

Quake tomato: strange electrical signals
from a tomato plant in Taiwan
five days before
the 2008 Sichuan M8.0 Earthquake
地震番茄：2008年汶川M8.0地震前5天
台灣番茄植株的奇怪電訊號

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Abstract

Five days before the 2008 Sichuan M8.0 Earthquake, I observed strange electrical signals from a tomato plant in Yilan, Taiwan. That opened my door to quake forecast. Since then, I observed electrical signals of plants, tofu, soil, water or air to predict earthquakes. I successfully predicted a lot of quakes. Now I have about 30 quake forecast stations all over the world. I will publish a series of papers for my discoveries in the past 10 years. This paper is the start of the series. I am Founder and CEO of Taiwan Quake Forecast Institute.

2008年汶川M8.0地震前5天，我在台灣宜蘭觀察到番茄植株的奇怪電訊號。這開啓了我的地震預測之門。從此，我觀察植物、豆腐、泥土、水或空氣的電訊號以預測地震。我成功預測了很多個地震。現在我在全球各地有大約30個地震預測站。我將發表一系列論文介紹我10年以來的發現。這篇論文是此系列論文的第一篇。我是台灣地震預測研究所創辦人兼所長。

Introduction

A tomato plant generates electrical signals in response to flame, ice or mechanical wounding [Fromm and Lautner, 2007]. Typical electrical signals of a tomato plant are with frequencies of 0 to 0.02Hz, with amplitudes of 5 to 50mV and last for half an hour to one hour.

My strange tomato plant electrical signals were with frequencies of 0 to 12Hz, with amplitudes of 3 to 80mV and lasted for five days.

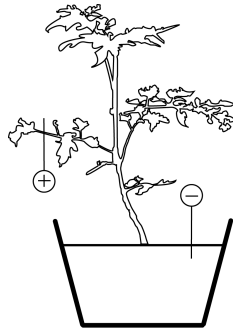


Figure 1: The tomato plant

前言

番茄植株對於火燒葉片、冰塊接觸或機械傷害會有反應，而產生電訊號 [Fromm and Lautner, 2007]。番茄植株典型電訊號的頻率為0到0.02Hz，振幅為5到50mV，持續時間為半小時到一小時。

我的番茄植株的奇怪電訊號的頻率為0到12Hz，振幅為3到80mV，持續時間為5天。

Materials and methods

I used piercing electrodes to measure a tomato plant's electrical signals. My experimental method was similar to what Dziubińska et al. used [Dziubińska et al., 2001] but with some differences.

I used a tomato plant which was 75cm high and about three months old. I used 0.2mm silver-coated copper wire as piercing electrodes. I used the Xction-View II data acquisition system from Singa Company, with 10M ohms input resistance for each electrode. My Faraday cage was open and unshielded on the front (southern) side. I used only one or two channels to measure the potential difference between the tomato plant and the soil. My sampling rate was 100Hz, with a 0 to 20Hz band pass filter. Figure 1 shows the tomato plant.

After the experiment, I filtered out the low-frequency (less than 0.1Hz) signals by Matlab to make the high-frequency characteristics of the signals more clear.

材料與方法

我使用穿刺電極測量番茄植株的電訊號。我的實驗方法與Dziubińska等人相似[Dziubińska et al., 2001]，但是有一些差異。

我使用的番茄植株大約75cm高，大約3個月大。我使用直徑0.2mm的鍍銀銅線當做穿刺電極。我使用天勝公司的XctionView II資料擷取系統，每個電極的輸入阻抗為10M ohms。我的Faraday cage的前面(南面)開口而無屏蔽。我只使用一或二個頻道測量番茄植株和泥土之間的電位差。我的取樣頻率為100Hz，並使用0到20Hz的帶通濾波器。圖1為番茄植株。

實驗後，我以Matlab濾除低頻(小於0.1Hz的)訊號，以突顯高頻訊號特徵。

Results and discussions

Five days before the 2008 Sichuan M8.0 Earthquake, the tomato plant underwent a leaf-burning experiment and generated typical one-hour electrical signals for leaf-burning. But after the typical signals, there were a lot of strange high-frequency signals. The strange high-frequency signals lasted for five days. And then the 2008 Sichuan M8.0 Earthquake happened.

Figure 2 shows the electrical signals from the tomato plant five days before the Sichuan M8.0 Earthquake on May 12, 2008. They were different from all the known electrical signals of plants.

Later, I got similar signals before two local earthquakes in Yilan, Taiwan from other two tomato plants.

Figure 3 shows the electrical signals from the second tomato plant before the Yilan M6.0 earthquake on June 2, 2008.

Figure 4 shows the electrical signals from the third tomato plant before the Yilan M4.5 earthquake on July 12, 2008.

So it is clear that the tomato plant signals are precursors of earthquakes.

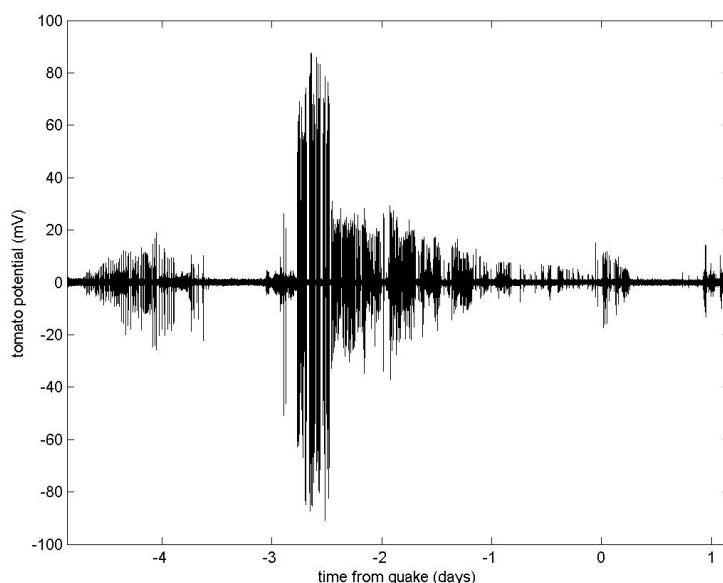


Figure 2: Electrical signals from the tomato plant before the 2008 Sichuan M8.0 Earthquake, with low-frequency (less than 0.1Hz) signals filtered out

結果與討論

2008年汶川M8.0地震前5天，我用番茄植株進行火燒葉片實驗，番茄植株產生了典型的火燒葉片的1小時電訊號。但是在典型的訊號之後，出現許多奇怪的高頻訊號。奇怪的高頻訊號持續了5天。然後2008年汶川M8.0地震發生了。

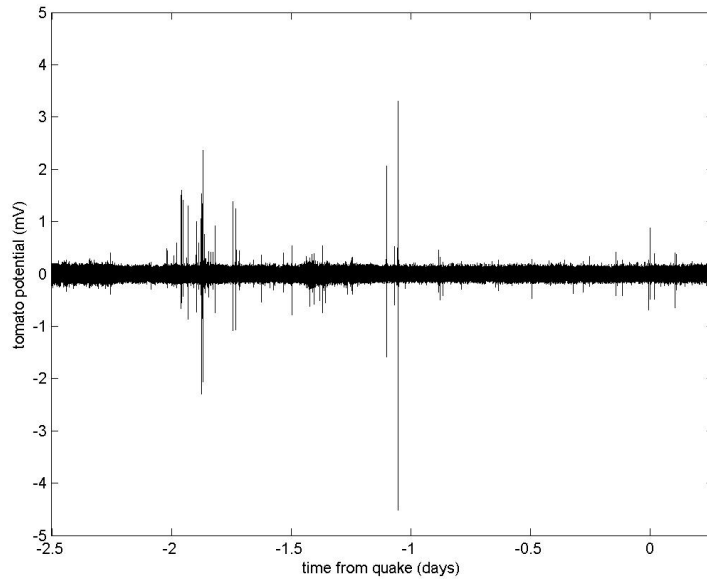


Figure 3: Electrical signals from the second tomato plant before the Yilan M6.0 earthquake on June 2, 2008, with low-frequency (less than 0.1Hz) signals filtered out

圖2為2008年5月12日汶川M8.0地震前5天番茄植株的電訊號。這些訊號和所有已知的植物電訊號都不同。

後來，我在台灣宜蘭本地的2個地震前，從另外2棵番茄植株觀察到類似的訊號。

圖3為2008年6月2日宜蘭M6.0地震前，從第2棵番茄植株觀察到的電訊號。

圖4為2008年7月12日宜蘭M4.5地震前，從第3棵番茄植株觀察到的電訊號。

所以，顯然這些番茄植株電訊號是地震的前兆。

Conclusions

The mechanism for a tomato plant to generate electrical signals before a big earthquake is unknown. Possibly it sensed the ionosphere concentration drop or something else. According to the research of Ikeya et al., there is a strong electrical field before a big earthquake that animals and plants can feel and respond to [Ikeya et al., 1998].

I suggest monitoring tomato plant electrical signals to predict big earthquakes. This could be life-saving in the future. I need further experiments to verify that.

結論

番茄植株在大地震前產生電訊號的機制仍屬未知。也許它感受到電離層的濃度下降或其他東西。根據Ikeya等人的研究，在大地震前有強大的電場，而動物和

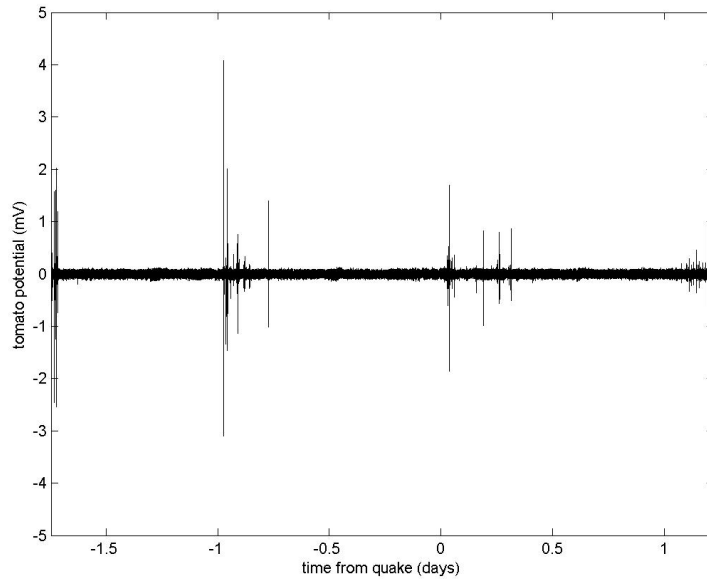


Figure 4: Electrical signals from the third tomato plant before the Yilan M4.5 earthquake on July 12, 2008, with low-frequency (less than 0.1Hz) signals filtered out

植物能感覺此電場並產生反應[Ikeya et al., 1998]。

我建議監測番茄植株電訊號以預測大地震。這在未來也許能拯救人命。我需要進一步的實驗以驗證此事。

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