


Driven by innovation, delivered by BT



# 1203

## Buildings Using Tree Bark

Results for Polythene:

Material	Temp	Color
Control	20°C	White
Sample	20°C	Yellow


Results for Control:

Evaluation of results:

# Scoil Mhuire Community School, Kildare

## Examining plant selection to improve the biodiversity of reed beds/integrated constructed wetlands to attract pollinators.

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# 1202

**An ICW is an Integrated Constructed Wetland, which is an artificial or manmade wetland**

The aim of my project was to investigate how Integrated Constructed Wetlands (ICW) are used as effluent/waste treatment & what flowering plants can be used in this habitat to promote this function as well as provide a habitat for pollinators (e.g. bees).

My project is "Examining plant selection to improve the biodiversity of reed beds/integrated constructed wetlands to attract pollinators". I was interested on researching reed beds as I live near an Integrated Constructed Wetland (ICW) and was interested in how it works. The other part of my project is investigating if the ICW is a suitable habitat for pollinators. A pollinator is a type of insect that transports pollen from one plant to another. Pollinators include insects such as wasps, butterflies and bees. In Ireland there are ninety-nine different species of bees which divide into bumblebees, solitary bees and the honey bee. I came across "The All-Ireland Pollinator Plan 2015-2020" and information on the bee population in Ireland. About a third of the wild bee population is threatened with extinction with some species near threatened. There is multiple reasons for this such as loss of habitats from urbanisation and intensive farming, use of pesticide and many natural meadows have been replaced by fields of cereal.

For my project, I decided to examine ICW's in Ireland and examine plants used within the ponds and surrounding area for the purpose of examining their suitability as a habitat for pollinators, in particular bees. There is about 130 ICW's in Ireland, so I chose a sample of them to visit and investigate further.

**How ICW's work**  
An ICW is an artificial wetland used to treat wastewater and grey water found in sewage, surface run off and industrial effluent from factories and small domestic areas. Biofilms formed from bacteria grows on the submerged plant stems to break down the pollutants in the effluent which consist of nitrogen, pathogen, metals and phosphorus. The water flows through multiple ponds and then goes through the outflow and preferably into a nearby river.

**Key Issues for pollinators**  
In Ireland, approximately one-third of wild bee species are threatened with extinction. Of the twenty-one bumblebee species, six species are threatened with extinction and three species are near threatened. Of the seventy solitary bee species, twenty four species are threatened with extinction and nine are near threatened.



**Loss of Habitat**  
Bee decline is a problem in Ireland right now due to destruction of their natural habitat from intensive farming, urbanisation and building of roads and other infrastructures.

**Sites Surveyed**  
There is about 130 ICW's in Ireland, so I chose a sample of them to visit and investigate further. The sites I chose are A. meat processing factory in Thimabea, Co. Kildare, Tolly Water Park, Finglas, Co. Dublin and Aine Valley (Dublin), Co. Waterford, Belgard Quarry, Co. Dublin, Clonsilla, Co. Laois and Glasglough, Co. Navanagh.

**Conclusion/Recommendations**  
Issues I have found with the survey of sites include:  
- Few insect pollinating plants are within the ICW ponds. (Further research is needed on plants)  
- Biodiversity reports generally do not cater for pollinators. (Entomologist should be considered for reports)  
- The only insect species catered for are invertebrates due to their presence is an indicator of good water quality.  
- I have seen Clonsilla and Duhilly have hedgerows around the site and between ponds. These provide good resources for bees.  
- At the ICW site in Dublin, there are areas of bare soil and rock faces which could be used as a nesting area for bees.

**Future Studies**  
If I was to continue with the project, I would like to focus on one of these aspects:  
- To retrofit an existing ICW as a habitat for pollinators using information from this project.  
- For future design of ICW's look at the shape of the ponds looking at the elongated designs and adding small islands for more pollinator plants. Some of these design ideas have been used but for other purposes such as nesting grounds for birds.  
- Investigate more into the biodiversity in ICW's and how they can be improved.

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School Name: St Raphael's College  
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Category: Biological and Ecological  
Application to Inflation in Design: None  
Stand Number: 4556

B.T. Young Scientist Exhibition  
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