



# Rainbow Saguaro Growth Study

conducted by the Saguaro Huggers of Tohono Chul



**Purpose:** to track the growth of selected saguaro cacti on the Tohono Chul grounds.

**Methods:**

• **Study Group:**

• For this analysis, the years of measurement and the number of saguaro measured for each time period are summarized below:

**1999 – 2018:**

32 saguaros added to database in 1999  
27 saguaros measured in 2018

**2000 – 2018:**

62 saguaro added to database in 1999  
43 saguaro measured in 2018

**2001 – 2018:**

157 saguaro entered into database in 1999  
116 saguaro measured in 2018

**Overall:**

251 saguaro entered (1999 – 2001)  
186 saguaro still active in 2018

• **Height comparisons:**

For each cactus entered into the study, height was measured annually after the completion of the growing season.

Heights at the beginning and end of the study were compared for each of the 186 saguaro included in this analysis. (Figure 1)

• **Growth rate determination:**

Linear regression was performed on the data (date of height measurement and height) for each saguaro. The resultant slope is the growth rate (mm/year).

Mean saguaro height was determined as height midway between the starting height and the ending height.

A sample calculation is depicted. (Figure 2)

• **Growth curve**

A growth curve for all saguaro in this analysis was created by plotting saguaro growth as a function of mean height. A polynomial was fitted to the data. (Figure 3)

**Results:**

251 saguaro were entered into the study between 1999 and 2001. Heights ranged from .4 inches to 6.75 feet. (Figure 1)

186 saguaro were still active in 2018. Heights ranged from 9.1 inches to 16 feet. (Figure 1)

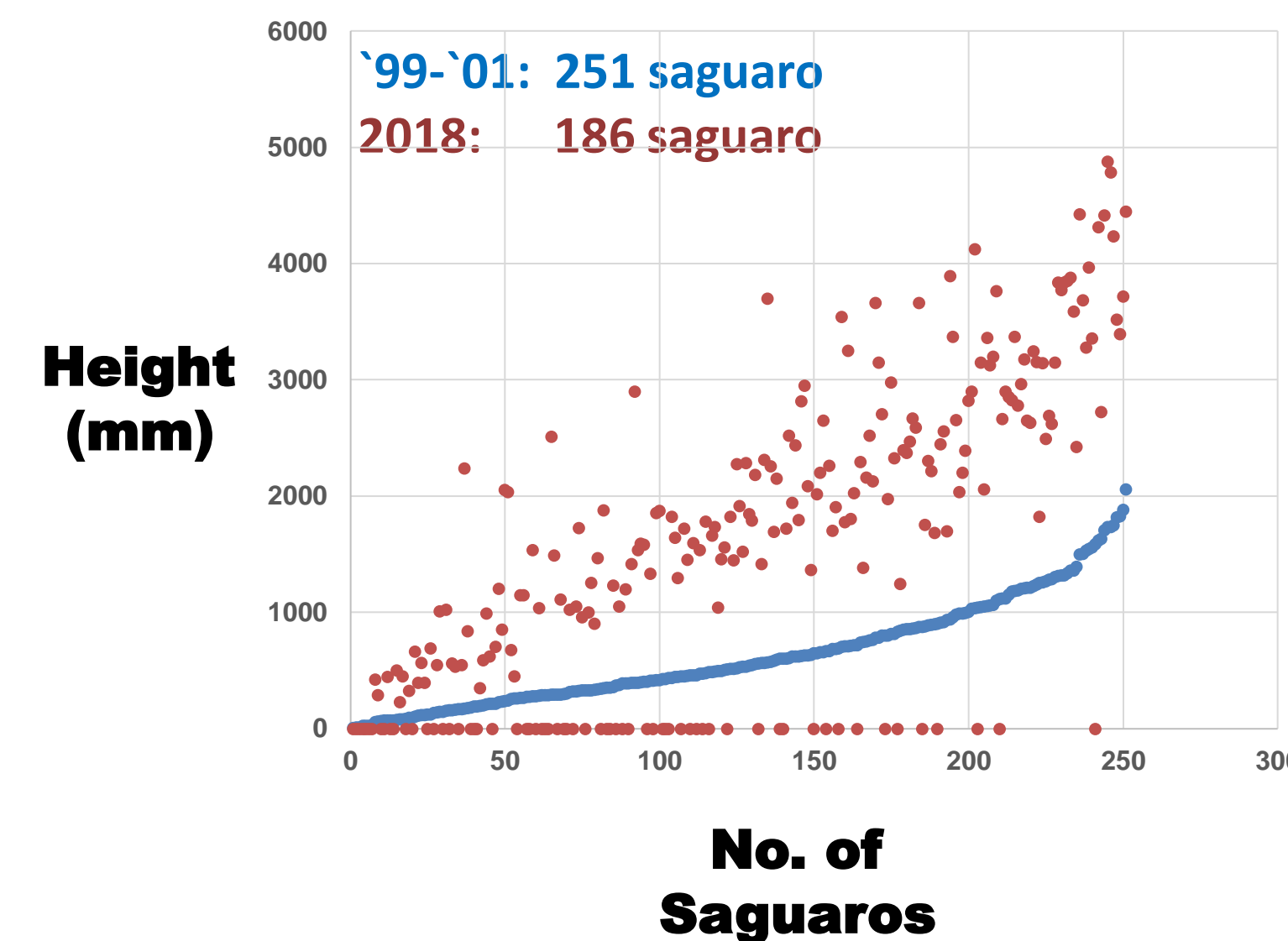
65 saguaro did not complete the study. (Figure 1)

For the 186 saguaro analyzed, growth was directly related to saguaro height; taller saguaro grew faster than shorter saguaro. (Figure 3) As examples:

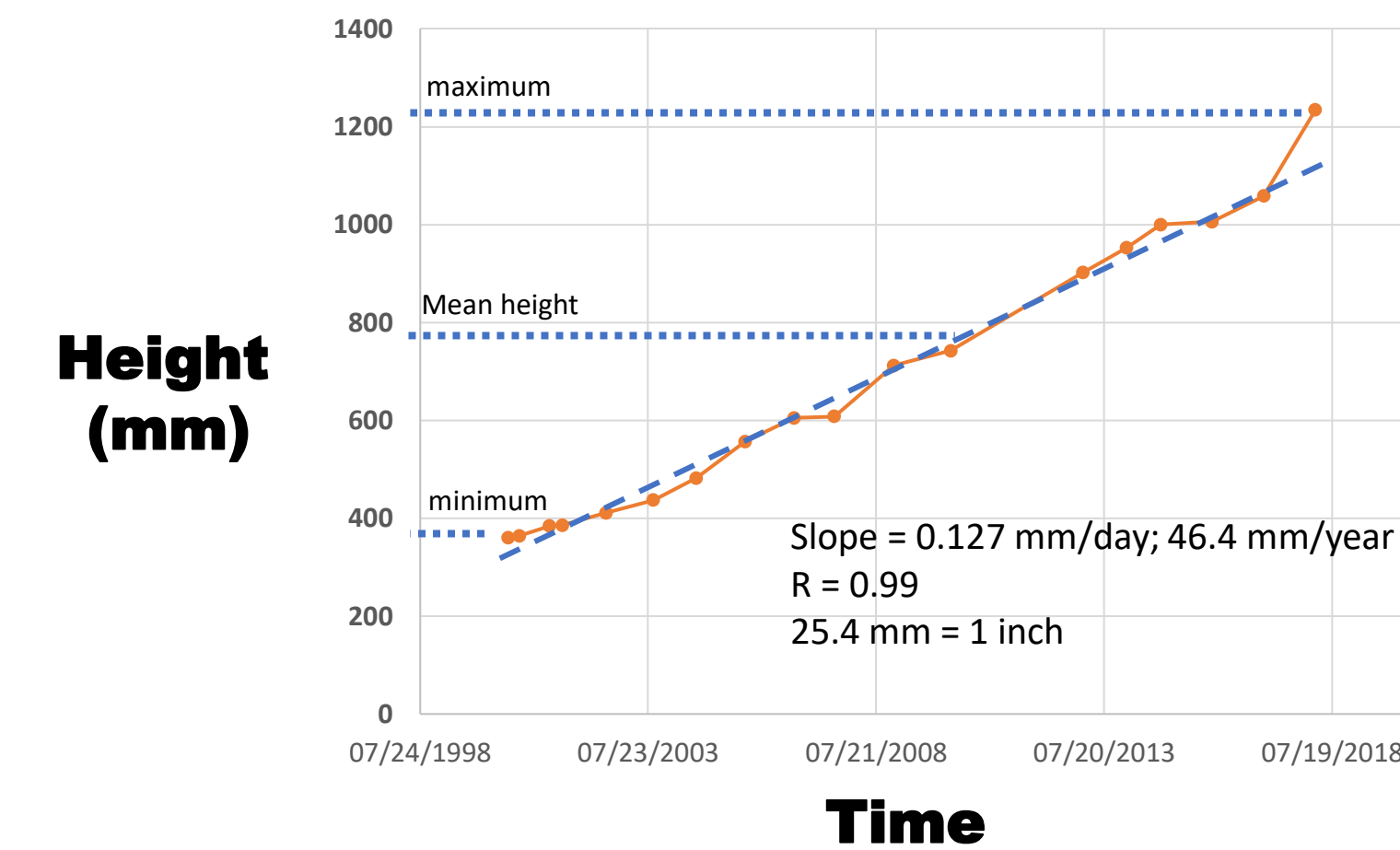
	Saguaro Height			Growth Rate	
	mm	inches	feet	mm/yr	inches/yr
1000	39.4	3.28	65	2.6	
2000	78.7	6.56	112	4.4	
3000	118.2	9.84	151	5.9	

**Figure 1. Saguaro Growth Analysis**

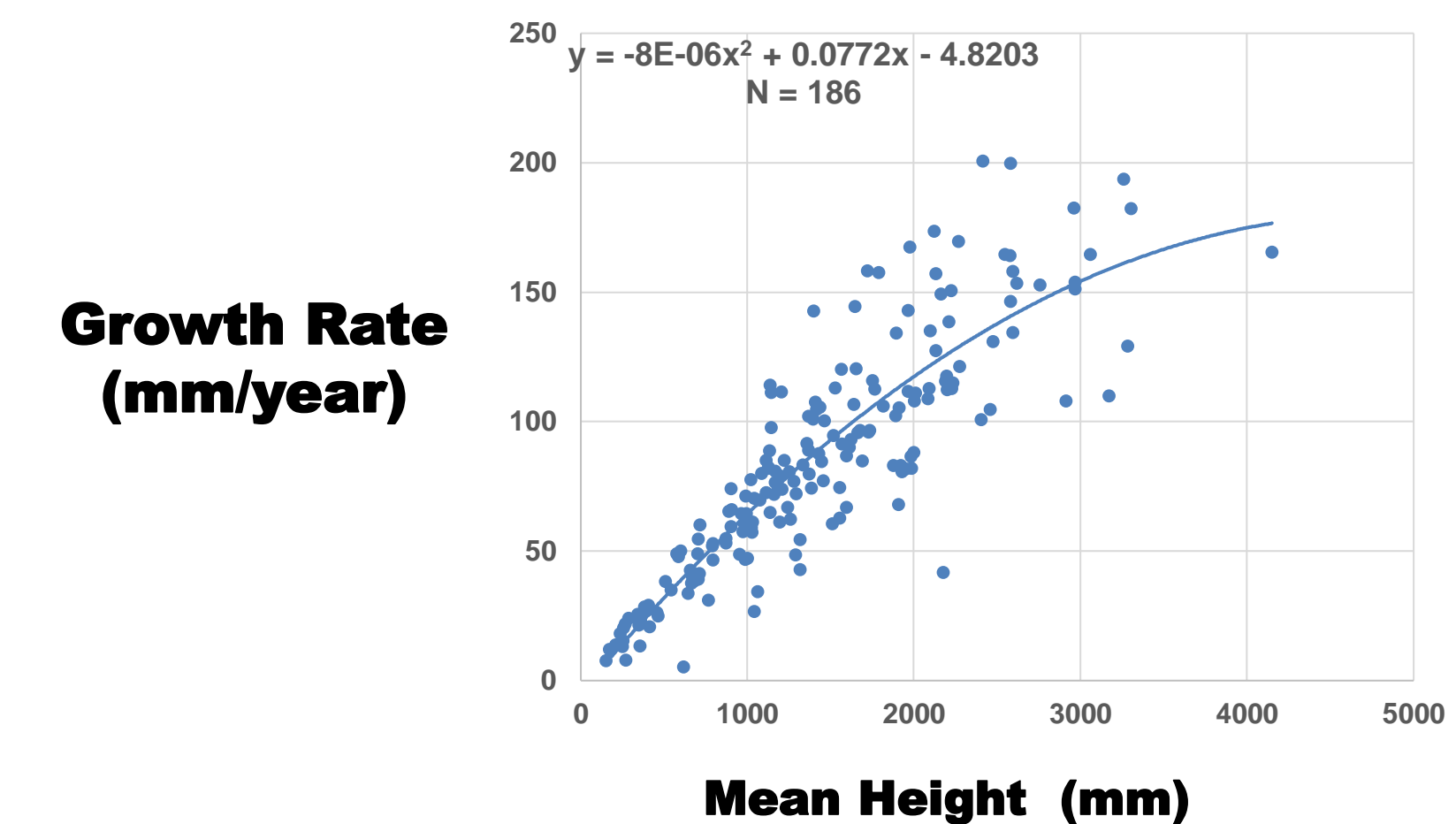
(1999-2001) vs. 2018



**Figure 2. Linear regression of height as a function of time (Saguaro G006)**



**Figure 3. Effect of height on saguaro growth (1999-2001) to 2018**



**Conclusions:**

The growth rates of 186 saguaro were determined over the 1999-2001 to 2018 period.

Saguaro growth rate was directly related to saguaro height; taller saguaro grew faster than shorter saguaro.

There was greater variability in growth rates for saguaro with a mean height greater than 1000 mm (39.4 inches).