



## Impacts of Ambient Air Quality in an Industrial Region

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### INTRODUCTION

Tarapur, a heavily industrialized and inhabited city, offers perfect circumstances for researching how urban stress affects plants. During the 2011 dry season, five distinct locations were subjected to *Tithonia diversifolia*, a plant belonging to the Asteraceae family. For thirty days, the transplants were exposed. Recorded were the following: Dust fall, shoot length, total chlorophyll content and phytomass dry weight above ground. The measurements were contrasted with those of a control, which was a reasonably tidy region. When compared to the control, a drop in every metric was seen. Every parameter showed a significant seasonal fluctuation. More trustworthy metrics for determining air quality and recognizing *Tithonia diversifolia* as significant indicator species include shoot length and chlorophyll content. The health of people, animals and plants is all impacted by urban air quality. As a result, it becomes essential to monitor the quality of the air in order to implement mitigation strategies and comprehend how air pollutants affect living things.

Dust, also known as suspended particulate matter, is one of the main air pollutants that are present in the environment. An urban or industrial area's dust load is progressively increasing as a result of growing industrialization, building, transportation, metal refining and residential activity. In urban and/or industrial environments, there is a cumulatively high deposition of particulate matter on leaf surfaces and soil. Numerous researchers have examined the phytotoxic effects of dust coming from urban and industrial areas.

As a sink for air pollutants, vegetation contributes to a decrease in dust concentrations in the surrounding environment. Choosing the right plant species for an urban setting is essential since plants' foliar surfaces serve as significant receptors for air pollutants.

### DESCRIPTION

Particulate matter has the potential to harm plants in a variety of ways, including stomatal blockage, reduced photosynthetic activity, tissue death and leaf drop. The effects of air pollution can be broadly categorized into two categories: Acute effects, which cause severe foliar injury and chronic effects, which result from prolonged exposure to low concentrations and cause invisible injuries like growth reduction, emaciation and eventually total dieback of the plant organs.

Maharashtra holds a significant role in India's manufacturing sector, with the Mumbai-Pune-Thane belt industrial zone accounting for over 60% of the state's production. The state in question leads the nation in both the quantity of automobiles registered and the amount of fossil fuels consumed, both of which are major contributors to air pollution.

Since the Tarapur industrial region in Palghar Taluka, Thane District, is one of India's most polluted locations, it was selected for the current study to better understand the ambient air quality there.

This study aimed to investigate the effects of environmental stresses, such as SPM or dust, on *Tithonia diversifolia* (Hemsl.) A. Grey plants, which were housed at different locations around the Tarapur industrial area. The plants were studied at two different levels: Morphologically, by analyzing the above-ground phytomass and shoot length and biochemically, by analyzing the total chlorophyll content.

For this investigation, *Tithonia diversifolia*, Hemsl., an ornamental species of the Asteraceae family, was selected. It is a perennial herb that grows up to 1-3 meters tall. Its broad, oblong leaves have a crenate edge and are occasionally 3-5 lobed. The inflorescence resembles a sunflower and the leaves and petioles are hairy.

### Correlation analysis

*Tithonia diversifolia* seeds were purchased from a nearby seed vendor and planted in garden pots. For the experiment, seeds from this generation were used. Plants were cultivated in 3:1 ratios in polythene bags filled with soil and farmyard compost. Four bags were created, each containing three plants. This made up a single set. When the plants were three to four leaves old, they were moved to the designated locations.

For phytomonitoring investigations, two morphological parameters the above ground phytomass and shoot length as well as one biochemical parameter the total chlorophyll content of *Tithonia* were used. Nonetheless, a correlation analysis was done to comprehend the impact of particulate matter, such as dust, on the development and physiological processes of *Tithonia*.

### CONCLUSION

The air quality varies greatly in metropolitan areas because of shifting traffic patterns and factories' continuous releases of air pollutants. In these circumstances, proposed that the phytomass of *Helianthus annuus* var. japonica, a member of the *Tithonia* family, showed growth, which proved to be a trustworthy photomonitor of air quality? Plants' responses to air pollution are consistent in terms of shoot phytomass, ascorbic acid and protein content.

Joshi NC noted a notable decline in *Tithonia diversifolia* phytomass while examining the air quality in various Mumbai neighborhoods. *T. diversifolia* housed at different locations exhibited this trait.