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A Native Plant Offers Hope for Cleaner Water

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Synopsis

Freshwater ecosystems around the world are under increasing pressure from pollution, climate change, and urban development. Finding affordable and environmentally friendly ways to treat polluted water is more important than ever. A recent study has turned to nature for help; specifically, to *Limnocharis flava* (yellow velvetleaf), a common aquatic plant native to Malaysia

We tested this plant's natural ability to clean water by placing it in samples from a detention pond at Politeknik Sultan Idris Shah. Over the course of nine days, *Limnocharis flava* caused changes in key water quality indicators, including chemical oxygen demand (COD), turbidity, pH, total suspended solids (TSS), and dissolved oxygen (DO).

The results were promising. *Limnocharis flava* noticeably improved water quality, showing that this humble plant could be a powerful ally in low-cost, sustainable water treatment efforts; especially in tropical regions where it already thrives. Interesting results, indeed. Let's dwell further!

Challenges in Urban Water Quality and Nature-Based Solutions

Freshwater pollution is becoming an increasingly urgent issue around the world. As cities expand and populations grow, so does the pressure on our water resources. Rainwater that flows over streets and neighborhoods often picks up oil, dirt, and trash along the way. This polluted runoff ends up in rivers, lakes, and ponds, harming ecosystems and reducing water quality.

To help manage this situation, many urban areas use detention ponds, which are artificial basins designed to temporarily hold stormwater and prevent flooding. But these ponds do more than just store water. They also act like natural filters, letting heavier particles settle to the bottom and giving pollutants time to break down.

However, there's a catch. In many institutional areas, like universities or housing complexes, detention ponds also receive greywater from kitchens, bathrooms, and laundry rooms. This water contains a mix of organic material, soap, food waste, and other pollutants. Over time, it can make the ponds murky, smelly, and less safe, especially when they're used for educational or recreational purposes.

While high-tech treatment options do exist, they're often expensive and energy-intensive. That's why we are trying to find low-cost, environmentally friendly alternatives, especially those that work with, rather than against, nature.

One such method gaining attention is phytoremediation, i.e., a natural process where plants help clean water. Some aquatic plants are especially good at soaking up harmful substances, breaking down pollutants, or trapping particles in their roots. This approach not only improves water quality but also supports biodiversity and makes water bodies look more attractive.

A standout candidate in this field is *Limnocharis flava* (yellow velvetleaf), a tropical aquatic plant commonly found in Malaysian wetlands. The plant thrives in slow-moving or stagnant water and can survive in polluted environments. Scientists have discovered that *Limnocharis flava* is particularly good at removing heavy metals and suspended solids from the water. Plus, its bright green leaves add beauty to the landscape.

We explored how *Limnocharis flava* can be used to improve water quality in a detention pond that

receives greywater. By monitoring key indicators like chemical oxygen demand (COD), turbidity, total suspended solids (TSS), pH, and dissolved oxygen (DO), we hoped to show that this humble wetland plant could be a powerful ally in our quest for cleaner urban water.

A Native Plant with Big Potential for Cleaner Water

The presence of *Limnocharis flava* made a noticeable difference in water quality. Our tests showed clear improvements across the board with significant reductions in total suspended solids (TSS), chemical oxygen demand (COD), and turbidity. At the same time, key indicators like dissolved oxygen (DO) and pH levels stayed within healthy, environmentally acceptable ranges. These results confirmed what earlier research has suggested: this native aquatic plant is a powerful natural tool for cleaning up polluted water.

But the benefits of *Limnocharis flava* go beyond water purification. Its use supports broader goals like ecosystem restoration, biodiversity conservation, and climate resilience. Because it's a native species, it fits easily into local ecosystems and doesn't require costly upkeep or chemicals, making it an ideal, low-cost, eco-friendly solution for managing urban water pollution. By helping restore healthy aquatic habitats, *Limnocharis flava* also strengthens essential ecosystem services that are increasingly under threat from urban development and climate change.

Future Directions: Greener Cities Through Native Plants

This small-scale study shows big promise. *Limnocharis flava* could become an important ally in designing cleaner, greener urban water systems. But there's still much to explore. Future research should look at how the plant performs across seasons, how densely it should be planted, and how to apply it at larger scales, such as in wetlands, stormwater ponds, or even household greywater systems.

There's also an opportunity to bring beauty and function together. Integrating native aquatic plants like *Limnocharis flava* into urban landscapes can improve water quality while also creating visually appealing green spaces. For engineers, urban planners, and policymakers, it's a reminder that nature-based solutions aren't just effective, they're also sustainable, affordable, and community-friendly.

Looking forward, researchers are encouraged to investigate other native plant species with similar abilities. By expanding the phytoremediation toolkit, we can better protect our waterways; one plant at a time.

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Short Author's Biography

Tuan Noor Rafidah is a senior lecturer in Civil Engineering at Politeknik Sultan Idris Shah, Malaysia, with over 17 years of experience in environmental pollution control, highway and traffic engineering, and pavement engineering. An award-winning researcher and educator, her work focuses on green infrastructure, bioremediation, and innovative use of alternative materials in civil engineering.