

ABSTRACT
**GROWTH RESPONSES OF PLANTS (*Bougainvillea spectabilis* Willd. and
Canna indica L.) TO AIR POLLUTION IN METRO MANILA**

Marinela Cecilia T. Pascua
University of the Philippines, 2005

Adviser: Dr. Reynaldo A. Tabbada
Reader: Dr. Lilian B. Ungson

The morphological and physiological responses of plants (*Bougainvillea spectabilis* Willd. and *Canna indica* L.) in terms of plant survival, plant height, leaf formation, expansion and injury, chlorophyll content, water content and standard biomass when grown and exposed to varying concentrations of air pollutants at five sites in Metro Manila were assessed. The levels of the following air pollutants: SO₂, NO₂ and TSP, were found within ambient standards and based on the Index of Philippine Air Quality, ranged from Good to Poor. Young *B. spectabilis* cuttings were found to be highly sensitive to air pollution as reflected by stunted growth and high mortality. The general response of plants to air pollution in terms of visible external injury includes: foliar damages such as necrosis and chlorosis, and defoliation, burning of leaf tips and twig dieback in *B. spectabilis* and abortive inflorescence in *C. indica*. Longer lateral branches of *B. spectabilis* formed while *C. indica* hardly increased in plant height and failed to produce new leaves when exposed to relatively higher pollutant concentrations. There was no apparent adverse effect of air pollution on flower initiation of *B. spectabilis* while flowering in *C. indica* was inhibited by the ambient levels of SO₂, NO₂ and TSP pollutants in heavy traffic study sites. The current levels of air pollutants in the study area were maybe below what could reduce chlorophyll levels in the leaves of both *B. spectabilis* and *C. indica* after prolonged exposure. The percentage water content and standard biomass of *B. spectabilis* cuttings in the different sites did not significantly vary and while the mean water content of *C. indica* was significantly higher in sites with elevated levels of air pollutants, plants had lower standard biomass. It is suggested that the plant injuries were manifestations of structural changes and interference in plant's metabolic processes and biochemical systems. Reduced growth was maybe mainly caused by physiological changes such as lowered net photosynthesis and altered carbon allocation that led to altered nutrient uptake, biomass production and partitioning of dry matter. Compared with *B. spectabilis*, *C. indica* is more appropriate as a bio-indicator in terms of cost effectiveness and the ease with which exposure tests can be performed. Plant height, total number of leaves, leaf area, water content and standard biomass are among plant growth parameters that can be used as valid bio-indicators of air pollution in Metro Manila.