembranoids (Thunberganoids).

RD.1720-A: Carotenoids in Tobacco - A Literature Survey.

Also handed over were methods used in GR&DC for determining diterpenes and carotenoids.

In conversation it transpired that Bill Court has himself developed methods for determining diterpenes (including DVT) and carotenoids + chlorophylls (unsaponified), and has prepared papers on each for publication. He uses dichloromethane for extraction of leaf surface gum and has observed a 2 : 1 ratio in DVT concentration among different Virginia varieties.

He mentioned that Ray Severson of U.S.D.A., Georgia, has found 3% DVT in one of Dr. Chaplin's breeding lines, but as his interest is in insect resistance it is possible he was looking at very young leaves.

Bill Court handed over reprints on determination of tobacco phenolics by reversed-phase HPLC, and on determination of organic acids (citric, malic, etc.) as their methyl esters by GC. He claimed that chlorogenic acid in cured tobacco correlates with grade index better than any of the traditional chemical indices.

Other interests include the toxic properties of phenolic acids in soil.

Dr. F.H. White and Dr. R.S. Pandeya (Genetics and Plant Breeding)

The breeding work has three main objectives: increased yield per acre, better quality, improved disease resistance.

Nicotine levels in Canadian tobacco are, in general, lower than those in U.S. Tobacco. In order to produce varieties with a higher nicotine content, particularly for use in low delivery cigarettes, two approaches are being followed:

- (1) *N. rustica* is crossed with a tetraploid form of *N. tabacum*. After three generations of back-crossing to *N. tabacum* acceptable strains of tobacco are produced. One such variety is Delgold.
- (2) Seed of Delhi 34 is treated with gamma rays to induce mutation. From the progeny one selected line, 73M26, has total alkaloids ranging from 3.0%

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in the bottom priming to 6.1% in the top priming, with sugars ranging from 4% to 18%. It is a dwarf type of plant with low yield, but by increasing the plant population from 6,000 to 12,000 per acre it is possible to achieve a normal yield without a decrease in nicotine content. The thick leaves characteristic of so many high nicotine varieties are not exhibited by this line.

The original parents of the tobacco plant, *N. sylvestris* and *N. tomentosiformis*, have been crossed, and the properties of the progeny compared with those of the present tobacco cultivars. The original chance crossing to produce the tobacco plant probably occurred thousands of years ago, and the aim is to see how far the tobacco plant has changed during the intervening period.

A massive correlation matrix was produced showing the level of correlation between large numbers of pairs of tobacco attributes. Particularly striking were the correlations between chlorogenic acid and tobacco nicotine, and between smoke aldehydes and yield.

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c.c. Mr. A.L. Heard
Dr. L.C.F. Blackman
Mr. J.W. Drummond

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