Design of Forage Hedge Tube Filament for Ferm Growth

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Research Article

Keywords: Ferm, Forage, Hedges

Posted Date: December 3rd, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-1137673/v1>

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Abstract

Ferms are reproductive plants capable of budding on stems. Owing to the delicate plant structure are not prominent in windy regions. Forages are a type of vertically place hedges. These go around the stem structure. Scanning microscopy was used to reveal the fibron structure. To locate and design regions of the stem for support of the plant. The findings yielded a design of the forage hedges. Hences increase the growth span of the plant. The height of the forage had the most effect. The mesh size had a change on the Ferm growth and stability of the plant.

Keywords: Ferm, Forage, Hedge

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Lipids are the composition of Ferm structure. These grow and develop after a period of 36 days. This occurs before budding at the inter-stem contact of the branch. These lipids lack fibrons for stability of the Ferm. This is explored in this research using forages in the starting stages. These are the full and half the stem height. To obtain findings on the contribution to the stem growth. The mesh size is the same in both about 50%. This was developed in Finite Element software and exported as a stl solid laminate file for 3D printing. The test was performed near a forest embarkment in an exposed area of the soil.

Method

Participants

The fermes of equal heights after a 36 day growth time (1month and 5days) were transplanted to the forest embarkment. The participants in this study were 3D printed forage hedges with filament hedges of full and half the length of the stem. This were used in this test to explore the effect of forage design on plant growth and fibron composition. In illustrations 1 and 2 of both plants.

Assessments and Measures

Scanning Microscopy (SEM) a nano-microscope was used to reveal the lipids in the stem. This was then studied using spectroscopy to obtain a cell count and distribution of the structure. This was performed for 5 seconds. The findings were then compared to obtain a hypothesis of mesh size and height on lipid reduction and fibron growth. The illustration 3 of the SEM microscope.

Scanning Microscopy

The scanning microscopy removes the addendum surface of the stem. This is usually convex in nature. To reveal the dendum surface. This contains the composition of the stem structure. This is a repeated process each step providing greater depth into the plant surface. To show the lipid and fibron composition of the plant. This is from a few micrometers to thousands of nanometres in size on the stem.

Spectroscopy

This is a quantitative process unlike scanning microscopy qualitative research. The design was an EFM spectroscopy using magnetic waves to count cells and hence cumulate the distribution of the plant. This uses a Reynolds distribution decreasing spectrum quadratically towards the centre and greater at the exterior surface. Since plant stem is concave in shape.

Finite Element Mesh Size.

The mesh used was tetrahedral to design the 3D printed forages. This was refined to 1.5 times the original design. The mesh was tubular to encapsulate the stem and branches of the plant. This was two step files each 5cm and 10cm in length of the Ferm. This was designed in Finite element

software. The step was exported to stl file. This was 3D printed using filaments two centimeter in size on the mesh. The illustration 4 of the two types of meshes of different heights.

The forest embarkment had lack of high growth plants and trees. The river was near the shore the farms were placed for this research. The winds speeds for a day were about 45mph. This was not sufficient to uproot the Farm plants from the soil. To ensure stability that measurements can be taken from the plant. This was for a 180 day time (6 months). The soil pH was neutral at 7.5 tested for study. This composed of sandy marsh and some clay rare elements. The illustration 5 of the meshes used at the exterior and at the filament.

The forages were entrained beneath the soil to just about the root depth of the soil. This was to ensure stability when there were high winds. The 3D printed polymer polyethylene was used to resist dew in colder climates. This could cause warpage from contraction and expansion. The property also includes biodegradability for reuse and further tests.

Results

The results show farms with two types of structures. The bicuspid which was semi-crystalline and has high lipids. The cuspid lacked this in its structure. These were studied using scanning microscopy and spectroscopy.

Scanning Microscopy Images

The scanning images showed a semi-liquid structure in Farm (hedge height of 10cm). The Farm (height of 15cm) had a semi-solid structure. This was provided using magnification of times 2.75 for the view in the supplementary material. The illustration 6 the microscopic images and notes.

Spectroscopy

This revealed the cell count of both Ferm stems. Ferm with hedge height of 10 cm had a maximum count of 889. This had a stable distribution. Ferm with hedge height of 5 cm had a maximum count of 890. This had an uneven distribution with high depths to the stem. The illustration 7 of the cell count of both ferm.

Discussion

The findings indicate the same stem size. However the structures are noticeably different from each other. It is recommended that half the stem be used for sand marsh soils. The full length should be used with clay soils.

Conclusion

The 3D printed hedges had an important contribution to development of the stem. The fermes survived well in the mixed soil environment. The structures had high and low lipid in the stem. Further study could indicate the effects of the forage on roots of the plant. To obtain a hypothesis on Ferm growth.

Declaration of Interest

The author declares no conflict of interest in the paper for publication.

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Supporting information Table S1. Field sampling dates and information. Samples highlighted in bold are those selected for the quantification of total organic carbon. Access issues prevented sampling at some locations in March 2015 and September 2016. We assessed the consequence of the additional uneven sampling by removing samples from these two time periods and recalculating the mean carbon content in newly accreted sediment. The value differed by less than 1% of the original value (i.e. 4.367% vs 4.372%), so we retain all samples in the data presented in the manuscript. Table S2. Summary of the fuel consumption and t.CO₂ emitted by construction vehicles in the construction of Steart Marshes. Figure S1. Photographs of sampling areas (Sites A-D). Figure S2. Relationship between elevation change measured with LiDAR derived-DTMs and in situ measurements with pins. In situ measured data (x axis) show difference in elevation between December 2014 (3 months after restoration) and March 2017. Left: Compares in situ data to elevation changes derived from LiDAR data taken in October 2014 and March 2017, and Right compares elevation changes between January 2015 and March 2017. No LiDAR images are available for December 2014.

Solid lines show a 1:1 relationship and the dashed lines show the actual 677relationship (linear regression) between DTM-derived and in situ measurements (dash lines Left: $R^2 = 0.775$, $P < 0.001$; Right $R^2 = 0.686$, $P = 0.002$). LiDAR measurements are strongly related to in situ 679measurements and are not systematically biased when sampling periods are more closely matched 680(i.e. Right).681682Figure S3. Cumulative elevation change trajectories of a sample of 1000 DTM pixels.683684Figure S4. Cumulative change in elevation for each LiDAR survey.685CC-BY 4.0 International licenseperpetuity. It is made available under a preprint (which was not certified by peer review) is the author/funder, who has granted bioRxiv a license to display the preprint in perpetuity. The copyright holder for this version posted October 12, 2021. ; <https://doi.org/10.1101/2021.10.12.464124>doi: bioRxiv preprint

686687Figure 1. Design and construction elements of Steart managed realignment, Somerset, UK.

a) Land 688use prior to the start of site construction in 2012, and locations of sampling points and the flood 689embankments constructed (new) or modified (raised) during the project; existing embankments that 690remained after the project are also shown. Land use was derived from Centre for Ecology and 691Hydrology Land Cover Map 2007 [66] and the project environmental statement [67]. Base aerial 692image from 2014 [68]. b) Elevations across the site showing design and location of creek network, 693lagoons and islands. The location of the breach is also shown. Elevations based on LiDAR data from 694October 2014 [36].

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Figure 2. Cumulative sedimentation at Steart Marshes calculated from Lidar DTMs. (a) Change in elevation (cm) between 13/09/2018 (1470 days since breach) and 31/10/2014 (57 days since breach). (b) Cumulative change in elevation over time for individual 50x50 cm pixels. Points show median cumulative change for a random sample of 10,000 pixels. Error bars show the interquartile range for the same sample of pixels.

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Figure 3. Proportion of total carbon in soil and sediment samples collected from Steart Marshes before and after the restoration of tidal inundation. Soil samples were collected prior to restoration from an area heavily disturbed during construction (site A), an area of pasture (site B), grass ley (site C) and arable (site D). 'New sediment' are samples of newly accumulated sediments from the restored site after restoration, with data from all locations and time points pooled. Sediment was also collected from an adjacent natural saltmarsh.

Differing letters denote significant differences in the carbon content of sediments between locations ($P < 0.05$). CC-BY 4.0 International license in perpetuity. It is made available under a preprint (which was not certified by peer review) is the author/funder, who has granted bioRxiv a license to display the preprint in perpetuity. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted bioRxiv a license to display the preprint in perpetuity. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted bioRxiv a license to display the preprint in perpetuity.

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Figures

Figure 1

A sample of Ferm plant for spectroscopy

Figure 2

A sample of a Ferm plant for spectroscopy

Figure 3

A sample of a Ferm plant for spectroscopy.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [EPFermSpectrum1.xlsx](#)
- [EPFermSpectrum2.xlsx](#)
- [EPFermSpectrum3.xlsx](#)