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Common Biotic and Abiotic Stress Affecting Indoor Plants and their Management

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Environmental air quality and a toxic material produced by household activities both influence the quality of the air within buildings. Nearly two million people die from indoor air pollution each year in developing nations, which is the main cause of sick building syndrome, asthma, lung cancer, and chronic obstructive pulmonary disease (COPD). The use of indoor plants is one of the intriguing study areas for solving the issue of indoor air pollution. Plants improve worker productivity and lowers physical discomforts while cutting down on dust emissions by up to 20% (Ramzan *et al.*, 2007). Although the process of plants purifying the air is not well established, trends in plant choices for homes generally focus on aesthetics, toughness, and low maintenance requirements. The majority of the chosen indoor plant species are broadleaf types. Broadleaf plants, on the other hand, are a result of environmental adaptation. Stomatal pores on the leaves are reduced as a result of adaptation, which causes pollutants to become more adhered to the leaves rather than being absorbed (Brilli et al., 2018). According to research conducted by the National Aeronautics and Space Administration (NASA), indoor plants can serve as natural water filters that remove VOCs like benzene, formaldehyde, and trichloroethylene (Seguel et al., 2016). According to Klepeis et al. (2001), two plants should be kept in every 100 square feet (9.3 m2) of space. However, because indoor plants are so sensitive to a variety of abiotic and biotic stimuli, they can be rather challenging to maintain. Furthermore, using chemical pesticides on indoor plants poses a direct risk to human health. So it takes a lot of care and protection to keep a healthy indoor plant. In this article, we've covered the symptoms of typical biotic and abiotic stress as well as how to avoid them.

1. Bacterial leaf spot

Symptoms: Yellow borders surrounding leaf lesions, tiny blister-like patches that run together, or places where the center pops out are possible symptoms. The tissues that have collapsed are typically mushy and soft, and they smell bad. Lesions are frequently seen in between the veins on leaves; they can also be confined within them and have an angular or V-shaped appearance. These diseases frequently result in leaf drop.

Management: Spotted leaves can be separated and disposed of individually. To ensure that leaf surfaces dry fast, leaves should be kept dry and aered early in the day. The likelihood of infection will be reduced with increased air circulation. In order to assist reduce moisture, space plants such that air may circulate between them.

2. Fungal leaf spot

Symptoms: Frequently consist of several roughly round tan, reddish brown, or black spots or lesions that may group together to form enormous, irregularly shaped lesions that cause the leaf to become completely blighted. The growing point of the plant may be destroyed if the

leaf spots target the youngest leaves closest to the top. Leaf spots may expand and spread out onto stems and branches. Severe infections frequently result in widespread dieback and leaf drop.

Management: Spotted leaves can be removed and disposed of individually. To ensure that leaf surfaces dry fast, leaves should be kept dry and aered early in the day. The likelihood of infection will be reduced with increased air circulation. In order to assist reduce moisture, space plants such that air may circulate between them. Though most home settings should benefit from the removal of sick plant parts and the modification of environmental conditions to drier conditions, registered fungicides designated for houseplants can be utilized.

3. Root rot

Symptoms: Include soft, black roots of the plant, which may eventually cause the plant to wilt and die.

Management: Its is advisable to water less as overwatering is the main cause of root rot. It's crucial to water the plant just when the soil feels dry to the touch for the majority of kinds. If the root rot is severe, the affected roots should be removed and repot the plant in a new pot with fresh potting mix. Maintain plants robustness with nutrient-rich soil and fertilizer, and thoroughly keep cleaning your tools (such an Exacto knife) before trimming. If you're determined to try, start by removing any afflicted parts of the plant that you can see. Next, apply fungicide, and repot the plant in a new, clean container and entirely new soil. Otherwise, the rot residing in the old soil and pot will simply transfer over!

4. Viruses ifection

Symptoms: Typically, plant viruses cause yellowing of the leaves. Blotches and stripes are the most common appearance for this; occasionally, aberrant flowers and fruits, growth retardation, and distortion (misshapen fruits and leaves) may also occur. However, viral symptoms in plants are not usually obvious. Usually, insects such as whiteflies, aphids, thrips, hoppers, and mites are the carriers.

Management: Control of viral diseases requires routine pest control. Quarantining infected plants is recommended because they are very tough to treat. It is best to isolate or discard infected plants rather than mulching or composting them. Plant viruses are extremely difficult to eradicate, thus protection is crucial now more than ever. While pruning your plants, sterilize your instruments and use pesticides after pruning. Plant types that are resistant to viruses are another option.

Most common abiotic stresses for indoor plants

Leaf yellowing might indicate underwatering as well as overwatering. Overwatered leaves are mushy and wet, whereas underwatered leaves are dry and crisp. A plant may be suffering from a lack of sunlight if its bottom leaves are becoming brown or yellow. This is usually the case when the plant's side facing away from the closest light source experiences the most of the leaf yellowing. in such cases, we need to move the plant to a well-lit south-facing window and rotate it frequently to make sure all sides receive enough sunshine to address this problem. If the plant shows up brown tips only it indicates that it needs more humidity. The plants need to be more frequently mists or run a humidifier close by. Another indication that your plant needs more sunshine is if it is withering away from its blossoms and leaves. For example, when plants are brought indoors for the winter after spending the entire summer soaking up the abundant outdoor light, leaf drop sometimes occurs. Moving your plants can also shock them into dropping their flowers and leaves. If you suspect this might be the cause, give your plant time to settle into its new environment before troubleshooting further. Again, plants are creatures of habit, so repotting a plant can sometimes bring on transplant shock and inspire the dropping of leaves. To prevent transplant shock, thoroughly water your

plant after repotting it, and be careful not to disturb its root system too much. Also, apply micronutrients to prevent nutrient deficiency symptoms.

Conclusion

The field of indoor landscaping is developing rapidly. It contributes to the design and installation of living inside landscapes, mostly for homes, workplaces, lobbies, and corporate areas. Indoor plants can help modern homes and buildings have a more aesthetically pleasant and functional atmosphere. Indoor farms need to overcome several knowledge- and money-related obstacles in order to succeed. When indoor plants aren't given the proper nutrition, they show signs of several diseases. A fungal infection is the primary cause of the majority of plant illnesses. However, bacteria and viruses are the main causes of serious plant illnesses in indoor plants.

Plant disease identification must now be done promptly and accurately for making its management simpler. If issues do emerge, begin by learning what that specific species need in terms of temperature, humidity, light, soil, water, and fertilizer. If these surroundings are not optimal, they need to be adjusted, or the houseplant needs to be relocated to an optimal spot.

Again many issues arise from a combination of elements that work together to make a plant unhealthy or unsightly rather than from a single source. To tackle a problem, always search for multiple potential contributing factors and address each one separately. It's critical to determine the main problem as well. Certain issues have several causes, and even though you can resolve the issue at hand, it will recur if the underlying cause is not resolved. Treating the pest or finding a solution to the issue will often be challenging. Sometimes it is impractical to restore a plant's health once a problem has been identified; it can be too late to address the issue, and there might not be access to efficient pest management. In these situations, it could be wiser to get a new plant and dump the old one. When growing plants indoors, hygiene is crucial. A plant disease will undoubtedly spread swiftly in a small area that is densely populated with plants. This is particularly true for hydroponic systems since water facilitates the easy transfer of viruses from plant to plant. In indoor growing systems, either the contaminated substrate or the diseased planting material is the primary source of disease. Purchasing planting supplies such as cuttings, seeds, and other materials from a reputable supplier is crucial. It's also important to utilize healthy, strong plants and sterile tools.

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