Diversitas Journal

ISSN 2525-5215
DOI: 10.48017/dj.v6i4.1670

Volume 6, Número 4 (out./dez. 2021) pp: 3757-3762.
https://periodicos.ifal.edu.br/diversitas_journal/

First occurrence of Tetranychidae mites in Desert Rose in Paraiba, Brazil

Primeira ocorrência de ácaros tetraniquideos em Rosas do Deserto na Paraíba, Brazil

Renato Nunes Nascimento[1]; Anilde da Graça Sousa Maciel[2]

1 ORCID https://orcid.org/0000-0003-0785-444X - Universidade Federal da Paraíba – *Campus* II, Centro de Ciências Agrárias, Departamento de Biociências. Areia – PB. – E-mail: renato.nascimento@cca.ufpb.br
2. ORCID https://orcid.org/0000-0002-1792-8548 - Universidade Federal de Alagoas – Campus de Engenharias de Ciências Agrárias. Rio Largo – AL. E-mail: maciel_anilde@hotmail.com.

Recebido em: 02 de dezembro de 2020; Aceito em: 03 de setembro de 2021; publicado em 10 de outubro de 2021. Copyright© Autor, 2021.

ABSTRACT: The desert rose, *Adenium obesum*, an apocynacea native to regions of Africa and the Arabian Peninsula is widely cultivated throughout the world for its ornamental and medicinal values. In Brazil there is a growing interest in the ornamental attributes of *A. obesum*, which leads to the interest of the scientific community in solving problems that may accompany the cultivation of this plant. Some studies on the forms of management, nutrition and irrigation have been carried out, however, studies that aim to understand diseases and pests that affect the desert rose are still scarce. This study aimed to report the first occurrence of mites of the family Tetranychidae causing damage to desert rose cultivated in a greenhouse in the state of Paraíba, Brazil. Sixty specimens of desert rose were monitored between December 2019 and July 2020 in a greenhouse in the biosciences department of the Federal University of Paraíba. All plants had injuries and damage caused by the mite. The main damages were necrosis, deformation of the edges, closing of the leaves along the central vein and yellowing with total dryness and falling of the leaves. Formation of webs over leaves and flowers. It was concluded that the mites of the family Tetranychidae cause damage to desert roses that can damage their commercial value.
KEYWORDS: desert rose, tetranychidae mite, ornamental plant.

RESUMO: A rosa do deserto, *Adenium obesum*, uma apocinácea nativa de regiões da África e da Península Arábica é amplamente cultivada em todo o mundo por seus valores ornamentais e medicinais. No Brasil existe um interesse crescente pelos atributos ornamentais de *A. obesum*, o que desperta o interesse da comunidade científica em solucionar os problemas que podem acompanhar o cultivo desta planta. Alguns estudos sobre as formas de manejo, nutrição e irrigação têm sido realizados, no entanto, estudos que visam entender as doenças e pragas que afetam a rosa do deserto ainda são escassos. Este trabalho teve como objetivo relatar a primeira ocorrência de ácaros da família Tetranychidae causando danos à roseira-do-deserto cultivada em casa de vegetação no estado da Paraíba, Brasil. Sessenta espécimes de rosa do deserto foram monitorados entre dezembro de 2019 e julho de 2020 em uma estufa do departamento de biociências da Universidade Federal da Paraíba. Todas as plantas tiveram lesões e danos causados pelo ácaro. Os principais danos foram necrose, deformação das bordas, fechamento das folhas ao longo da nervura central e amarelecimento com ressecamento total e queda das folhas. Formação de teias sobre folhas e flores. Concluiu-se que os ácaros da família Tetranychidae causam danos às rosas do deserto que podem prejudicar seu valor comercial.
PALAVRAS-CHAVE: rosa do deserto, ácaro tetranychidae, planta ornamental.

INTRODUCTION

The desert rose, *Adenium obesum* (Forssk.) Roem. & Schult., Belongs to the Apocynaceae family. This plant family comprises more than 5000 species. Is one of the largest families of angiosperms. Most species of this family occur in the tropical region, growing in various environments, from tropical forests to semi-arid regions. (RAPINI, 2000).

The genus *Adenium* is native to tropical Africa and the Arabian Peninsula. All species of this genus occur in savannas or open forests with sandy or rocky soil, can be brackish, at medium and low altitudes. The specie *A. obesum* has the widest geographical distribution among all the genus (PLAIZIER, 1980).

A. obesum is of interest as an ornamental and medicinal plant. For these reasons it was disseminated around the world, however in its origin regions it is under threat of extinction by commercial exploitation and destruction of its habitats (OYEN, 2008; TALUKDAR, 2012; WANNAKRAIROJ, 2008).

In Brazil, interest for the desert rose as an ornamental plant is growing. There is an increase in the supply and demand for *A. obesum* in the market, including online, and the search for the term "desert rose" on Google in the last five years has increased by more than 200%.

Following the increase in popular interest, the scientific community began to develop research aimed at solving the problems that arise with the cultivation of desert rose. Mcbride et al. (2014) studied the mineral nutrition of desert roses, Colombo et al. (2018) investigated the relationship between substrate and irrigation levels and its influence on the growth of desert roses in pots and Tiago Neto et al. (2017) reported the occurrence of mealybugs and aphids in *A. obesum* in the State of Goiás, Brazil.

The presence of pests in ornamental plant crops can cause losses as the esthetic damage causes loss of added value of the product to be marketed (MENEGAES *et al.*, 2015) and the expansion of cultivation may favor infestation by pests, notably insects and mites. However, there no reports in State of Paraíba, Brazil, of mites of the family Tetranychidae infesting *A. obesum*. This family is part of the order Trombidiformes, suborder Prostigmata and comprises a wide variety of mites strictly phytophagous that have as one of their characteristics the ability to weave webs over the leaves on which they feed (MORAES; FLECHTMANN, 2008).

Knowing the pests that attack crops is important for the development of management strategies that aim to avoid or minimize damage while preserving the commercial value of the products. Therefore, the objective of this work was to make the first report of mites of the family Tetranychidae in desert rose on State Paraíba, Brazil, and describe the injuries and damages caused by the action of this pest.

MATERIAL AND METHODS

Sixty plants of the *Adenium obesum* species grown in a greenhouse were observed between December 2019 and July 2020 in Departamento de Biociências da Universidade Federal da Paraíba, *Campus* II – Areia, PB, Brasil.

Mites were collected, filmed and photographed for identification and characterization. Some specimens were sent to the Entomology Laboratory of the Federal University of Alagoas, *Campus* Arapiraca for slide assembly and identification through morphological characteristics based on taxonomic keys presented in the references up to the family level (PRITCHARD & BAKER, 1955; BAKER & TUTTLE, 1994;)

During the observation period, the plants were examined, and the damage and injuries caused by the mites were described.

RESULTS AND DISCUSSION

The presence of the tetraniquid mites was characterized by injuries and damages, mainly in the leaves and flowers. Damage to the leaves, plesionecrosis (yellowing) and necrosis in areas of the limbus were observed (figure 1A), these leaves lost their photosynthetic power, dried completely and fell (figure 1B).

Figure 1. Desert rose leaves attacked by tetraniquid mites: A) Leaf with yellowing and necrosis caused by mites. B) A completely dry leaf, about to fall, still shows signs of the presence of mites.

Dust mites feed through the insertion of the stylets in the leaf tissues, preferably on the abaxial surface, sucking the extravasated cellular content. With the destruction of the epidermal cells, yellowing occurs along the central vein and on its lateral part. Tanning can also occur in more severe infestations, which can cause leaf fall (BOTTON et al, 2015). The damage caused by tetraniquid mites can start with translucent punctuations, which later give rise to silvery or pale green areas. There is also oxidation of the attacked areas, which end up giving them tan tones. Under more intense attacks, the leaf may show necrotic spots, tears and fall. Some damaged leaves showed deformities at their edges and some tended to close on the main vein axis (figure 2 A). Over the youngest leaves and flowers located at the apex of the stem, mites moved on the webs between the parts of the plant (figure 2B).

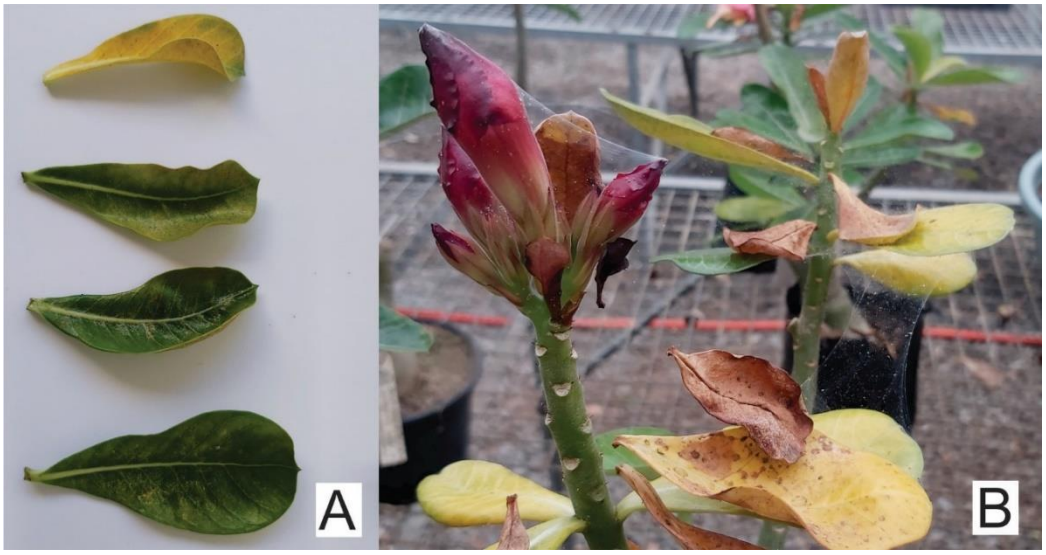

Figure 2. A) Evolution of the state of leaves attacked by mites; deformations are observed at the edges, yellowing and closing of the leaf along the axial vein. B) Formation of the webs on the flowers and leaves.

Most tetraniquids have the ability to weave webs over the leaves on which they feed. The webs have the function of preventing the establishment of another species in the same place, protecting the eggs against desiccation. They also protect the mite colony from raindrops and from attack by predators which have difficulty moving between the wires. However, some more specific predatory mites are favored by the webs (MORAES; FLECHTMANN, 2008; FRANCO et al., 2010).

The webs facilitate the dispersal of mites when plants are heavily infested and food resources become scarce. When web formation occurs and large amounts of mites accumulate on top of the plant, these mites are dispersed by the wind. This process is known as "ballooning" (MORAES; FLECHTMANN, 2008; CLOTUCHE et al., 2011). In the webs formed on the abaxial surface of the leaves, eggs, nymphs, adults and ecdysis remains were observed (Figure 3).

Figure 3. Webs in the abaxial part of the leaf. Remains from ecdises can be seen.

A significant number of species of pest mites from agricultural crops belong to the family Tetranychidae, order Prostigmata (PRITCHARD & BAKER, 1955); these mites attack crop plants, fruit, olericultural plants, ornamental, and uncultivated plant species (ROGGIA, 2007). And although they have been reported to cause damage to various plant crops, there is still no report in the State of Paraíba, Brazil of this mite attacking desert rose.

Esthetic damage caused by pests directly affects the ornamental plant production chain, decreasing the value or preventing the sale of the product. Recognizing the agents that cause these damages allows for adequate management with preventive or control measures in order to avoid losses.

CONCLUSION

Mites of the family Tetranychidae cause data and injuries to *Adenium obesum* affecting its commercial value. In this work we report for the first time tetraniquids mites in desert rose on the State of Paraíba, in greenhouse cultivation.

ACKNOWLEDGMENTS

Professor Dr. Edmilson Silva Santos of Universidade Federal de Alagoas, *campus* Arapiraca.

REFERENCES

1. BAKER, E.W.; TUTTLE, D.M.. 1994. A guide to the spider mites (Tetranychidae) of the United States. *Indira Publishing House*. 347p.

2. COLOMBO, R.C. et al.. 2018. substrates and irrigation levels for growing desert rose in pots. *Ciencia e Agrotecnologia*, v. 42, n. 1, p. 69–79,

3. MARCOS, B. CRISTIANO, J. ARIOLI, R. M. J.. 2015. Manejo de pragas e doenças. 1. ed. Brasilia: Embrapa. v. 4

4. MCBRIDE, K.M. et al. 2014. Mineral nutrition of adenium obesum 'red'. *Hortscience, v. 49, n. 12, p. 1518–1522.*

5. OYEN, L.P.A. 2008. Adenium obesum (Forssk.) Roem. & Schult. In: Schmelzer GH, Gurib Fakim A (eds). *Plant resources of tropical Africa, medicinal plants, Backhuys*. Wageningen. p. 46-49

6. PLAIZIER, A.C. 1980. A revision of Adenium Roem. and Schult. and of Diplorhynchus Welw. Ex Fic. & Hiern (Apocynaceae). Wageningen: H. Veenman & Zonen BV. 40 p.

7. PRITCHARD, E. & BAKER, E.W. 1955 A revision of the spider mite family Tetranychidae. Pacific Coast Entomological Society Memoirs, 2, 1–472

8. RAPINI, A. 2000. Sistemática: Estudos em Asclepiadoideae (Apocynaceae) da Cadeia do Espinhaço de Minas Gerais. (Tese de doutorado) - Instituto de Biociências, Universidade de São Paulo, São Paulo, 2000. p. 29-31. doi:10.11606/T.41.2000.tde-12122001-085018. Acesso em: 07 ago. 2020

9. ROGGIA, S. 2007 Ácaros tetraniquideos (prostigmata:tetranychidae) associados à soja no Rio grande do Sul: Ocorrência, identificação de espécies e efeito de cultivares e de plantas daninhas. <https://repositorio.ufsm.br/bitstream/handle/1/5122/SAMUEL.pdf?sequence=1&isAllowed=y>. Acesso em: 27 ago. 2020.

10. TIAGO N, L.J. et al.. 2017. Ocorrência de insetos fitófagos em Adenium obesum (Forssk.) Roem. & Schult no estado de Goiás. *Revista Agro@Mbiente on-Line*, v. 11, n. 4, p. 379.

11. WANNAKRAIROJ, S. 2008. Status of ornamental plants in Thailand. *Acta Horticulturae*, v. 01, n. 788, p. 29-36.

12. TALUKDAR, T. 2012. Development of nacl-tolerant line in na endangered ornamental, Adenium multiflorum Klotzsch through in vitro selection. International Journal of Recent Scientific Research, v. 3, n.10, p. 812-821.