

# Aviary Ventilation

by Steven P. Hartman, Sunbury, OH

Ventilation is often the first portion of the environmental controls to have its carrying capacity exceeded. For me this one area is responsible for more aspects of the environment than any other. Ventilators do more than just ventilate. I have at least four objectives in mind when designing a ventilation program. Controlled air movement can help to regulate air quality (content), humidity, temperature and to bring in odors from the outside.

Stagnant and uncirculated air acquires additional gasses and dirt not found in clean air from the outside. Toxic gasses accumulate from many sources. By-products of the birds' respiration, drains, radiation from the ground, feces, bird dust, decaying food, bacteria and fungi that grow on all surfaces, and by-products of electrical appliances like lights, fans and water heaters can contribute to poor air quality. When left in the birds' environment these toxins can directly and/or indirectly cause health problems, lower production and increase maintenance time.

Just as we need water to survive, so do bacteria and fungus. By controlling the humidity level in the aviary we can keep the growth of these organisms to an acceptable level. A good ventilation system will exchange the air from every corner of the room. If high moisture levels are allowed to occur in corners and under cages, fungi and bacteria will grow to unacceptable levels and problems will eventually occur.

Moving air generally creates a cooler feeling. As summer time heat is removed from the aviary a cool breeze can be generated to make the birds feel more comfortable. Generally the birds are perching near the top of the room. This area is where the heat will collect in a room not properly ventilated. Periodically the temperature of the

room should be taken at the floor, half way up the wall and at the ceiling. If the temperature varies by more than 10 degrees in the summer it may indicate inadequate air movement in the room.

Many of the factors causing my birds to begin the reproduction process are a mystery to me. Since parrots in the wild tend to breed at the onset of the rainy season, I like to bring in fresh odor of air ionized by the early spring lightening. Many gasses are also given off by the ground as the winter thaw allows rejuvenated soil to begin the new season. Just as these smells cause us to take a deep breath of spring air, I sense a jubilation in the early morning raucous activity of my birds.

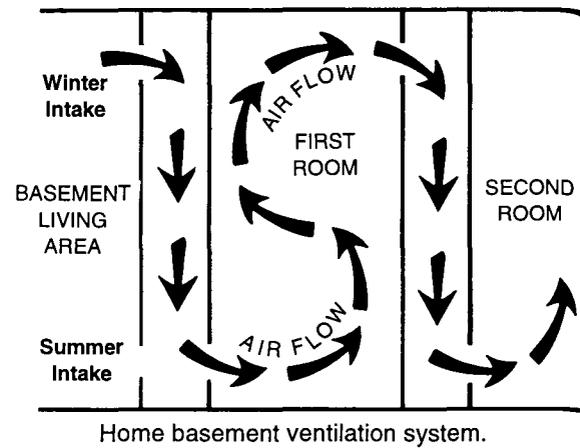
All of these factors are taken into account in determining the rate air is exchanged in each room. Because we have three different facilities we have different programs tailored to each situation.

## Home Basement Ventilation System

Just as most aviculturalists, we have birds living in the house. In the house there is a ventilator fan operating continuously year round. This is done primarily to create a vacuum in the bird area to keep any air or dust from getting into the living area. There are additional blowers that will increase the rate of exchange as needed during the year.

The foundation of my home aviary ventilation system is an exhaust fan that operates 24 hours a day, year round. All birds in my home are living in three rooms that occupy  $\frac{1}{2}$  of the basement. The main exhaust blower is mounted on a wall that adjoins my garage. All exhausted air from the basement is deposited into the garage. An additional fan is located at the point where household air enters into the bird area. This blower operates on a timer as needed and pushes additional household air into the bird area increasing the efficiency of the main blower unit.

An advantage to exhausting air into the garage is a well ventilated and heated garage in the winter. Often I here of an aversion to exhausting air



that one has paid to heat or cool to the outside. The reality is that this ventilation program is very cost effective. Often this heated and cooled air is continuously lost at a similar rate though open doors and cracks in the house. This ventilation system creates a low pressure zone in the bird area. Household air is then drawn to this area and results in very little air loss though cracks and open doors.

Since air is drawn from the living quarters into the bird area there will be a great reduction of bird dust, dander and odor in the living quarters.

At the air's point of entry into the bird area there are two air intake vents, one near the ceiling and one near the floor. During warmer months, cooler air is allowed to enter from the lower floor vent and in the winter we utilize the warm air by the ceiling.

Air circulation from one room to the next is increased by drawing warm air from the ceiling into a vent by the ceiling, pulling it down though the wall and exhausting it though a vent onto the floor of the next room. This warmer air will then pick up humid air (dry the feces and dropped food) and rise to the ceiling before being drawn into the exhaust vent at the ceiling of the far wall.

## Building 2 Ventilation System.

Even when heating in the winter, the air exchangers are removing and replacing air in the building. The exception is that in the winter the air exchangers turn off during the last half of the night and also in the summer during the hottest part of the afternoon. This is done to keep the building from getting too cold or too hot.

The best system I have developed is in this newest building. Each zone has a ceiling fan in the center of the room that is left on continuously. These fans have three speeds and are increased as the temperature rises in the summer. The ceiling fans insure the circulation of air to every nook and cranny of the rooms. The faster summer speed also creates a slight breeze.

Our free standing buildings are all masonry. The heat sink properties of masonry work well to help moderate the environmental temperature. This goes a long way to reduce the stress on the other factors ventilation is responsible for. Centrally placed ceiling fans in each zone continuously move the air around the room. In the attic, in the center of the building, there is a central vacuum system that pulls air from each room and exhausts it to the outside above the center of the roof. Along the ceiling at the end of each room there is an exhaust pipe with small holes in it that cause the air to be removed from along the entire end of the room rather than one location. On the opposite end of the room is another long pipe that allows the fresh air entering to be distributed along the length of the wall. This system eliminates the drafty and uneven situation encountered with systems that have small entry and exit vents.

By having our exhaust fan on the roof in the center of the building and our intakes low on the ends of the buildings, there is less risk of air exhausted from one zone contaminating another through its fresh air intake.

Multiple fans in the vacuum chamber allow the building to be set for different continuous flow rates on a seasonal basis. We use two blowers of different sizes. One blower can move 250 cubic feet of air per minute (cfm) and the other can move up to 320 cfm. By turning on one or both of the fans we can change the exchange rate from 250 to 320 and up to 570 cfm. This means that our maximum exchange rate is about once every half hour.

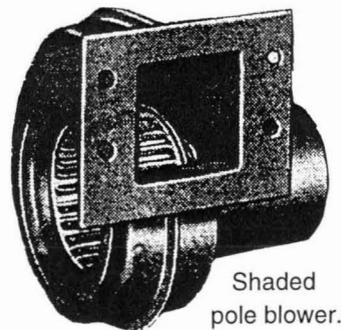
### General Principles

Depending upon time of year, climate and individual circumstances, the ventilation requirements of each aviary will vary. Each aviculturist has to deter-

mine what are acceptable parameters of air quality for their aviaries and attempt to achieve these parameters through a scheduled ventilation program. I try to have some air moving in all zones continuously all year. Each of our 10 zones have different requirements and we usually have three to five different programs at any one time.

There are a few common sense dos and don'ts when it comes to timing your ventilation program. Ventilators make noise and create air movement when they come on. I usually try to set the system to turn on when the birds are active so they are less likely to notice. I never turn them on at night. In the winter when you will be exchanging for the least amount of the day, you can take advantage of the warmer afternoons and pull in slightly warmer air. This will save on heating and be less likely to chill the birds. Conversely, in the summer cool air can be pulled in at night while avoiding drawing in hot air in the afternoon.

All blower units we use are of the squirrel cage variety and are rated for continuous duty. This type of blower can be dampered down without causing a drag on the motor. Fans with blades generally need to have a free flowing supply of air. Lack of free flowing air will stress the motor and create a hazard. A fan with blades in a room without adequate air intake would soon burn out. These type fans also often have motors not adequately protected from bird dust. Since the air blows past the motors on this type they tend not to last as long.



Good quality blower units, also known as shaded pole blowers, can be purchased for \$35 to \$75 at any commercial equipment supply outlet.

Your closest Grainger outlet can be found by calling 1-800-2255994. Also, inexpensive bathroom vent fans are useful in many situations. The vent pipe we use is the same pipe used in drainage systems around your house. It is white, 4 in. in diameter and can be purchased at any builder supply dealer.

The timers I use for programming my ventilation program are the small inexpensive lamp and air conditioner timers. These timers are not always accurate and should be checked periodically to make sure they are on time and actually turning on and off.

### Air Cleaners and Purifiers

Air cleaning and air purifying programs rarely equal or have much to do with ventilation or good air quality. It might be easier to think of the air in a room as being used up and requiring to be replaced to continually with a new supply air of consistent high quality. Most air cleaners remove particles from the air but do not readjust the levels of all the different gasses. In addition to this problem, most filters clog soon after being turned on and the reduced air flow significantly reduces the efficiency of the unit. Ionizers are usually slightly better. They function by charging solid particles in air and causing them to stick to surfaces. No longer are they airborne but they are still in the environment. Ionizers also often produce excessive amounts of caustic ozone as a by product.

There is a unique form of ionizer that I can recommend as a component of a good ventilation and air cleaning system. This system acts as a dirt magnet. There is no filter but has a solid surface that the dirt particles are attracted to. This solid surface can be cleaned by wiping with a cloth. A significant amount of pollutants can accumulate on this surface before there is a reduction in efficiency. As an added benefit, the ionization of the air may be a breeding stimulus for the birds.

Good quality air control programs can increase the comfort of your wards while decreasing the manpower necessary to maintain your aviary.

Vigilance and record keeping of your program will allow you, with time, to create the program tailored to your specific needs. Good luck! ➤