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The correlation between visual scoring and chemical analysis of starch in *Robusta coffee*.

Resumen. Se establece la correlación entre el contenido de almidón estimado en forma visual y química para café robusta. El coeficiente de correlación (R) varió con la reacción de la planta utilizada, siendo no significativo cuando se empleó tejido cercano al sétimo internudo.

The importance of carbohydrates in vegetative growth, flower bud initiation, development, blossom, fruit set and berry growth in coffee is well known and established (1, 5, 6).

Carbohydrates which are mainly stored in the form of starch as reserve food material in the wood can be estimated quantitatively through chemical analysis. The need for assessment of starch through a simple, reliable and rapid method without involving time consuming processes is generally felt, so that any grower should be able to know the carbohydrate status of a plant by carrying out simple tissue tests in the field. Wormer and Ebagale (7) developed a method which was later modified by Janardhan *et al.* (2) for the assessment of starch in the fresh wood of arabica coffee by visual scoring which showed positive correlation with chemical analysis. The present communication deals with studies on visual scoring and chemical analysis of starch in robusta coffee.

Twenty non-bearing tertiary branches from forty-seven year-old robusta plants (spacing 9' x 9') grown under both temporary and permanent shade trees at Central Coffee Research Institute estate were collected at random from ten plants. The starch assessment was done in the branches depending upon the development of blue colour in the pith region (2). The visual scoring was carried out in all the tertiary branches covering all the seven internodes as described above. In each tertiary branch which was used earlier for visual assessment, internode-wise quantitative chemical estimation of starch was carried out using unicam spectrophotometer by the method of McCready *et al.* (3) as modified by Patel (4) for coffee.

The results of the study indicate that starch index ranged from 8 to 19.75 percent in the non-bearing branches of robusta plants. Maximum starch index of 19.75 percent was recorded in the second internode whereas minimum starch index was recorded in the seventh internode (8%). However, it is interesting to note the pattern of starch index in different portions of the branch. The apical portion had lower starch index as compared to basal portion of the branch. The actual chemical analysis of starch in a branch has shown that it ranged from 2.34 to 3.28% . Maximum starch content (3.28%) was recorded in the sixth internode whereas the fourth internode recorded minimum starch content (2.34%) (Table 1). When values of starch index and starch content were compared in a branch it was generally found that a higher starch index recorded by visual scoring did not give more starch content, when the same material was subjected to chemical analysis. However, in spite of these variations between visual scoring and chemical analysis of starch a correlation was found between two methods of estimation. The data on starch index, starch content and results of statistical analysis are given in Table 1.

Table 1. Correlation between visual scoring and chemical analysis of starch in S.274 robusta branch. (mean of 20 branches).

Internode Number	Starch[1] index	Starch[2] content	Correlation coefficient
1	14.75	2.62	+ 0.7854**
2	19.75	2.52	+ 0.8441**
3	13.75	2.63	+ 0.7705**
4	12.75	2.34	+ 0.7690**
5	15.75	3.16	+ 0.8701**
6	14.50	3.28	+ 0.9501**
7	8.00	2.74	+ 0.4394ns

1 By visual scoring in percentage.

2 By chemical analysis, percentage of dry weight

It is clear from the above data that out of seven internodes in a branch, in six internodes the visual assessment of starch was positively correlated with actual chemical analysis (at 1% probability level).

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Summary

Correlation was established between visual scoring and chemical analysis in robusta coffee. The correlation coefficient (R) varied with the reaction of the plant used, although it proved to be non significant in the seventh internode.

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El hongo *Erynia neoaphidis* infectando el áfido *Rhodobium porosum* en Venezuela.

Summary. *Erynia neoaphidis* is identified as parasiting the aphid *Rhodobium porosum* Sanderson (Homoptera: Aphididas) found in roses (*Rosa* sp.) in Venezuela. The fungal structure found in dead bodies of aphids corresponded to primary conidias of 15 x 24u x 12 x 15u, $\bar{x}$ = 22 x 12u, and secondary conidias of 13 x 21u x 12 x 15u, $\bar{x}$ = 17x 13u in length- and withd respectively.

Los hongos de la familia Entomophthoraceae se han estudiado debido a su relación parasítica con otros organismos. Entre los que se hallan insectos y arácnidos de importancia agrícola o médica. Por esta razón se ha pensado en varias oportunidades en usar a estos hongos como agentes de control biológico en agricultura o salud pública.

Se conocen estudios sobre este tema en Europa y Norteamérica (1, 2), pero no sucede lo mismo en el estudio de estos hongos en Latinoamérica. Las citas de aislamientos de hongos entomophthoraceos en Latinoamérica son escasas y en muchos casos sumamente vagas no llegándose en general a mencionar más que el género del entomophthoral encontrado infectando un cierto hospedero.

En esta comunicación se informa la ocurrencia de un hongo entomophthoraceo en Venezuela y se presentan algunas de sus características morfológicas. Se espera que esta información permita a otros investigadores la identificación de este hongo en otras localidades de Latinoamérica.

Durante diciembre 1980, se encontraron numerosos áfidos *Rhodobium porosum* Sanderson (Homoptera: Aphididae) muertos sobre el envés de hojas de rosas (*Rosa* sp.) en Maracay, Estado Aragua. Los áfidos estaban momificados, conservando gran integridad estructural y presentaban una costra café clara cubriendo su cuerpo (Figura 1). Los cadáveres estaban pegados a la lámina foliar por su superficie abdominal ventral por micelio (Hifas 4.4 u diámetro; n = 7, s = 70). Al ser examinado los cadáveres usando microscopio compuesto se hallaron las siguientes estructuras de un hongo del grupo de los entomophthorales: a) conidias de tipo oblongo con base 15-24u x 12-15u (promedio 22 x 12u; n = 32, s = 2.50 y 0.60 para largo y ancho, respectivamente) (Figura 2). Estas conidias son lanzadas por los conidió-

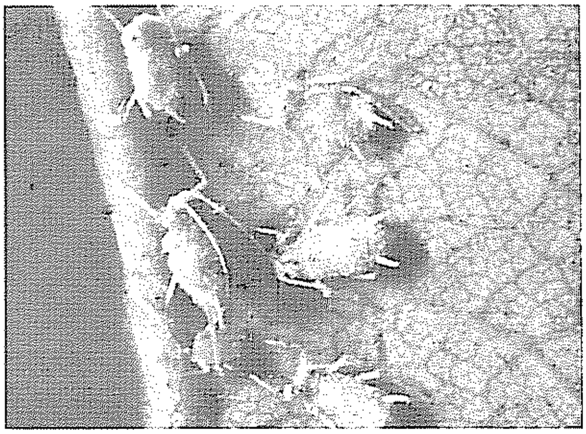

Fig. 1. Momias de *R. porosum* muertos por *E. neoaphidis* sobre hojas de rosa (25 X).

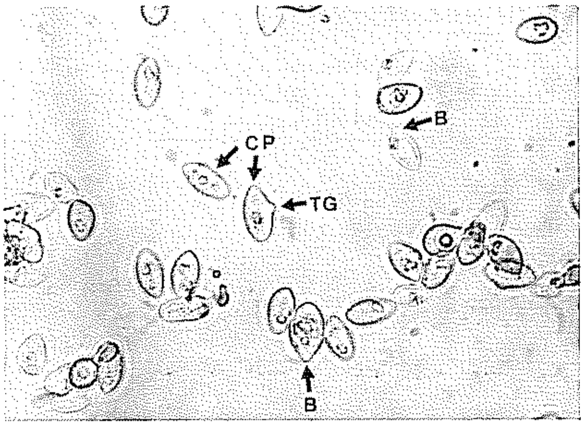

Fig. 2. Conidias primarias de *E. neophidis*. Una de ellas empieza a germinar para producir una conidia secundaria (CP = Conidia primaria; TG = tubo de germinación; B = base de conidia) (425 X).