UNVENTED KEROSENE HEATERS – OK FOR GREENHOUSES??

A new breed of kerosene heaters—from Japan—came on the market about two years ago. They have become a "hot" sales item. Many homeowners use this type of heater to supplement their regular heating equipment.

The fuel used in these heaters is referred to as "clean" or "white" or "pure" kerosene. As the use of these heaters has increased, so has the cost of the kerosene. In many cases, it is more expensive than regular fuel oil used in the home.

However, they are convenient, portable and economical to use. Directions included with these units point out certain safety requirements. In addition to using only clean kerosene, the manufacturers stress "use only in well-ventilated rooms." Provide ventilation of at least 40 sq. in. for each 10,000 BTU of rating.

Several growers have called about using a heater of this type in a greenhouse. They are certainly NOT something to be considered for a greenhouse of any size. Number one—it would take too many as they don't provide many BTU's. A small hobby greenhouse owner might consider using a heater of this type—BUT we'd like to share some observations, pros and cons concerning this type of heater in a greenhouse.

PRO—By-products of the burning of the kerosene will be water vapor and carbon dioxide. At one time a number of rose, carnation and other growers used an open flame kerosene CO_2 generator heater to supply CO_2 in the greenhouse. Some heat was given off, but the prime use was for carbon dioxide—increased plant growth and yield was their aim.

CON—Unless an outside source of oxygen is maintained, you can exhaust the O_2 in the greenhouse. If all the O_2 is removed, the flame will be extinguished, there would be no heat and the greenhouse crop would be lost. We still remember one grower who put in propane heaters and decided not to vent them outside—he wanted all the CO_2 for his plants. The heaters clicked on and off over a period of time, then eventually went out—no oxygen.

Ethylene gas injury is seen frequently in houses that are not vented properly. This type of plant injury is seen frequently in plastic houses during the heating season—the reason—no outside air exchange.

Carbon monoxide can be another problem, especially if someone enters or works in a small or hobby greenhouse heated with this type of unvented kerosene heater. Carbon monoxide is colorless and odorless.

A sooty or oily deposit has been noticed on the inside of windows of homes where these heaters are used. During the winter—low light intensity months—all available light is needed for plants to grow normally. Plants grown in low light conditions tend to stretch.

Plant injury (ethylene and sulfur dioxide) has been seen in greenhouses heated by "jet-type" kerosene heaters —not vented. A good general rule—vent all heaters.

Commercially, growers frequently have "salamander" heaters (used by construction workers to heat unfinished buildings or by orchard owners to prevent fruit from freezing). Greenhouse owners use this type of heat for emergency heat—but they keep the top ventilator cracked several inches. The reason—supply oxygen and to minimize any possible damage to plants from fumes.

We talked with the customer relations department of one of the firms selling these heaters. They pointed out that their heaters burned with 99% efficiency. However, they were quick to point out that sulphur in the kerosene might present problems. A white deposit would be seen on the surface of walls, etc. (Note: Sulphur is an old-time remedy to control mildew on plants. There are more efficient ways of using sulphur than relying on what comes from the kerosene heaters.)

Kerosene heaters of this type do not have any thermostat to regulate the amount of heat that is being released. Because of this fact, the representative of the firm that we spoke to suggested that kerosene heaters sold by them should NOT be used in greenhouses.

SUMMING IT UP—*Our recommendation—DO NOT USE the unvented kerosene heater in a greenhouse.* We know that some folks are using this type of heater, even in small plastic structures, but we feel the "cons" are apt to catch up with the plants or even the owner.

More On Kerosene Heaters

Several articles appeared in local newspapers with these headlines: Kerosene brands not exactly pure . . . Kerosene brands are not all alike. The problem is that kerosene might have a high sulfur content.

The kerosene specified for flueless kerosene heaters is 1-K. This kerosene will be 99.5% clean burning. Grade 1-K kerosene is allowed a maximum sulfur content of 0.04 weight percent.

Unfortunately, it is very difficult to find 1-K kerosene available for sale. 1-K is costly, probably twice as much per gallon to buy as standard kerosene. Kerosene should be hauled in clean or purged tank trucks; otherwise, it will be contaminated with fuel oil or other impurities. Kerosene refiners would have to sell 1-K in 1-gal. containers, not pumped, to make sure it remained pure.

The second grade of kerosene is 2-K. This is what is offered for sale by the majority of dealers. The sulfur content of this plain, standard kerosene is considerably higher than 1-K.

Sulfur dioxide, a by-product of burning 2-K kerosene, is a possibility. This air pollutant causes a bleaching or leaf burning effect on plant foliage. The tissue between the veins is injured and this damage is often more prominent towards the petiole. Fully expanded leaves are the most sensitive to this type of sulfur dioxide injury.

Dr. O. W. Davidson, retired professor of floriculture, Rutgers Univ., shared with us some additional information concerning kerosene heaters. Dr. Davidson said that he thought that an unvented kerosene space heater could be used in a hobby greenhouse—with a small amount of ventilation.

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Unvented Heaters (continued)

A news release from EXXON was passed on to me by Dr. Davidson. A summary of this news item follows:

The American Society for Testing & Materials (ASTM) has defined the standards for two grades of kerosene: Grade 1-K—a low-sulfur kerosene, with a maximum sulfur content of 0.04 weight percent, intended for use in flueless burner appliances; & Grade 2-K—a regular-grade kerosene with a maximum sulfur content of 0.3 weight percent, intended for use in flue-connected appliances.

The EXXON Company of the USA pointed out that 2-K kerosene should *not* be used in flueless space heaters. Such use will result in excessive production of noxious and odorous sulfur dioxide emission. Because of the flueless design of the heater, these emissions are retained in the room and could build up to harmful levels.

EXXON kerosene is intended as a 2-K type fuel, and therefore is not suitable for use in flueless space heaters.

Persons using these unvented kerosene heaters should check with their supplier as to the type of kerosene being sold. *Larry Newbold,* Cape May County Agr. Agent, told us that no one in the state of N.J. is checking to see if 1-K or 2-K is being sold for use in unvented space heaters. "Clean as water" kerosene can still be high in sulfur. So it is another case of let the consumer beware!

James K. Rathmell Jr.

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New Penn State Geranium Manual

The 410-page book, published in November 1982, is available from Pennsylvania Flower Growers, 102 Tyson Building, University Park, PA 16802. Cost is $15.00 postpaid.

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