Prediction of daily contagions of CoViD-19 - SARS-CoV-2 from August 24 to July 31, 2021 in Sicily, a region of Italy, by using a New Epidemiologic Fractal Model.

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Abstract: We study a new fractal model for prediction of contagions of CoViD-19 (SarbecoBetavirus SARS-CoV-2) from August 24, 2020 to July 31, 20201 in Sicily that is a region of Italy. We obtain that the time of the peak is estimated to be at December 7, 2020 and the number of contagions will be about 903 cases.

Introduction

The aim of the present work is to effect a prediction of the contagions of SARS-CoV-2 in Sicily in the period from August 24, 2020 to July 31, 2020.In the work we use the method of the fractal analysis, fitting a new fractal model following the performance that was used previously from Ziff and Ziff [1] during the contagions in China. The current prediction, effected by such new model introduced by us, is that the size of the epidemic will be about 903 cases of contagions in Sicily and the time of peak will be about December 7, 2020 on the general plane, depending instead the actual size of the process from the respect or an increase o decrease of the prevention measures that are fixed from the governing bodies.

Materials and Methods

The power-law (fractal) behavior has been postulated and applied in epidemic studies of Corona Virus disease in China. It is related to the properties of the networks that carry out the propagation of the

disease. Vazquez [2] developed a network model, Anna L. Ziff and Robert M. Ziff [1] applied a fractal behavior model in contagions in China. The daily number of new contagions cases, n(t), in an epidemic followed a power-law with an exponential cutoff

$n(t)=kt^{\gamma}exp(-t/t_0)$

This model was used in our previous estimations [3,4,5]. We have modified such model introducing an additive linear term *C(n)*. Therefore, the model that we adopt is the following

$n(t)=kt^{\gamma}exp(-t/t_0)+C(n)$

where *C(n)* is a linear parameter that is established by the fitting operation.

Results

We applied the previous model for the contagions of SARS-CoV-2 in Sicily. The parameter values that we estimate are the follows

k =0.000705

γ =3.8411

t_0=27.2511

C(n)= 35.00

They confirm that we are in presence of a fractal regime given by the non-integer value of γ .The value γt_0 represents the Time of the Peak. The results are in Figure 1. The time explored is from August 24, 2020 to July 31, 2021. It is seen that the time peak is about the December 7, 2020 with a total of contagions of about 903 cases.
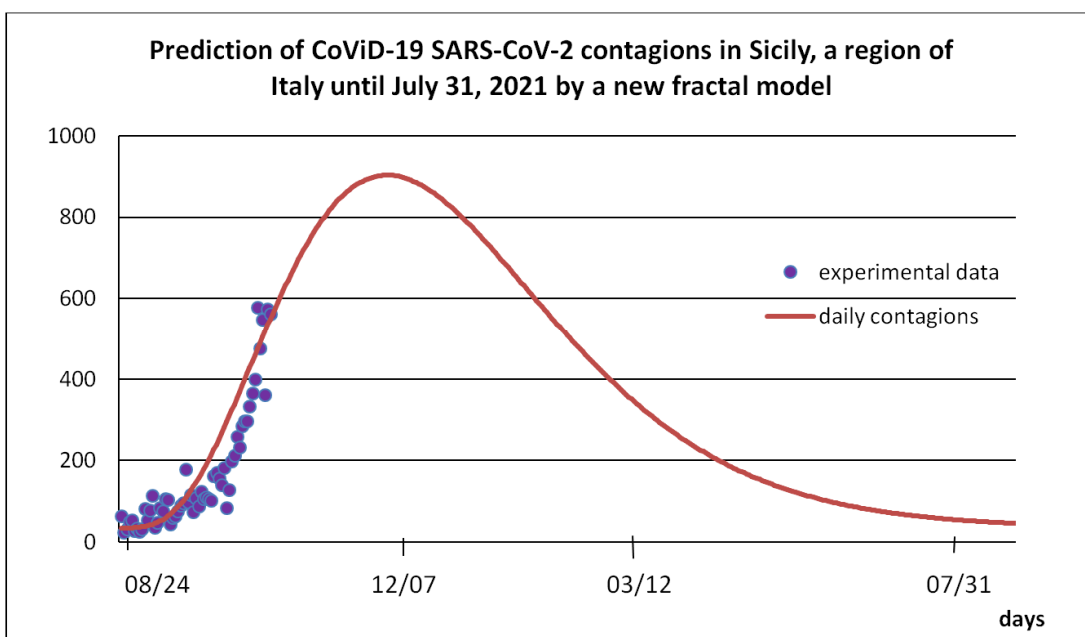

Figure 1

We calculated also the correlation existing daily between the number of contagions and the swabs made. The results that follow, indicate that such correlation does not exist .

Number of XY Pairs	13
Pearson r	0,3871
95% confidence interval	-0.2085 to 0.7732
P value (two-tailed)	0,1913
P value summary	ns
Is the correlation significant? (alpha=0.05)	No
R squared	0,1498

References

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