**Code**

import numpy as np

import matplotlib.pyplot as plt

from matplotlib import style

from matplotlib.backends.backend\_pdf import PdfPages

style.use("ggplot")

filename = "provided/abalone.data.txt"

# x and y coordinates, whitespace-separated

X = np.loadtxt(filename, delimiter=',', usecols=(2, 4))

class Abalone\_Data(object):

    def \_\_init\_\_(self, data):

        self.data\_diameter = data[:, 0]

        self.data\_weight = data[:, 1]

class Abalone(Abalone\_Data):

    def \_\_init\_\_(self, abalone\_data, a, b):

        self.data = Abalone\_Data(abalone\_data)

        self.a = a

        self.b = b

        self.mansonmodel = self.model(self.data.data\_diameter, a, b)

        self.ssr = self.SSR(self.mansonmodel, self.data.data\_weight)

        self.ssr\_str = r'SSR = ' + str(self.ssr)

        self.plot = self.generate\_plot()

    def SSR(self, y\_observed, y\_predicted):

        ssr = np.sum((y\_observed - y\_predicted)\*\*2)

        return ssr

    def model(self, x, a, b):

        manson\_model = a \* x \*\* b  # model = 5.1 \* X[:,0] \*\* 2

        return manson\_model

    def generate\_plot(self):

        plt.clf()

        plot = plt.scatter(X[:, 0], X[:, 1], marker='o', s=150, alpha=0.5, label='Observed')

        plot = plt.scatter(X[:, 0], self.mansonmodel, marker='.', color='black',

                    label=r'Model: W=' + str(self.a) + r'D$^{' + str(self.b) + r'}$')

        plot = plt.text(0.05, 2.2, self.ssr\_str)

        plot = plt.xlabel('D')

        plot = plt.ylabel('W')

        plot = plt.legend()

        return plot

    def save\_plot(self, fileprefix):

        self.plot.get\_figure().savefig("%s.png" % fileprefix)

abalone\_dataset\_first = Abalone(X, 5.1, 5.0)

abalone\_dataset\_first.save\_plot("first")

abalone\_dataset\_second = Abalone(X, 5.1, 2.2)

abalone\_dataset\_second.save\_plot("second")

abalone\_dataset\_third = Abalone(X, 5.1, 2.15)

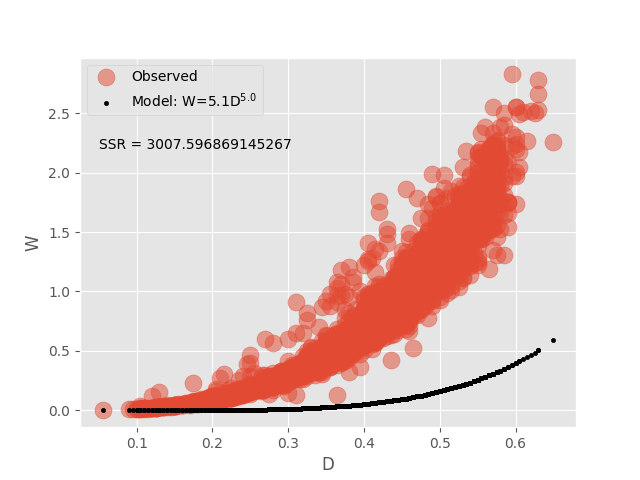
abalone\_dataset\_third.save\_plot("third")

#print(abalone\_dataset\_first.ssr\_str)

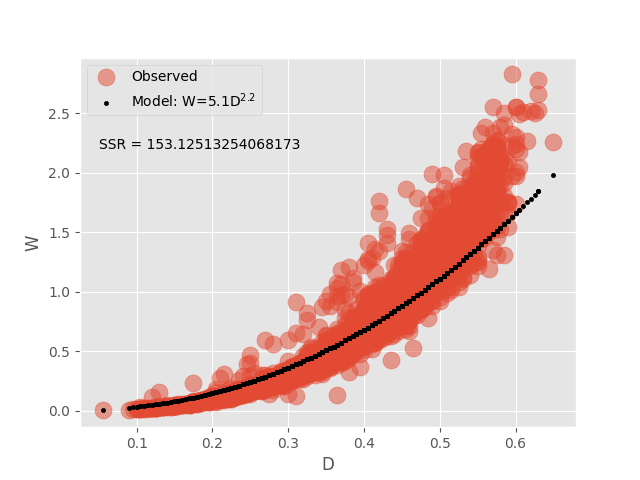
#print(abalone\_dataset\_first.plot)

**Results**

The first plot uses the given 5.1 and 5.0 with an SSR of 3007 which is majorly off



The second plot uses a of 5.1 and b of 2.2 has a much better ssr of 153 which his closer



The final plot has an A value of 5.1 and B value of 2.15 which returned 133 SSR which is a better fit

