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A quick way to determine nitrogen levels in peach palm

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The peach palm and the inhabitants of the Colombian Pacific

The peach palm (*Bactris gasipaes* Kunth) is a palm native to tropical America. This plant is highly valued by many inhabitants of the Colombian Pacific region due to its use in food, crafts, construction and medicine. Although the palm fruit or its core (commonly known as palmito) can be consumed, in the Pacific only the fruit is consumed, which is characterized by a high content of proteins, essential amino acids, beta-carotene, vitamins and minerals (Figure 1). This product has traditionally played an important role in the food security of the communities in the region. In the Pacific region, the peach palm can be established in monoculture or in agroforestry arrangements (figures 2 and 3).

Figure 1. Clusters of peach palm fruits.

Nitrogen in chontaduro cultivation

Peach palm cultivation can be considered a great mineral extractor from the soil, mainly nitrogen (N) and potassium (K). It is worth mentioning that the removal of N is even greater when the palm is grown not for obtaining fruit but for obtaining the heart of palm. After N and K, the nutrients most extracted by the crop are: calcium (Ca), magnesium (Mg), phosphorus (P), manganese (Mn), iron (Fe), zinc (Zn), and copper (Cu).

Figure 2. Peach palms in polyculture.

Figure 3. Peach palms in monoculture.

Crop fertilization

Peach palm crops respond very well to the application of N, while the response to the application of other nutrients such as P is not as marked. Experiences with fertilization of peach palm crops in Costa Rica report applications of up to 300 kg of N, 82 kg of P, and 205 kg of K per hectare annually. For the establishment of seedlings, 31 to 62 kg/ha of P, 50 kg of K and three applications of 20 kg of N per year are recommended.

How to determine the amount of N in the palms?

Given the importance of applying N to chontaduro crops and the constant increases in fertilizer prices, not to mention the negative effect of excessive use of inorganic fertilizers, it is very important for farmers to determine the amount of nitrogen fertilizer that is really needed for the crop. In this order of ideas, it is necessary to determine the levels of N in both the soil and the tissues of the palms. Currently, a series of devices have been developed that allow indirect measurement of the concentration of N in the leaves by relating it to the greenness of the leaves (which is determined by the leaf chlorophyll content). These devices are known as SPAD chlorophyll meters (figure 4).

Figure 4. Different models of chlorophyll meters.

Using the chlorophyll meter

To make the measurements, the palms to be sampled are identified, four leaflets are selected from the middle part of the fifth leaf and the SPAD greenness index measurements are taken with the chlorophyll meter (figure 5). To do this, the device is placed in contact with the leaf blade and the measuring head is closed, then a few seconds are waited until the meter shows the SPAD value on the display, this operation is repeated nine times in different parts of the leaflet for each of the leaflets (Figures 6 and 7). Finally, the average of the SPAD value for each plant is taken and this value will replace the X in equation (1) whose result will be the N value of the plant:

(1) $Y = 0{,}046X + 0{,}186$

Figure 5. Numbering of the leaves of the peach palm, the arrow indicates the area where samples would be taken and measurements made.

Figure 6. Obtaining leaf greenness values using the chlorophyll meter.

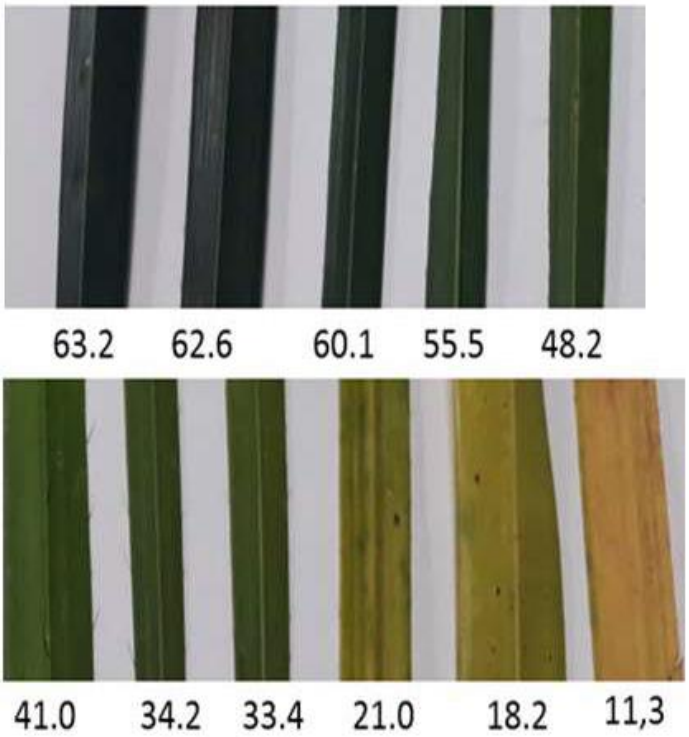

Figure 7. Different values of SPAD greenness indices in peach palm o leaves.

Example: Suppose the average value obtained is 60.1 SPAD, then the approximate N content of the plant will be equivalent to 2.95% of the total dry weight.

References

Ares, A., Deenik, J., Russell, S.Y. (2000). Fertilization response and nutrient diagnosis in peach palm (*Bactris gasipaes*): a review. Nutrient Cycling in Agroecosystems, 56(3), 195-207.

Lasso-Rivas, N., & Rengifo, E. (2021). Determinación del contenido de clorofila y nitrógeno en plantas de chontaduro (*Bactris gasipaes* Kunth) mediante el uso del medidor de clorofila TYS-A. En: Lasso-Rivas N. (Ed.) (2021) Estudios en fisiología de algunas especies vegetales promisorias en el pacífico vallecaucano. Diké.

Molina, E. (2000). Nutrición y fertilización del pejibaye para palmito En: Informaciones agronómicas. Vol. 1 N 38, p 10.

Molina, E.; Alvarado, A.; Smith, T.J., Boniche, J., Alpizar, D., Osmond, D. (2002) Respuesta del pejibaye para palmito. Agronomía costarricense. 26(2) 31-39

Quintero B.A., Pardo-Locarno, L.C. (2016). Escarabajos (Coleóptera: Melolonthidae) asociados a la floración del chontaduro (*Bactris gasipaes* Kunth) en Buenaventura, Valle del Cauca, Colombia En: Investigación agropecuaria. Vol. 14 (1) p 1.

Reis, E.L. (1997). Respostas da pupunheira ao NPK na produção de palmito no Sul da Bahia. In: Congresso Brasileiro de Ciência do solo, 26, Rio de Janeiro Resumos. Rio de Janeiro: SBCS. p.180