

# Wildlife of the Tamaulipan Brush in the Dispersion of Chapote (*Diospyros Texana* Scheele) Seeds

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**Abstract:** In nature, all seeds need external agents (biotic or abiotic) to ensure their movement. Dispersion mechanisms turn out to be an essential factor in the natural distribution of plant species and in the mobilization and exchange of genetic material within and outside populations. The objective of this research was to analyze the interaction that the native wildlife in the Tamaulipas scrub has with the fruit of one of the species of the “Chapote” plant species (*Diospyros texana*) and its contribution to the dispersal of seeds. The research was carried out at the Experimental Campus of the Faculty of Forest Sciences of the UANL, Mexico, located in the municipality of Linares, NL, Mexico, during the month of July and August 2019. The method used was by means of photo-trapping to monitor the fauna that interacts with the species in question. It was possible to conclude that the average distance of distribution of excreta with seeds of *Diospyros texana* was three meters. Some members of the wild fauna of mammals present in the vegetation of the Tamulipe scrub were white-tailed rabbit (*Sylvilagus floridanus*), gray squirrel (*Sciurus aureogaster*), raccoon (*Procyon lotor*), armadillo (*Dasypus novemcinctus*) and coyote (*Canis latrans*); they feed on the fruits of *Diospyros texana* and thus act as dispersers of its seeds.

**Key words:** dispersal, facilitation, wildlife, seeds, *Diospyros*

## 1. Introduction

Seeds are the fundamental means by which plants regenerate and move in space. All seeds need external agents (biotic or abiotic) to ensure their movement. Among biotic agents, animal species are the main dispersal vector [1]. Dispersal mechanisms are an essential factor in the natural distribution of species and in the mobilization and exchange of genetic material within and outside populations [2]. For this reason, it is essential to know the dispersal patterns of the species that make up a community in order to assess their possibilities for natural regeneration [3]. Plant-disperser interactions are therefore crucial for the dynamics of plant communities [4-6], especially in scenarios of environmental change. In Mexico, the

genus *Diospyros* is important for its fruit of some species that is edible [8], it is the most representative of the Ebenaceae family, with more than 500 species, more than 100 in the American continent and more than 20 in the Mexican territory [9].

The plant species *Diospyros texana* is a shrub or tree, which can reach 16 meters in height, its fruit is a black drupe when mature, containing 3 to 8 seeds, and is consumed by some birds and mammals. The wood of *Diospyros* in the region is used for poles in rural rooms, corrals and in the manufacture of toys.

The objective of the present investigation was to know which species of the wild fauna of the Tamaulipas scrub shows interaction with the fruit of “Chapote” (*Diospyros texana*) and its contribution in the dispersal of its seeds.

## 2. Method

The research was carried out at the Experimental Campus of the Faculty of Forestry Sciences of the Universidad Autonoma de Nuevo Leon, located in the municipality of Linares, N.L., Mexico, during the months of July and August 2019. The method used was through photo-trapping to monitor the fauna that interacts with the species in question, using camera traps (Cuddeback model E3). First, the “Chapote” species (*Diospyros texana*) with the presence of fruit were identified, later, the selection of three groups of trees distributed outside of the bush vegetation in open areas was made for the installation of the cameras, being placed the cameras at the tree trunk. Likewise, three groups of trees were selected within the scrub vegetation and cameras with night vision and movement sensitive were also installed.

The cameras were checked every ten days to analyze the photographs and determine the wildlife species captured as consumers of the “Chapote” (*Diospyros texana*) fruit.

The sampling of excreta carried out with *D. texana* seeds was, lifting the excreta and being taken to the laboratory to separate and obtain the seeds for subsequent germination tests and also the excreta geo position was recorded to later obtain the distance and geographical orientation respect to the trees *D. texana*.

## 3. Results and Discussion

In the present investigation, in the sampling months (summer) it was possible to observe the dispersion of seeds of *Diospyrus texana*, in 100% by species of mammalian wildlife. In this regard, Scott *et al.* [10], found in their research, regarding the ecological role of wild fauna, that it is partly responsible for the propagation and reproduction of plants, since, for example, in the Tamaulipas, Mexico, in the scrub 57 % of plant species depend on animals for their dispersal (60% birds, 36% mammals, 4% ants). In the present study it was found that, both in the open observation areas with *D. texana* trees, even resisting deforestation,

in areas where there was previously scrub, and inside the scrub, 100% dispersal by wildlife was observed in its entirety, composed of mammals, which coincides, regarding the role played by wild mammals as did found by Montoya [7], who mentions that tree species, whose seeds are dispersed by animals (mainly birds and mammals) are generally more resistant deforestation, than those others in which its dispersion is essentially done by the wind. It should be mentioned that in the present study, frugivorous feeding was presented by medium-sized birds (mainly the magpie *Quiscalus mexicanus*) and that due to the size of the *D. texana* fruits, the seeds were not eaten, only the pulp of the fruits.

The results of this research, where it was shown that some members of the wild fauna feed on the fruits of *Diospyrus texana* and thus act as dispersers of its seeds, which corroborates what Herrera [11] and Jordano [12] mention, who argue that seed dispersal by frugivorous vertebrates is a mutualistic interaction in which animals benefit from the nutritious pulp of fleshy fruits, while plants ensure the movement of their seeds.

In the present investigation, resulted average distances of distribution of excreta with seeds of *Diospyrus texana* to the trees of this plant species was of three meters of the top of the monitored trees were observed, as mentioned by Traveset [13], who affirms according to his research, that frugivorous animals ingest fruits, transport the seeds in their digestive tracts and defecate or regurgitate them under conditions appropriate for germination. With this, frugivorous vertebrates contribute to the regeneration of plant populations [14], the connectivity of meta-populations [15] and the colonization of vacant habitats [16, 17].

The species observed in the photographs in the present study were: white-tailed rabbit (*Sylvilagus floridanus*), gray squirrel (*Sciurus aureogaster*), raccoon (*Procyon lotor*), armadillo (*Dasypus novemcinctus*) and coyote (*Canis latrans*), see Figs. 1-4. The last three species being the ones with the highest nocturnal activity. The dispersion of the seeds

found in the present investigation was confirmed by photographic samplings, where five species of wild fauna (mammals) can be observed interacting with the arboreal species *D. texana* dispersing their seeds, this is also corroborated by Montoya [7], who mentioning in the results of his study that the various ways in which a tree disperses its seeds are a key factor in understanding the sensitivity of different species to deforestation, in addition, tree species effectively respond differently to the lack of forest habitat. Under similar conditions, a species dispersed by wind will be more threatened by habitat loss than a species dispersed by animals. In this regard, González [18], mention that the consumption of fruits (frugivory) represents, both the exit phase of the seed dispersal process of endozoic



**Fig. 1** Armadillo (*Dasypus novemcinctus*) consuming fruits from *D. texana* on August 31, 2019 at 05:39 am.



**Fig. 2** Group of raccoons (*Procyon lotor*) consuming *D. texana* fruits on September 1, 2019 at 12:24 am.



**Fig. 3** Coyote (*Canis latrans*) consuming fruits of *D. texana* on September 04, 2019 at 11:12 pm.



**Fig. 4** White-tailed rabbit (*Sylvilagus floridanus*) consuming fruits by *D. texana* on September 05, 2019 at 08:29 am.

plants, and the beginning of the plant-disperser interaction.

Likewise, the results of this research show that although the biological richness decreases and that, the forest area is therefore affected, as happens in the deforested areas considered in the present study, where individuals were also selected to be monitored, the presence of trees, either within the forest surface and in the isolated relics of vegetation, contribute to the resilience of these degraded areas, thus, when observing in the results of this study a variety of wildlife species greater than expected, who magnify the ecological importance of the relationship between the wildlife with vegetation and also with the soil and other ecological resources. Montoya [7] also obtained

similar results in his research carried out in 2008, where he concluded that biological richness decreases in deforested areas, and most species are harmed by the loss of wooded area, where even a tree, although its seeds are dispersed by animals, it will be more vulnerable to forest loss if the animal that disperses its seeds goes extinct, since the tree will have no means to transport its offspring and survive another generation. These results indicate that the protection of plant-animal interactions is one of the fundamental pillars towards which conservation efforts should be directed.

The results of the present investigation allow to determine that the wild mammal species interact and participate in the seed dispersal dynamics of the *Diospyros texana* species when consuming their fleshy fruit by them. The frugivorous vertebrate represents the beginning of primary dispersal for the propagules of many plants [19], however, frugivory studies rarely link the activity of these vertebrates that act as primary dispersers, with the final destination of the dispersed seeds [20, 21].

#### 4. Conclusions

The impact of wildlife mammals on seed dispersal in vegetated areas magnifies the ecological importance of the wildlife mammals-vegetation relationship and thus with the soil-plant-water and other ecological resources.

In the present investigation, average distances of distribution of excreta with *Diospyrus texana* seeds of three meters were observed.

Some members of the wildlife of mammals present in the vegetation of the Tamaulipan scrub in northeast of Mexico, among them, white-tailed rabbit (*Sylvilagus floridanus*), gray squirrel (*Sciurus aureogaster*), raccoon (*Procyon lotor*), armadillo (*Dasypus novemcinctus*) and coyote (*Canis latrans*), in they feed on the fruits of *Diospyrus texana* and thus act as dispersers of its seeds.

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