Understanding the value and fragility of 'soil'
Our 'soils', along with water, are one of our most valuable resources. Sadly, we have allowed our soils to be depleted, not just in our agricultural practices but more generally including in our towns and cities. If we want urban trees to grow then we must provide a healthy growing medium within the best tree rooting environments we can create. Section 3.1.4 of Trees in Hard Landscapes dispels the 'topsoil myth' and also emphasises the importance of using existing soil where fit for purpose as opposed to the environmental harm of importing soil. Soil is also a front-line contributor to carbon sequestration and mitigating climate change. This session invites experts in the field to explain why caring for our soil is so vital.

Chair:
Tony Kirkham MBE, former Head of Arboretum, Gardens & Horticulture Services, Royal Botanic Gardens, Kew, Vice-President of the Arboricultural Association and TDAG Patron

Speakers:

Fungi – the missing link in tree planting schemes
Aileen Baird, Lead Advisor for Tree Action Plan Delivery, Natural England

Urban trees – creating biologically vibrant soil for long term sustainability.
Glynn Percival, senior arboricultural researcher at *Bartlett* Tree Research and Diagnostic Laboratory, University of Reading

Soil management through the planning and construction stages of development projects.
Birgit Höntzsch, Senior Project Lead, Cornwall Council

Protecting soils through ecologically guided project implementation
Luke Engleback, Studio Engleback

Partners: Arboricultural Association, IEMA

Document from IEMA
https://www.iema.net/resources/blog/2022/02/17/launch-of-new-eia-guidance-on-land-and-soils)

Meeting Chat – comments, questions and references

Comments

Luke Engleback:
Since the 1950s we have lost about 400 000km of 'linear woodlands - hedgerows & hedgerow trees - about 50% of what had existed - these linked with copse, woodlands and rivers from coast to coast and the soil biomes also beneficially affected nearby agricultural soils -an idea taken forward in the idea of agroforestry.

Chris Knapman:
Also cleared highly valuable scrub.

Sue James:
So, we need a land use strategy that considers multiple issues in deciding where to plant trees.

Chris Knapman:
But where do the millions of trees come from to meet the ever-increasing targets? We import them along with pests and diseases including those in non-native soil…

Owain Holland:
Planting trees has a carbon footprint.

Steven Gray:
Natural regeneration willows, birches then plant larger seed trees.

Marie:
Thank you for pushing the issue of fungi in soils in relation to tree planting. They are so overlooked by so many.

Aileen Baird:
@Sue - The fungi Red list is a challenge - probably the most challenging of the recommendations we made in the paper. It needs lots of expert mycological input (and there aren't many mycologists in the UK now), and the funding and push from large organisations to keep it moving. There is a draft version being developed by the British Mycological Society, but it is a slow process.

Sue James:
@Aileen - as a group (TDAG) with the various organisations who support...should we be canvassing for this with government?

Paul Casey MICFor:
I'd say that robust and enforceable Planning Conditions in respect of agreed landscaping schemes and aftercare are also key to successful tree and green infrastructure establishment and longevity.

Aileen Baird:
Soil translocation are a really interesting idea - I think they are being trialled in a lot of places. There are biosecurity risks & risks of taking too much soil from ancient woodlands! But it could also be massively beneficial - more research to be done!

Anthony Mills:
The BIM technique involves burying sterilised soil in a container in woodland rich in local organisms for a period to allow it to be colonised, no soil removal is involved the soil is brought in to be colonised.

Aileen Baird:
Completely agree on the mycorrhizal products - they are generally not sourced from UK fungi, and rarely appropriate fungal species for woodlands. At best very expensive, at worst we could be introducing invasive fungal species!

Luke Engleback:
It’s such a problem when you have design and build contracts as such tags can increase costs and interfere with profit margins…reclamation is a problem where it’s complicated to rescue soils on urban sites framed with kerbs etc. Even getting a larger tree on compacted ground has caused problems!

Charlotte Smith:
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Jo Gibbons:
Early engagement with the contractor is vital too, all landscape schemes should have a soil resource management plan?

The landscape profession needs to lead on this.

Sue James:
@ Jo - good point. do we also need to train construction operatives to understand WHY things must be done in a certain way?

Sarah Hanson:
Can't enforce effectively without sufficient resources (which we don't have).

Sarah Collings:
Local planning authorities have lost so many staff including specialists & sadly struggle to do more than required tasks.

Sue James:
Question: 'resources' is always the response as a barrier to getting it right - how do we find ways to overcome the lack of resources?

Jo Gibbons:
Monitoring during site works is always part of our specification, we encourage the LPA to insist on this, so our clients have to step up.

Ruth Benson:
More attention needs to be paid to soil as a living medium in the EIA process.

Sue James:
Bring back the Clerks of Works...we don't have enough!

Marie:
Permeable paving combined with rain gardens can help develop housing sites which are more sustainable. It's about rethinking how we can combine both our urban needs (i.e., parking) with nature.

Sarah Collings:
Really interesting presentations. Would like to hear from developers & contractors how they propose to be more eco - they seem better at hedging than tree planting.

Jo Gibbons:
Thank you for this session - I have to leave, but collaborating across disciplines and scientists is vital.

Anthony Mills:
Trichoderma was used at Wisley in highly artificial growing substrates and environments as a means of flooding the growing medium to exclude pathogenic organisms. Not appropriate for ''natural'' environments.

Questions

Owain Holland:
With climate change presumably the metabolism of soils (the variety of organisms within them) will speed up, therefore is it correct to assume the rate of a soil's carbon absorption will increase significantly? More carbon being absorbed into the soil would

mean soil volume will technically increase at a faster rate? I'm assuming there might be a more complicated and nuanced answer to that.

Sue James
If we need one, how do we press for a Red List for Fungi?

Sue James:
Would natural regeneration be more positive for good fungi?
Aileen Baird in answer to Sue's question:
Natural regeneration is a slower process, and based on our current knowledge gives more time for fungal communities to develop, so it can be fantastic option. However, not all sites are suitable for natural regeneration as they don't have seed source close enough.

Natasha:
Is there any data on fungi in agroforestry systems (thinking about potential risks to agricultural crops from fungi) and/or tropical forests?

Aileen Baird in answer to Natasha's question:
We are really lacking in data on agroforestry systems, especially for fungi. However, the majority of key tree-associated fungi would not be a risk to crops. Most trees are associated with ectomycorrhizal fungi, whereas crops are associated with arbuscular mycorrhizal fungi.

Steven Gray:
How doe glyphospate spraying of trees affect fungi?

Anthony Mills:
Should the cultivation of beneficial indigenous microorganisms [aka Korean Natural Farming from one of its origins] - which include fungi and bacteria grown from local woodland soils - be promoted as a useful soil amelioration when planting in non-woodland soils?

Hen Abbott:
Thinking about street trees on new developments. Can the panel suggest some soils tests we can request developers to undertake so we can understand the base soil before deciding the best tree species and planting method?
+
Ruth Elwood:
Who does the testing on micro content pls?

Some answers to the above two questions

Anthony Mills:
RHS provide basic soil testing for P, K, [not N] organic matter and texture with advice for specific garden environments for £30 per test.

Neil Bancroft To Everyone:
Is this the soil testing centre?
https://cawood.co.uk/nrm/soil-analysis-nrm/

Matt Searle:
Hi Glynn. Did you look at compost teas?

Eileen Woodbyrne:
Hi Glynn. did you cultivate or de-compact the soil in the pits before you applied the treatments?

Scott Cumming
How do can we be sure that the chicken pellets are organic?

Marie:
If you encourage richer soil (more organic activity) and therefore see less root development, does that affect the overall mature size of a tree?

Neville Fay:
Really interesting presentation Glynn - do you check redox potential as well as pH.

Tim Scott-Ellis:
Wasn't there a lot of soil translocation for the construction of the Tunnel? There should be some data from there.

Matt Searle:
Interestingly Tim, soil from Cross rail was translocated to the RSPB Wallasea Island, at the time, the largest wildlife site project in the EU.

Alice Massey, Living Woods:
Tim -some of the Cross Rail tunnel soil was used for a RSPB reserve with flood defences, so that would be a recent translocation. Not sure how much life in soil from under a city mind you?

Tim Scott-Ellis:
It wasn't all from under the city, there was a huge amount of landscape works involved.

Fiona:
Where is the soil from HS2 construction work going???

Daisy Brasington:
How will stripping topsoil be either calculated in or factored out of BNG calculations?

Robert Wilkins in answer to the above:
Easy you don't. Soil is excluded

NB. General discussion following – clearly a serious omission???

Sue James:
Question for Birgit - how to we enforce better practice on construction sites?

From Sue James:
Do we need a session on What we know and don't know about soil?

Chris Knapman:
There is a general mis-apprehension that top soil is good and sub-soil is bad. 'Topsoil is the 'top' soil!' In reality, trees need both in the right place. Perhaps a soil education programme- 'Broaden your Horizons'!

Neville Fay:
Defra 25 Year Environment Plan has a national target for soils to be sustainably managed by 2030.

Sue James:
Good point Neville...but did we not also have laws about using less or no further peat in 2010 and yet usage has increased year on year...so how do we get the delivery and actions on the ground.

Sue James:
In Trees in Hard Landscapes, we have a section on the topsoil myth - 3.1.4

Owain Holland:
With climate change presumably the metabolism of soils (the variety of organisms within them) will speed up, therefore is it correct to assume the rate of a soil's carbon absorption will increase significantly? More carbon being absorbed into the soil would mean soil volume will technically increase at a faster rate? I'm assuming there might be a more complicated and nuanced answer to that.

Emma Ferranti:
@Owain, there should be something from the BIFoR FACE research team on this. The FACE Experiment is raising levels of CO2 in a forest ecosystem in Staffordshire and measuring everything to see how it responds.
https://www.birmingham.ac.uk/research/climate/climate-publications/nature/not-just-standing-there-the-carbon-utility-of-established-forest.aspx

Birgit Hontzsch:
@Owain not necessarily - for example see here, it depends on a great number of factors - https://climate.mit.edu/explainers/soil-based-carbon-sequestration

Fran Poštenjak:
Q: With raising awareness of native soil fungi, would you advise for more cautious application of Trichoderma spp. (and associated products) on and around the trees as Trichodermas are known as natural predators on other fungi and could create disbalance in soil fungi and associate microbes what can ultimately result in aboveground plant cover degradation?

Sue James:
Question for Luke - so do we need improved adopted strategies in local authorities to give them greater authority to set the requirements for development?

Nolao:
Luke what is the source document for soil microbial activity zone extending 50m from ancient wood canopy?

Luke Engleback:
This was based on ancient woodlands here, my research in NZ did not reveal info but I made an assumption that it may be similar.

Sue James:
For Luke...value engineering...wasn't this supposed to make sure that value was retained and now seems to be a way to cut costs?

Rob Scholefield:
Absolutely - value engineering is now a euphemism for cost cutting.

Daniel:
Any thoughts about the influence of synthetic 'grass' (green plastic) carpets? Any research?

Ruth Benson:
De-paving or minimising paving of urban streets in new developments, Freiburg style - do we have any really good examples in the UK?

Amanda Vesty:
Can anyone advise what to replace ash with when I replant after coppicing in a SSSI ancient woodland site?
Aileen Baird in answer to Amanda's question:
@Amanda - there's a couple of papers from Forest Research on this. Generally, the best ash replacements are Oak & Sycamore - however as it's a SSSI woodland, natural regeneration is likely your best option here. Get in touch with your woodland specialists at Natural England!

Chris Knapman:
Field Maple or let nature decide via re-generation.

References

Aileen Baird:
Here is the paper link: https://onlinelibrary.wiley.com/doi/epdf/10.1002/fes3.371

And the article in the Conversation: https://theconversation.com/fungi-the-missing-link-in-tree-planting-schemes-175008

David Winlo:
National Soil Map available at: https://cranfield.blueskymapshop.com/maps/aerial-photo-standard-25cm?x=493951&y=242569&z=4&w=2000&h=2000&f=&p=[]&m=
Includes: Carbon Stock
The Carbon Stock map is derived from the National Soil Map. It provides users with a summary of the stock of organic carbon by unit area in the soils across England and Wales at three-layer depths 0-30 cm, 30-100 cm and 100-150 cm

We are in the process at looking at the import of National Soil Map data as a *shp file and always interested to hear your thoughts of how the use of this Pay-as-you-Go dataset would benefit your tree reporting services.
www.mapscape.co.uk GIS tree mapping software

Neville Fay:
Worth checking out various visual soil, assessments e.g. (VESS)
https://soils.vidacycle.com/wp-content/uploads/2019/08/VESS_score_chart.pdf

Steven Gray:
Worth checking the history of the Forest of Dean in the 19th century. Direct seed planting plus natural regeneration.
https://www.british-history.ac.uk/vch/glos/vol5/pp285-294

Sue James:
Biochar and sustainability
https://carboncopy.eco/initiatives/urban-biochar-sustainable-materials-demonstrator?gclid=Cj0KCQiAkMGcBhCSARIsAIW6d0AwTXKTOp1BLouvKYNeMPsszVzJvV6uxZ-C9R6PHm-eazmcHrmZTU8aAnh0EALw_wcB

Neville Fay:
The project is really important work. Our sector needs to be aware of the Defra's 2009 'Construction Code of Practice for the sustainable Use of Soils on Construction Sites'? (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachme

nt_data/file/716510/pb13298-code-of-practice-090910.pd f) - it's an extremely useful doc even though a little out of date. It's currently being updated

Charlotte Smith:
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Cameron:
It is worth considering the full implications of potentially spreading some pests and diseases e.g., phytophthora before transferring soil. This could be particularly important on sites near Statutory Plant Health Notices.
https://www.gov.uk/guidance/prevent-the-introduction-and-spread-of-tree-pests-and-diseases

Neville Fay:
https://www.cardiff.gov.uk/ENG/resident/Planning/Planning-Policy/Supplementary-Planning-Guidance/Documents/Consultation/Soils%20TGN%20English%20June%202017.pdf

Birgit Hontzsch:
https://www.soilstaskforce.com/

https://www.cornwall.ac.uk/recon-soil-project/

Sue James:
Making peace with nature - https://www.unep.org/resources/making-peace-nature?gclid=Cj0KCQiAkMGcBhCSARIsAIW6d0DA6FbWA0ijQ0vaALNxD9Ye2lcdaHmq5uYi5W1rvtu8YfBXB02fuAkaAgNwEALw_wcB

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