

Chapter THIRTEEN

AIR



A carbon filter and ozone exchange box dominate the landscape in this Dutch grow room.

Introduction

Fresh air is essential in all gardens. Indoors, it could be the difference between success and failure. Outdoor air is abundant and packed with carbon dioxide (CO₂) necessary for plant



Monitor temperature and humidity regularly. The 86°F (33°C) 34 percent relative humidity conditions make plants use more water and less fertilizer. Adjust irrigation schedule to meet needs.



Smoke is immediately sucked out of the room when using this in-line fan. The fan demonstration took place at the 2000 CannaBusiness trade show in Germany.

life. For example, the level of CO₂ in the air over a field of rapidly growing cannabis could be only a third of normal on a very still day. Wind blows in fresh CO₂-rich air. Rain washes air and plants of dust and pollutants. The outdoor environment is often harsh and unpredictable, but there is always fresh air. Indoor gardens must be meticulously controlled to replicate the outdoor atmosphere.

Carbon dioxide and oxygen provide basic building blocks for plant life. Oxygen is used for respiration—burning carbohydrates and other foods to provide energy. Carbon dioxide must be present during photosynthesis. Without CO₂ a plant will die. Carbon dioxide combines light energy with water to produce sugars. These sugars fuel the growth and metabolism of the plant. With reduced levels of CO₂, growth slows to a crawl. Except during darkness, a plant releases more oxygen than is used and uses much more carbon dioxide than it releases.

Roots use air, too. Oxygen must be present along with water and nutrients for the roots to be able to absorb nutrients. Compacted, water-saturated soil leaves roots little or no air, and nutrient uptake stalls.

Air Movement

Air ventilation and circulation are essential to a healthy indoor harvest. Indoors, fresh air is one of the most overlooked factors contributing to a



At least one good circulation fan and an extraction fan are necessary in grow rooms. The extraction fan in this grow room is attached to a carbon filter.

healthy garden and a bountiful harvest. Fresh air is the least expensive essential component required to produce a bumper crop. Experienced growers understand the importance of fresh air and take the time to set up an adequate ventilation system. Three factors affect air movement: stomata, ventilation, and circulation.

Stomata

Stomata are microscopic pores on leaf undersides that are similar to an animal's nostrils. Animals regulate the amount of oxygen inhaled and carbon dioxide and other elements exhaled through the nostrils via the lungs. In cannabis, oxygen and carbon dioxide flows are regulated by the stomata. The larger the plant, the more stomata it has to take in carbon dioxide and release oxygen. The greater the volume of plants, the more fresh CO₂-rich air they will need to grow quickly. Dirty, clogged stomata do not work properly and restrict airflow. Stomata are easily clogged by dirt from polluted air and sprays that leave filmy residues. Keep foliage clean. To avoid clogging stomata, spray foliage with tepid water a day or two after spraying with pesticides, fungicides or nutrient solution.

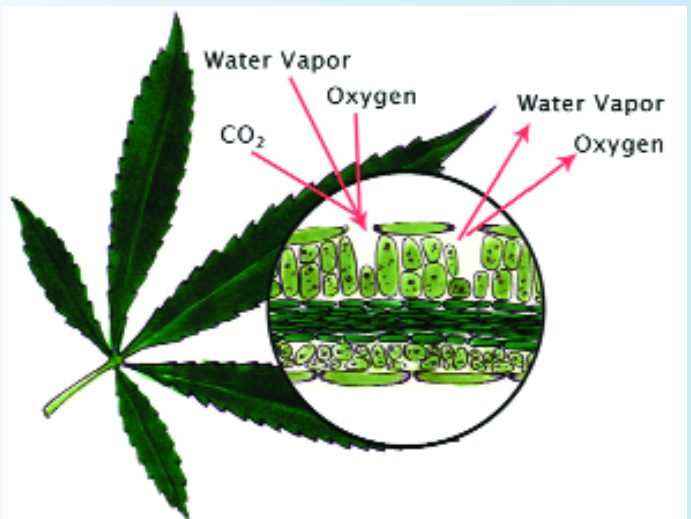


This photo of a half-opened stomata, the mouth-like opening on leaf underside, was magnified 2500 times.

opening a door or window and/or installing an oscillating circulation fan. Air circulation also helps prevent harmful pest and fungus attacks. Omnipresent mold spores do not land and grow as readily when air is stirred by a fan. Insects and spider mites find it difficult to live in an environment that is constantly bombarded by air currents.

Circulation

Plants use all CO₂ around the leaf within a few minutes. When no new CO₂-rich air replaces the used CO₂-depleted air, a dead air zone forms around the leaf. This stifles stomata and virtually stops growth. If it is not actively moved, the air around leaves stratifies. Warm air stays near the ceiling, and cool air settles near the floor. Air circulation breaks up these air masses, mixing them together. Avoid these would-be problems by



Microscopic stomata located on leaf undersides must remain clean and un-stifled by humidity to promote rapid growth.



Hot air flows upward naturally. Always design grow rooms and greenhouses to take advantage of this principle.



This garden has several circulation fans to move air between dense, resinous buds.



Floor-mounted oscillating fans stir the air in this room 24 hours a day.



CO₂ around leaves is used quickly and must be replaced every few minutes.



Place circulation fans far enough away from plants to prevent too much airflow on any one portion of the garden.



Here is an example of a heavy-duty extractor fan from a Dutch grow room.