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## บทความฉบับเต็ม / Proceeding

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## SUITABLE OF THE GARDEN PLANT POSITIONING FOR REDUCING THE WIND SPEED IN HOSPITAL

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### ABSTRACT

This research is a study of wind blowing through the garden plant at corridor of patient room in hospital in order to be used as guidelines for the green areas of hospitals. The *Sansevieria spp.* and *Aechmea fasciata* is suitable to be used because of the drought-resistant plants of both species need water small amounts and can be maintained easily. The experiment for *Sansevieria spp.* and *Aechmea -fasciata* is set at the height of 30, 40, and 50 cm in one row, two row and two row of zigzag. The results showed that the speed of the wind blowing through the *Sansevieria spp.* is higher compared with the *Aechmea fasciata*. due to the slender or thinner of the leaves. The plants height at 30 cm let the wind blow through better than at the 40 cm and 50 cm plant, respectively. In planting layout, the wind blow through one row of plant better than two rows and two rows of zigzag. It can be concluded that at the height of 30 cm of *Sansevieria spp.* planting in one row is the most suitable to be used as garden plant to be planted in the corridor balcony of the hospital.

**Keywords:** *Sansevieria spp.*, *Aechmea Fasciata*., Wind Velocity, Building

### Introduction

Due to the current global warming, the average global temperature tends to increase 1.1 to 6.4 degree Celsius. One reason of the temperature rise is the greenhouse effect which is anthropogenic activities such as coal burning, fuel burning and specific chemical emissions. Nowadays, more air conditioners are used for Thai architecture because of the hot and humid climate in Thailand is not in the comfort zone or thermal comfort for the whole year. Thus, the air conditioners are used to adjust the temperature into the thermal comfort [1]. If the air conditioner is compared to other electrical equipment, it consumes around 50% of the electricity consumption in the whole building [2]. The passive design or design without the energy consumption for the comfort zone would help in the reverse of thinking [3]. One solution to use less energy is to find a suitable way which is good for the environment. Planting trees is another way to help decrease the global temperature. Trees exhale oxygen and absorb carbon monoxide. Therefore, they work as global air filters. If everyone helps grow a tree, we then can have more filters for our planet [4].

From reviewing, it is found that the range of wind speeds for comforting is around 0.25 to 3 m/s and the temperature is in the range of 22-36 degrees celsius. Many types of plants have been studied using the selection criteria to choose a plant for this experiment. One of the contexts in passive design for comfort zone is the attempt to increase the natural ventilation in the building [5]. At the same time, some other green concept would lead to the opposite result of good ventilation. The promotion of having



more plants as green area by growing the plant at the opposite site of patient room can block wind crossing the walk way. The good point is the view of green area but it would also reduce the natural ventilation or block the wind velocity from outside the building. The research therefore investigate the appropriate of bush or garden plant at balcony or the side row of the walk way in front of the patient room in hospital.

### Research Objectives

To study the suitable of the garden plant positioning for reduction the wind speed in hospital

### Methodology

#### 1. Plant Material

In this study, the *Sansevieria spp.*(Fig1) and *Aechmea fasciata.*(Fig2) was hereby chosen as experimental samples. It is drought resistant plants which is good for the experiment.



Fig. 1 *Sansevieria spp.*



Fig. 2 *Aechmea fasciata.*

#### 2. SITE

The experiment location at the building of the Faculty of Environmental Management, Prince of Songkhla University was sets because inside the building can control the interfere wind speed.

#### 3. Instrument and data collection

The *Sansevieria spp.* and *Aechmea fasciata* were planted in the prepared plant pots which were categorized at the different heights: 30 cm, 40 cm and 50 cm while being planted as in one row, two rows and two zigzag rows. Each type of the plants was planted based on the set different heights and rows mentioned.

The data collection was the equipment for the measurement of wind speed, temperature and humidity, in a pocket type. The equipment specification was Testo 410-2. A fan which was turned on replacing natural wind was fixed by its speed of 0.5 to 4.00 m/s. The measurement position was at the front of the plants for the building at 0 cm, behind the plants at 0 cm, 50 cm, 100 cm, 150 cm and 200 cm.

## Research Results

### 1. Result from varied wind speed

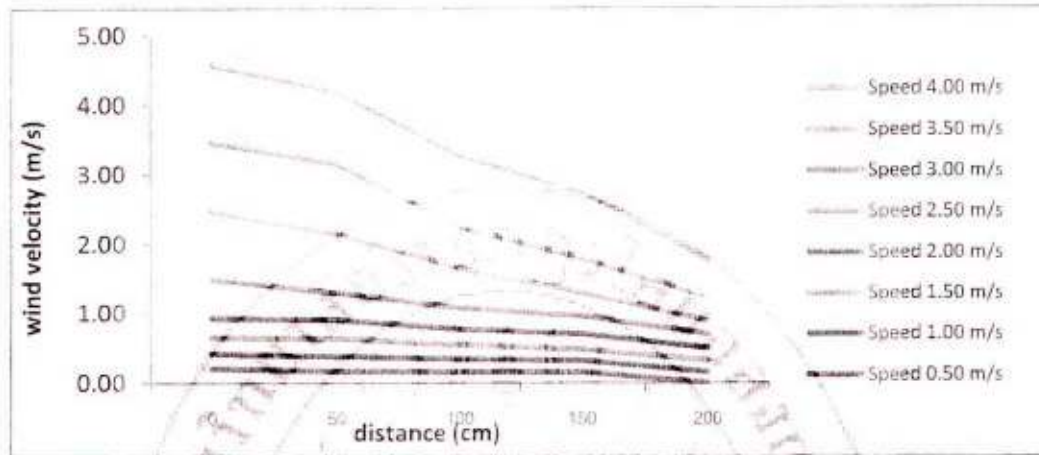


Fig 3 *Sansevieria spp.* at the height of 30 cm, planting 1 row.

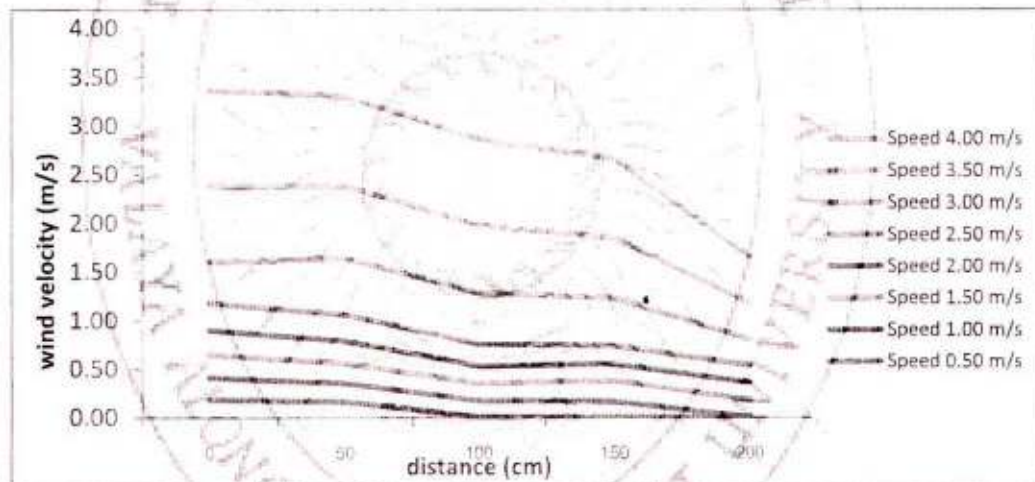


Fig 4 *Aechmea fasciata.* at the height of 30 cm, planting 1 row.

From the experimental results, the flow of wind speed through *Sansevieria spp.* and *Aechmea fasciata.* at the same height and planting layout, in Fig 3 and 4 at the beginning, the wind can flow through the *Sansevieria spp.* better than *Aechmea fasciata.* Therefore, it is concluded that the types of plants affects the wind blow through because of the appearance of leaves and trees.



2. Result at the height of 30, 40, and 50 cm of plant.

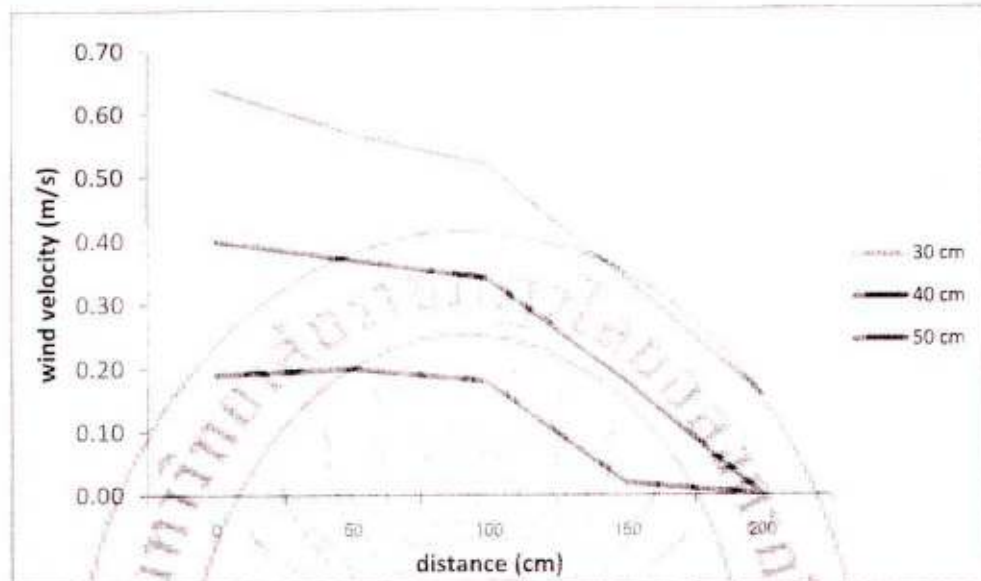


Fig.5 *Sansevieria spp.* planting 1 row at a wind speed of 0.50 m/s.

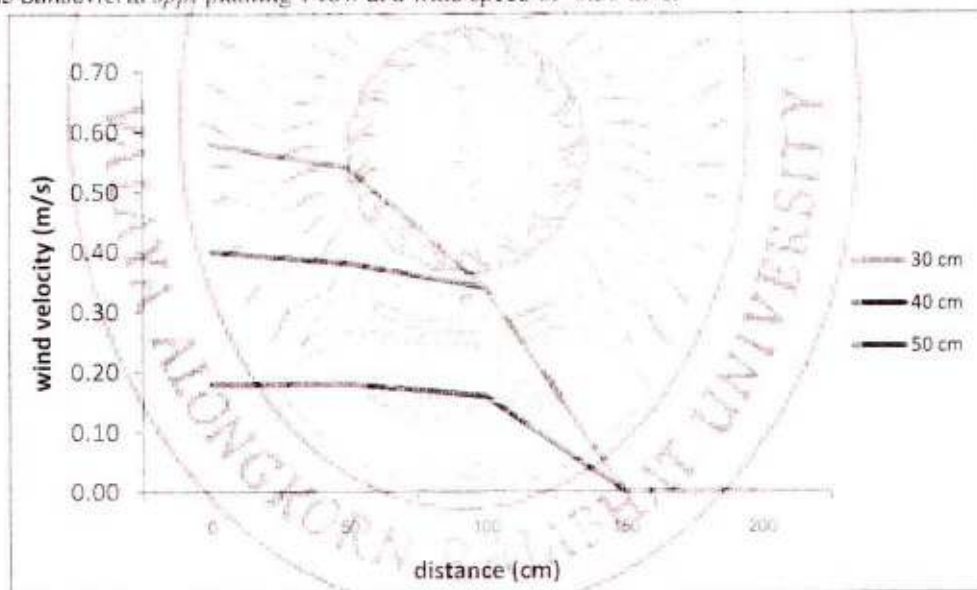


Fig.6 *Aechmea fasciata*, planting 1 row at a wind speed of 0.50 m/s.

From the experiment, when comparing the *Sansevieria spp.* and *Aechmea fasciata*, at different heights as in Fig.5 and 6, it is found that the wind passed the shorter plant better than the higher plant for both *Sansevieria spp.* more than *Aechmea fasciata*.

### 3. Study the layout of planting.

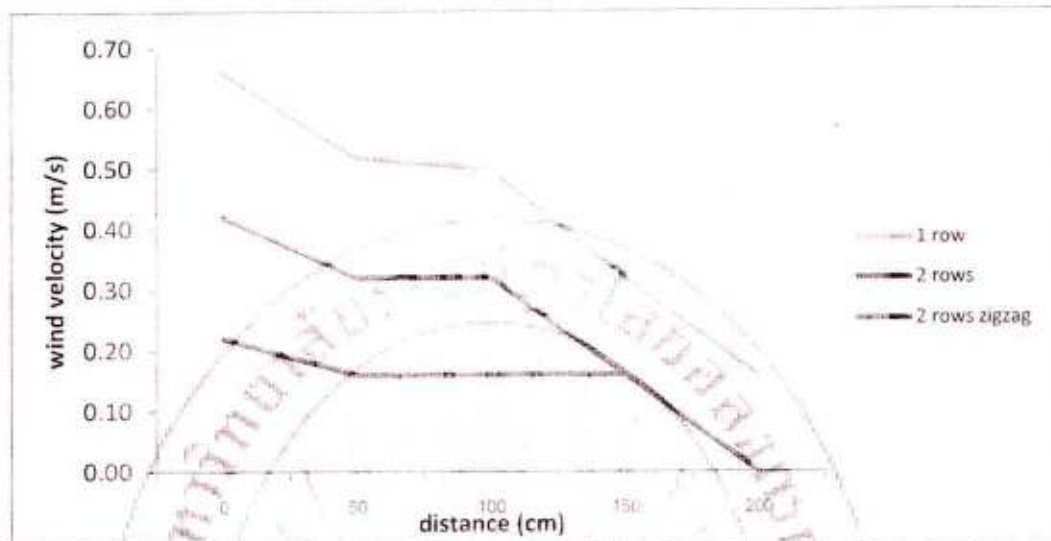


Fig.7 *Sansevieria spp.*, at a height of 30 cm, a wind speed of 0.50 m/s

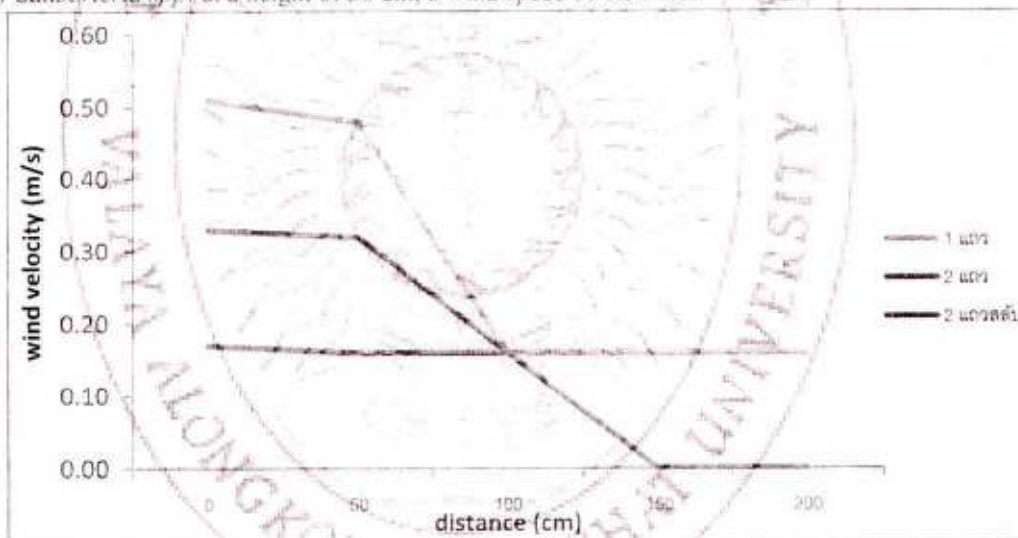


Fig.8 *Aechmea fasciata*, at a height of 30 cm, a wind speed of 0.50 m/s

From Fig 7 and 8, the wind passed through the plant in one row layout better than two rows and two rows zigzag.

#### Summary and Recommendation

In comparing the two types of plants, it was found that the wind flows through the *Sansevieria spp.* better than *Aechmea fasciata*. In an experiment to the height of plant at 30 cm is better than 40 cm and 50 cm because the higher, the lower of wind speed behind the plant. In the aspect of the plant layout, the one row planting is the best from ventilation compared to two rows and zigzag.

#### References

- Givoni, B. (1998). *Climate consideration in building and urban design*. New York: John Wiley & Sons.

- Khedari, J., Yamtraipat, N., Pratintong, N., Hirunlabh, J. (2000). Thailand ventilation comfort chart. **Energy and Buildings**, 32, 245–249.
- Auliciems, Andris and V.Szokolay. (1997). **Thermal Comfort**. Brisbane. The University of Queensland Printery.
- Chen, J.M., and T.A. Black. (2007). **Defining leaf area index for non-flat leaves**. *Plant Cell and Environment*, 5, 23-35.
- Khedari, J., Yamtraipat, N., Pratintong, N., Hirunlabh, J. (2000). Thailand ventilation comfort chart. **Energy and Buildings**, 32, 245–249.

