



I-INTERNATIONAL MEETING OF ANIMAL SCIENCE IN SEMI-ARID REGIONS

Universidade Federal do Agreste de Pernambuco – UFAPE
July 03rd to 05th, 2024, Garanhuns-PE

Area of work: Pasture and Forage Science

Modeling the emission of primary cladodes of the forage cactus *Nopalea cochenillifera* Salm-Dyck var. "orelha-de-onça" using linear and non-linear models

Rosângela Souza de Santana*¹, Francisco Pereira Neto¹, Alberício Pereira de Andrade¹, Fernando dos Santos Araújo¹, Airon Aparecido Silva de Melo¹, Djalma Cordeiro dos Santos²
¹Federal University of Agreste of Pernambuco, Garanhuns/Pernambuco, Brazil; ² IPA - Agronomic Institute of Pernambuco, Arcoverde/Pernambuco, Brazil * rose.santana2103@gmail.com

The exotic cactus of the genus *Opuntia* sp. and *Nopaleae* sp., collectively called forage cactus in Brazil, have become a staple food for domestic ruminants in the country's Semiarid region. This is due to its high content of energy and water, good forage acceptability and digestibility, with high production potential in dry conditions. Even so, your growth patterns and phenological development are not fully understood. The use of mathematical models to characterize the growth patterns of the forage cactus over time can be useful to evaluate the temporal variation of plant growth dynamics in cultivation regions in the Brazilian Semiarid. Therefore, the objective of this study was to evaluate the emission patterns of primary cladodes of the forage cactus *Nopalea cochenillifera* Salm-Dyck var. "orelha-de-onça" in the agroclimatic conditions of the "agreste" region of Pernambuco. To this end, 15 individuals cultivated in a field competition trial were evaluated over 420 days after planting (DAP) in the municipality of Garanhuns, PE. The number of cladodes was first counted at 60 DAP and then every 90 days until 420 DAP. The description of cladode emission behavior over time was evaluated using linear (Linear and Quadratic) and non-linear (Sigmoidal) mathematical models using the statistical software PAST 4.16. The coefficient of determination (R^2) and the Akaike Information Criterion (ICC) were used as statistical criteria for fitting and selecting the mathematical function. The linear models, both the Linear (ICC = 55.00; $R^2 = 0.4872$) and the Quadratic (ICC = 158.00; $R^2 = - 3.643$), did not fit the observed data adequately according to the statistical criteria for fitting and selecting the mathematical function. The sigmoidal non-linear model was the one that best fit the data, as it had the lowest ICC value (ICC = 18.00) and the highest R^2 value ($R^2 = 0.9979$) among the tested mathematical models. According to the sigmoid curve, the emission of primary cladodes of this variety increased until 150 DAP and then remained constant until 420 DAP. This suggests that the first vegetative phenological stage of *N. cochenillifera* Salm-Dyck var. "orelha-de-onça" plants reaches maximum activity at 150 DAP under the studied agroclimatic conditions. Probably, after this period, the plant is preparing for the emission of secondary cladodes, which will start the second phenological stage. The forage cactus *N. cochenillifera* Salm-Dyck var. "orelha-de-onça" emits primary cladodes up to 150 DAP, with the sigmoidal non-linear model being the most appropriate to explain this behavior of this variable over time in the agroclimatic conditions of the "agreste" region of Pernambuco, Garanhuns-PE. This result will help in understanding the growth and development patterns of forage cactus varieties in cultivation regions in the Brazilian Semiarid.

Key words: mathematical models, cactaceae, agroclimatic conditions, Pernambuco "agreste" region.

Financial support: FACEPE, CAPES, and CNPq. The authors thank IPA - Instituto Agrônomico de Pernambuco, Arcoverde-PE for technical support in the research.