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Phenological response of Tillandsia purpurea in a fog-dependent ecosystem, south of Peru.

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Background.
The present research was developed in the scope of the project "The chilean-peruvian arid coastal fog ecosystems under climate change: understanding biosphere-atmosphere interactions to support biodiversity conservation (2016-2019)", in which it is intended to know and understand the phenological dynamics of Tillandsia purpurea; one of the species that make up the tillandsial communities (Borthagaray et al., 2010; Mostacero et al., 2007), which settle in sectors of the desert coast of Peru and Chile (Pinto, 2005); and to study their relation to the microclimatic variables in which they develop, given that this relationship has an important role for their survival and permanence in these environments, and that until now they have been poorly studied (FontQuer 2000).

Aim. Study the phenological response of Tillandsia purpurea and possible association with environmental variables in a fog-dependent ecosystem

Method.
We studied the phenological response of a T. purpurea, in a tillandsial patch in a sector of the coastal desert of Arequipa, Peru, located 15 km from the coast and 998 m. a.s.l., monthly field visits were made from February to December 2018. The phenological stages (vegetative state, flower buds, flowering, fruiting and dehiscence) of the species were determined, and they were related to microclimatic data on temperature, atmospheric humidity and precipitation, collected with DataLogger Climatological sensors (PCE) and a Rain Collector (DAVIS), installed at the level of the tillandsias, additionally, modified mini fog collector of 0.25 m2 was installed, to obtain data of available fog collection.

Results.
The preliminary analysis shows that T. purpurea, has constant flowering phenological characteristics throughout the months of evaluation, with an increase of fructification between the months of July to September, these characteristics are increased when there is a previous fog or precipitation event . According to the results, the fog collection presents a monthly average of 5 L / 0.25 m2, with an increase during the months of May to October; the precipitation was presented from June to October, with a maximum of 6.6 mm in August. In the relation of the phenological stages applied for this species, it is also shown that dehiscence occurs from February to May. On the variables of temperature and humidity, they do not present an apparent relation of these with the phenological stages, presenting monthly averages of atmospheric humidity of 63% and 18 ° C of environmental temperature.

Conclusions.
T. purpurea presents a positive phenological response by increasing flowering and fruiting events in response to the presence of precipitation and the increase of available fog water. It is important to know and understand the phenological responses of this type of fog-dependent vegetation, since they act directly as indicators of climate change, in the face of possible future scenarios.