rebolo para a rebrota da cana-planta em um terceiro experimento. No primeiro experimento, plantas provenientes de rebolos de duas gemas foram cultivadas por 90 dias em potes contendo 5,5kg de solo PV, adubado ou não com 180mgP. No segundo, plantas provenientes de rebolos de uma gema foram cultivadas durante 45 dias em dois litros de solução nutritiva modificada. Dois dias antes da colheita adicionou-se ^{32}P, livre de carregador, e acompanhou-se a queda da radioatividade por oito horas para determinação dos parâmetros cinéticos. No terceiro experimento, observou-se a absorção e translocação de fósforo em rebolos de duas gemas, da variedade Co 997, marcados com ^{32}P, cultivados em areia lavada com quatro níveis de fósforo (0, 40, 200 e 1.000μMP), com colheita aos 2, 15 e 25 dias após a brotação. As variedades diferiram significativamente quanto à absorção de fósforo nos dois primeiros experimentos, destacando-se em ambos a variedade NA 56-79. No experimento com solo, a variedade NA 56-79 continha 12,8mgP, superada apenas pelas variedades RB 72454 e Co 997, com 14,8 e 13,6mgP respectivamente. No experimento com solução nutritiva, a variedade NA 56-79 continha 16,6mgP, e teve uma velocidade máxima de absorção de 7,7 cpm x 10^{-3}/h/planta, valor igualmente apresentado pela variedade RB 732577 e superada apenas pela variedade CP 51-22 com 8,1 cpm x 10^{-3}/h/planta. No experimento de translocação, determinou-se que a maior parte do fósforo do rebolo foi translocada para a parte aérea, em todos os quatro níveis de fósforo do meio, e foi crescente em função do tempo. Após 25 dias de brotação, a parte aérea continha de 54,1 a 84,8% do fósforo total para os níveis zero e 1.000μMP respectivamente. Quando medida a translocação através do ^{32}P, a parte aérea continha de 74,4 a 90,1% do ^{32}P inicialmente contido no rebolo, também para os níveis zero e 1.000μMP. Para a raiz, foram translocados no máximo 5% do fósforo, e a translocação variou em função dos níveis de fósforo no meio.

TITLE: Variations in both carbohydrate and enzymes of the underground organs of *Cochlospermum regium* (Mart. & Schr.) Pilger in different stages of development

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ABSTRACT — The composition and the variations in both carbohydrate content and activities of three hydrolytic enzymes (amylase, starch phosphorylase and invertase) in the underground organs of *Cochlospermum regium* (Mart. & Schr.) Pilger, a species of the cotton plant found in the "cerrado" of Brazil, were examined in this research.

The plants were collected from the "cerrado" in Goiânia (GO) county, and analysed in the "Seção de Fisiologia e Bioquímica" at the "Instituto de Botânica de São Paulo (SP)". The underground organs studied were grown under different environmental conditions and were examined in three distinct phases, 1 — underground organs of different dimensions and in the "cerrado" condition; 2 — in the first year of plant development and in the "cerrado" condition; 3 — in different phenological stages in experimental conditions.

It was observed that loss of leaves and the entry into the dormant stage did not seem

to be a result of the water shortage that occurs in the "cerrado", but rather of the progressive shortening of the photoperiod and lowering in temperature.

The metabolism of the underground organs of *C. regium* seems to be directed towards the synthesis of starch. It was observed that the soluble sugar content relative to the total dry matter declined with the increase in size of the underground organ and during the dormant stage, and that this process was accompanied by an increase in starch content.

The free water-soluble sugars found in the underground organs of *C. regium* were glucose, fructose, sucrose and raffinose. In organs from plants in their first year of development, as well as those more highly developed, the relative content of glucose and fructose decreased as the size of the underground organ increased, and during dormancy. When the plants sprouted, these sugars increased, probably as the result of starch hydrolysis. The water-soluble polysaccharides found after hydrolysis were glucuronic acid, galactose, glucose, arabinose and xylose, all of which varied in amount according to the stage of growth of the plant.

During dormancy, pectic substances increased in the more highly developed underground organs; whereas, they decreased in those plants which were in their first year of development.

Similarly, the hemicellulose content of *C. regium* decreased as the underground organ developed and during dormancy, but increased again when the plant sprouted. A and B hemicelluloses were composed of the following sugars: glucuronic acid, rhamnose, arabinose, xylose, mannose, galactose and glucose. Of these, the xylose was the principal component. Xylose content in the A hemicellulose increased during dormancy and decreased at the start of sprouting in the underground organs of plants in the first year of development. Xylose content in the B hemicellulose decreased during dormancy and increased at the start of sprouting.

Amylase activity was found only in small underground organs. At sprouting, there was an increase in amylolytic activity in plants in their first year of development. This coincided with a decrease of starch content.

Starch phosphorylase isoenzymes were found only in the less developed underground organs. Thus in *C. regium* underground organs, starch phosphorylase seems to be correlated with the synthesis of starch but only in the early stage of development of the storage organs. During dormancy, there was a decrease in the number of starch phosphorylase isoenzymes, which disappeared from underground organs when the plant sprouted.

Alkaline invertase activity was not found. Acid invertase activity decreased with the growth of the underground organ as well as during dormancy. This activity increased at the start of sprouting in plants which were in their first year of development.

Total protein content of the dry matter increased as the underground organ increased in size. In the larger underground organs, the amount of total protein decreased during the dormant stage. In plants in their first year of development, the amount of total protein increased at this same phenologic stage.

It was suggested that plant age and environmental conditions seem to have some influence on carbohydrate metabolism in *C. regium* underground organs.

TITLE: Fitogeografia, uso do espaço e proteção ambiental — o caso de uma relíquia paleoambiental ameaçada de extinção

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