

PLANTS AT WORK, INDOORS

Dr. Leonard Perry, Extension Professor
University of Vermont



Plants at Work is a national information program of the green industry to inform businesses and the public of the benefits of using plants indoors. Studies have shown that plants in homes and workplaces help reduce stress, increase productivity, enhance employee attitudes, lower operating costs, help in “green building” design, and improve air quality.

Studies in Texas, Washington State, and England showed that employees in environments with plants were 12 percent more productive than those not exposed to interior plants. Visual exposure to plants helped to reduce blood pressure, and to lessen stress within five minutes. Perhaps some of this arises from the reduction in office noise with the use of plants, another factor well-documented in studies. For instance, a small indoor plant hedge around a workspace can reduce noise by five decibels.

Surveys and studies have verified the positive effect of plants on employee perception and disposition. A key incentive for firms to have interior plant design and maintenance contracts is this, as well as employee retention. Plants have been shown to reduce employee absenteeism by 14 percent. It is cost effective to keep the employees happy, this asset valued at 10 times the building operating cost and 100 times the energy cost.

Plants cool by the process of “transpiration”, releasing moisture into the air. A USDA estimate is that proper use of plants could decrease air temperature in an office by as much as ten degrees. Plus, the moisture released by these plants helps maintain indoor humidity in the human comfort zone of 30 to 60 percent, and helps prevent materials such as wood from cracking when dried out.

The main effect of plants on buildings environments, however, may be on the outside. One young healthy tree, according to the International Society of Arboriculture, has a net cooling effect equivalent to ten room-size air conditioners operating 20 hours a day. Other industry statistics indicate the proper use and placement of trees can lower heating and cooling costs by up to 20 percent.

Similar to outdoor plants, indoor plants improve the perceived value of spaces in addition to the aesthetics. A study in England reinforces that indoor plants have a positive effect on perception, while costing less than most other choices for corporate décor. Clients and employees perceive interior spaces with plants as more welcoming, relaxed, and upscale.

An often cited example of the positive effect of plants on perception and value is the study of the Opryland hotel in Nashville. Its 85 percent occupancy is considerably higher than the 68 percent national average. A scientific case study found the main factor accounting for this high occupancy is the

significant investment (over \$1 million) in interior plants, in fact one of the largest investments in indoor plants in the country. This hotel has 12 acres of indoor space, containing about 18,000 indoor plants representing over 600 species.

A study over 20 years showed that interior plants can have a positive impact on “sick building syndrome.” This is the condition found in many tight, energy efficient buildings from indoor pollutants. These are the toxic chemicals from building components such as carpets, paints, and synthetic construction materials. Toxins include such compounds as xylene and benzene, with the most commonly found in EPA tests being formaldehyde at 0.173 micrograms per liter of air. Such tight buildings can be ten times more polluted than air outside or in “leaky” environments. An adequate installation of plants in sealed U.S. offices could save, by one estimate, \$258 billion.

Rooms filled with plants were shown to have 50 to 60 percent fewer molds and bacteria in the air than in rooms where no plants were present. These, and toxins, both are absorbed in the soil, and into plant leaves. Toxins may be translocated down into the root and used there as plant food, or destroyed through a process called “metabolic breakdown” as shown in a study by German scientists.

Plants grown in potting soil have been rated for their relative removal rate of toxins, such as formaldehyde. For this compound, Boston fern can remove 1863 micrograms per hour, bamboo palm 1350, Janet Craig dracaena 1328, English ivy 1120, peace lily 939, areca palm and corn plant 938 for examples. All the details of how plants clean such air, and how to use them for this, are in the paperback book by the researcher B.C. Wolverton.

In another fascinating study by a university professor Tove Fjeld in Oslo, Norway, plants were shown to improve employee health in offices, schools and hospitals. Plants were included or not in offices during various periods for employees. When plants were present, ailments such as fatigue, headache, sore throat, coughs, and dry skin were all reduced. The mean reduction of 12 ailments with plants present, compared to without, was 23 percent.

U.S. researchers Fisk and Rosenfeld of the Berkeley National Laboratory have quantified this into a \$58 billion annual savings from sick-building illness with the use of plants, 40 percent of all sick days related to poor indoor air quality in their study. In addition, they estimate an additional \$200 billion could be saved using plants indoors from improvements in worker performance.

You don't have to think big to benefit from the use of plants indoors. A Scottish brewer is an example of a firm that uses plants indoors extensively, including planters on top of filing cabinets to divide space, reduce noise, and to improve employee health and satisfaction. For office workers, just having a plant on the desk can improve the six to eight cubic feet of “personal breathing zone” where most the day is spent. Author Jay Naar suggests 15 to 20 plants can clean the air in a 1,500 square foot area.

<http://www.uvm.edu/pss/ppp/articles/plantswork.html>