SOURCES AND AVOIDANCE OF LEGIONNAIRES DISEASE
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Margaret Burchett, Jane Tarran & Fraser Torpy
Plants and Indoor Air Quality Group
Faculty of Science, University of Technology, Sydney, PO Box 123, Broadway, NSW 2007

IN SUMMARY
Question: **Can drainage water in receptacles under pot-plants in an office building cause Legionnaires disease?**
Answer**: In practical terms, it is highly improbable, for reasons outlined below.**

CAUSES OF LEGIONNAIRES DISEASE
This disease is classed as a type of pneumonia, caused by bacteria of the *Legionella* family (Fam. Legionellaceae) (see NSW Health *Factsheet - Legionnaires Disease*[1]). The disease involves fever, coughs, muscle pain, headaches, fatigue and diarrhoea, and can sometimes be fatal[1,4]. A large number of species or strains (ie clusters of similar types that may be different varieties or species) of the genus *Legionella* have been identified (eg, nearly 50 in a study in Japan[2], nearly 60 from a NSW study[3]).

Two main species of *Legionella* have been found in patients with Legionnaires disease. Of these, *L. pneumophila* is found naturally in freshwater habitats[4]. This bacterium reproduces inside the single-celled animal, *Amoeba*, but can do so in human lung cells as well. The second species, *L. longbeachae*, lives in soils, and hence is also found in potting mixes. Its reproductive life history is not as well worked out as for the other species, so we are not so sure how it reproduces in human lungs[5]. Both species occur in only low numbers in its natural habitats[4].
This disease can be contracted only by breathing in air which contains an aerosol of the **Legionella** ***bacteria.*** An *aerosol* is any dispersion of tiny particles of liquid or solid that are suspended in air.
The disease is not transmissible from human to human[1]. In addition, predisposing factors are very important in determining who might succumb to the disease following exposure to the bacteria, eg people with pre-existing illness, smokers, or the elderly.

SOURCES OF THE DISEASE
Overseas, *L. pneumophila* has been the species responsible for virtually all reported outbreaks of the disease[3,4]. This species can multiply in water sources of buildings, particularly where the water is warmed. For effective bacterial growth, the optimum proliferation temperature range is 38-49^{o}C. Sources include water-towers, air-conditioning coolers, whirlpools, saunas or spas[3].

In Australia, both species have been found to cause the disease[1,3]. *L. pneumophila* has been found in outbreaks from water-based aerosols from buildings. *L. longbeachae*, has been implicated in plant-handling cases, such as where someone has been bending over and opening new potting mix bags under warm, confined circumstances, in the garden or greenhouse.

It has been pointed out for both *Legionalla* species that the bigger the potential source, the more likely it is that these bacteria can cause problems[4] – eg the bigger the hotel, its water reticulation systems and guest recreational bathing facilities; or the bigger the pile of enclosed potting-mix.

An epidemiological study published this year by researchers in the Department of Health of South Australia[6] has again found that it is not only exposure while handling potting mix that is implicated in

the onset of illness. Their analysis of 25 confirmed cases, and 75 matched controls, indicated that: 'Better predictors of [the] illness…included poor hand-washing practices after gardening [and] long-term smoking…'. Without clean hands, the bacteria can be also ingested with food. The authors also found that 'being near dripping hanging flower-pots' could also be involved - ie, again, where an aerosol might be created by the continuous splashing of water. The NSW Health *Factsheet*[1] contains guidelines for avoiding the disease from handling potting mixes.

CAN DRAINAGE WATER IN OFFICE PLANT-POT RECEPTACLES CAUSE THE DISEASE?

There has never been a case reported arising from this source. This is not surprising, since, from the information above, it is evident that it would be very unlikely that any drainage water collected in pot-receptacles could be a cause of the disease. The preconditions for its doing so are absent. Normal environmental conditions for pot-plants in an office building include:

- Only a very small volume of drainage water per pot-receptacle
- Average office temperatures are commonly in the 19-25^{o}C range, and are highly unlikely to rise above 38^{o}C
- The receptacle-water not being in a position to form an aerosol (by spraying, splashing, or 'puffing' as from a new bag of potting mix)

The only potential future exception to these conditions would be if hanging plants were installed with dripping baskets beneath. But this would hardly be an attractive or popular planting regime in an office building or, indeed, any other indoor setting.

In conclusion, it has to be reiterated that good horticultural hygiene and plant husbandry are expected of the interior plantscape industry, and should never include the use of drainage receptacles that leak, or any overhead plant arrangement from which drainage drips into the air can occur so an aerosol could be created (as well as a wet mess below). Good management practice minimises all EH&S risks for the professional providing service and the client alike.

References

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