



Why Children Need to Read About Plants at a Time of Climate Change

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Abstract

We begin developing our relationship with and for Nature during childhood, and over the last 20 years research has advanced our understanding of human relationships with Nature. However, a focus on human-animal relationships dominates environmental understanding, including through the medium of literature, especially children's literature. It is critical that children know, engage with and care for plants at this time of climate crisis and this could be facilitated through climate literature. The popularity of children's climate fiction has increased dramatically in the last few years due to what publishers are calling the 'Greta Thunberg effect' – resulting in many more books now available that aim to empower young people to save the planet. However, in these texts, we argue that there is still an emphasis on animal and human consequences of climate change rather than on those of plants and the agency of plants (or lack thereof). We argue it is imperative that children understand not just the importance of human-animal relationships in regard to the climate crisis, but also the fundamental role of botanical life forms in preserving life on Earth. Taking three recently published children's books of fiction we consider how botanical encounters are represented in these texts, and how this can undermine the perceived environmental importance of plants and people's relationships with them. Informed by the recent work of Lykke Guanio-Uluru (2020), we consider the position plants play in these examples of contemporary children's climate literature and encourage a more critical consideration of the place of plants.

Keywords children's books · climate fiction · plants · botanicals · content analysis

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Introduction

Plants are essential to our ongoing survival on the planet: for air, for shelter and for food. Plants are the source of hundreds of medicinal treatments and facilitators of improved well-being (Bratman et al. 2015); they are absorbers of carbon dioxide and other air pollutants, whilst being the producers of oxygen for planetary life (Prentice et al. 2001) and they are a natural environmental coolant and bringers of rain (Ellison, et al. 2017). Whilst their importance is clear, plants are also the victims of climate change, with mass devastation in the face of dangers such as extended droughts and wildfires (Vigilio et al. 2019). Even with such a high profile, it is only relatively recently that scholars in the social sciences have begun to challenge the accepted interest in non-human relations that have predominantly focused on animals, and shifted them towards plants (Head et al. 2014).

In this paper, we want to highlight the importance of plants in young people's understanding and engagement with the climate crisis. We wish to explore fictional portrayals of plants at a time when being with plants is arguably growing ever more difficult. We will do this through the critique of three books: *Melt* (Fountain 2021), *Boy in the Tower* (Ho-Yen 2014) and *The Promise* (Davies 2013).

Being with plants and interacting with nature tends to equate to a greater commitment to environmental stewardship and pro-environmental behaviour (Larson et al. 2015). Leopold's (1949) classic environmental movement text is considered a systematic, holistic approach that balances planetary life with respect. In his theoretical framework he calls for a moral responsibility towards the natural world. His most enduring idea, the 'land ethic', continues to be relevant today (DesJardins, 2013). Leopold argues that we can only be ethical in relation to something we can see, feel, understand, or have faith in. It is recognised that adults and young people alike develop a greater appreciation for plants through botanical encounters (Jones, 2004). Yet, our relationship with the environment (plants included within this) can also cause anxiety, or what has been termed 'eco-anxiety'. Hickman (2020) notes that this form of anxiety occurs in response to knowing about the ecological and climate breakdown that has been accelerated by human action, while simultaneously feeling that the human response is inappropriate, with adaptation and mitigation being woefully inadequate. However, Scoffham (2021) argues that informing children of the irreversible changes that are going on in the world around us is essential. Children's literature, as Mickenberg and Nel (2011) claim, is a powerful force in challenging the accepted state of the world, creating a passion for environmentalism, social justice, and empathy. They suggest that education about the climate crisis through the medium of cli-fi is imperative to children's understanding and emotional connection to the climate crisis.

Whether the relationship with plants and knowing about plants hinders or harnesses our well-being and positive attunement to sustainable development, we argue that being with plants is increasingly difficult. The primary National Curriculum for England (Department for Education, 2013) has no reference to climate change or sustainability. The only explicit expectation to take children outside of the classroom is on geography field trips which the schools' inspectorate (Ofsted) have noted are an element many schools do not fulfil (Freeland, 2021). In addition to this, we are seeing

detrimental impacts on the environment, for example, increased urbanisation, deforestation and mass wildfires that are destroying acres of plant habitat, coupled with a decline in rates of young people's physical activity and individual mobility (Witten et al. 2019; Balmford et al. 2002; Skar and Krough 2009). In addition to this, the Covid19 pandemic has resulted in more recent restrictions on freedom of movement, albeit (hopefully) temporary ones. There is also the wider public rhetoric that childhood is becoming 'de-naturalised' (Taylor, 2013; McKee, 2005) and young people are finding it increasingly difficult to develop positive relationships with Nature.

This situation, where access to botanical encounters is limited, provides the research context for our paper. It has been argued that the readers of literary fiction have the potential to develop skills and learn explicit rules that can be transferred through the example of characters to pervade individuals' own corporeality (Leder 1990). Head et al. (2014) refer to a plants 'plantiness', or, what it is to be a plant. To consider plantiness is to consider the unique and multiple ways in which plants do things. Making explicit the agency of plants, through literary fiction, could therefore guide readers towards pro-environmental behaviour, greater empathy for and curiosity about plants and ecological stewardship.

The way in which Guanio-Uluru (2020) analysed three Nordic books for young adults with a climate fiction theme has informed this paper. We recognise her call to highlight the place and placelessness of plants in fiction for young people and the need to analyse more texts from other geographical areas and for younger readers. Like her, we move away from a wider field of ecocritical theory and instead draw on the growing field of cultural plant studies. We explore the representation and role allocated to plants in three fictional works for younger readers that have a climate theme.

Plants in Literature

Ecocriticism has been defined as the study of the relationship that literature develops with the physical world (Glottfelty, 1996). Critical posthumanism and ecocriticism have debated the concepts of 'human' and 'nature' that have led to established species' hierarchies being questioned. Perhaps the first recorded account of species hierarchy comes with Aristotle. He believed all living things could be positioned in a hierarchy that represented their degree of perfection - plants were at the bottom while humans took their place at the top (Aristotle, 1910). More recently, the development of animal studies has interrogated the human-animal relation (for example, Haraway 2008, Wolfe 2010, Derrida 2002) with such discussions also reaching children's and young adult's literature (Cosslett, 2006 and Ratelle, 2015). Branching from this animal-human relation focus is the growing scholarly field of cultural plant studies where concern lies in how plants are represented in literature, with Duckworth and Guanio-Uluru (2021) beginning to explore children's literature and plants in their recently edited collection.

An anthropocentric view of plants is common in, for example, poetry, where plants tend to be merely the backdrop or setting for human or animal performance. In scientific literature too, plants are underrepresented when compared to their animal com-

panions. Gagliano et al. (2017) reported that between 2010 and 2015 journals such as *Nature and Science* published half the number of articles about plants when compared to those of animals. Hitchings and Jones (2004) also note that whole disciplines such as human geography have traditionally conceived of plants as nothing more than a collective *landscape* rather than individual organisms of importance. Wandersee and Clary (2006), have labelled such a lack of appreciation as ‘plant blindness’ – where an individual is unable to recognise the plants within their own environment, and is often unable to recognise the biological features or importance of plants to either the biosphere or human development. While the position of plants may have been overlooked by many, there are changes to the way scholars think and associate with plants. Donna Haraway recently used plant metaphors to put forward notions of not just post-human but ‘com-post’ relations (Haraway 2016:p32) and N. Katherine Hayles (2017) discussed plants as intelligent entities. Within children’s literature the notion of plant sentience has also begun to be critically examined (Jaques, 2015, Guanio-Uluru, 2018). Additionally, through personal correspondence with children’s authors, at least two children’s books of fiction are planned to be published shortly which have plants as central characters in the future. The important role of plants and how they are presented is changing.

Within this growing environmental context of plant awareness and appreciation, we wish to broaden the discussion of climate change and cli-fi to question to what extent plant blindness is apparent within texts for younger readers. We wish to begin to include plant representations through the perspective of British authors’ work and critically consider the place, or lack of place, plants have within this literature. We offer content analysis of three very different books and will consider how these examples may be reinforcing animals and humans as important actors in climate change - to the detriment of plants - as well as how they have both comparable and divergent ways of engaging with climate change compared to texts from the wider climate change genre. So as to maintain consistency of approach we will, as Guanio-Uluru (2020) did, draw on Adam Trexler’s, *Anthropocene Fictions: The Novel in a Time of Climate Change* (Trexler, 2015) as a way of framing discussion. Trexler’s (2015) significant contribution to the emergent genre of climate fiction maps the contexts, structures and strategies frequently used by authors who are attempting to portray climate fiction for adult readers. Here we use this analysis as a useful reference for the discussion of climate fiction texts for younger readers.

A Method of Three Books

Trexler (2015) makes the observation that a vast majority of climate fiction novels are set in urban contexts rather than wild, pastoral landscapes (2015, p76). Contrary to this, Guanio-Uluru (2020) notes how the three Nordic fictions for young adults she analysed portray the pastoral landscapes of this geographical area. She considers it important to be aware of how different places in cli-fi are represented to different geographical audiences. Of our selected three books by British authors: only *Boy in the Tower* is set in the UK alone. *The Promise* moves between different urban places:

starting in London, and then travelling to other global cities. *Melt* disrupts this trend as it is set in a polar location.

The three books for this study were chosen through a search of award winning and recommended children's books websites in the UK. Criteria for the search included: being written by a British author, published in the last eight years (to coincide with the newly revised National Curriculum (Department for Education, 2013)), having a theme relating to climate crisis, mitigation and or adaptation. A short list of 26 possible books was made and then checked for their reference to plants within their content – plants did not have to be the central theme and could be included in either or both words and illustrations. We were left with 15 books which we then presented to five classes of 8–11 year olds ($n=146$) in diverse inner city schools from the south west of England. Pupils were asked to choose the three books we would go on to analyse. The children were given a synopsis of each of the titles and in groups of between 6 and 10 discussed the books with us in focus groups of c.30 min. During the discussions, each group chose their top three titles they felt should be read in more depth for their reference to plants. The three titles with the most votes were *The Promise*, *Boy in the Tower* and *Melt*. Our initial intention was to then run reading workshops with children and have them assist with the analysis of the three books. Unfortunately, due to schools being overwhelmed with Covid19 cases and the challenges this brought, we were unable to continue the project with children as co-researchers. We carried out analysis as adult researchers alone. However, we believe that listening to and working with the choices of young people is important if we are to understand what is being read. In future projects we intend to work with children as co-researchers.

The Promise is an illustrated short story in picture book style. The words and pictures tell of a young person in a depressed city without plants. The implication of the grey tones and plantless locations depicted in the illustrations are mirrored by the unhappiness of the characters at the start when the narrator of the tale recounts how they stole a 'bulging' bag from an old lady in order to get money for food. There is a romantic assumption here that humans have spoiled the world and a return to Nature would relinquish these problems. This shift and desire to bring Nature back to the urban wasteland comes when an old lady surrenders her bulging bag to the thief, but only on the condition of fulfilling a promise – to plant what is inside. Away from the scene of the crime the thief finds that the bag is full of acorns. Recognising the potential these fruit with their seeds have, the thief travels across the city planting them. As they begin to shoot and grow, people, once silent in the urban sprawl, start to communicate with each other and enjoy looking and touching the plants. The protagonist continues to plant seeds in other cities as the story progresses. At the end, the once young thief is now old and the roles are reversed. Now, their own bulging bag of seeds is stolen – on the same understanding that the younger thief has to make a promise to plant them.

Boy in the Tower, a short story with chapters and no illustrations, follows the story of Ade, a boy who lives in a block of flats with his mother who suffers with severe anxiety about leaving the building?. One day Ade's local area starts to be invaded by menacing plants known as Bluchers. These plants produce an enzyme that destroys concrete and steel, and has spores that are deadly to humans when inhaled. The story follows Ade's quest to survive the invasion and keep himself and his mother safe as

the city and its familiar landscape are destroyed to make way for Bluchers and the reclaiming of an urban space by plants.

Melt (a short story with chapters and no illustrations) follows the story of two young people - Yutu, who lives in the Arctic Circle, and Bea, who has just moved to a city a four-hour plane journey away. Bea finds her life colliding with Yutu's at a point when he discovers how the sea ice is melting and threatening his village's traditional way of life, and she discovers her father – a geologist – is working for a petrochemical company wanting to drill in the Arctic.

Following Guanio-Uluru's (2020) method, we counted plant references in the three books. We read each of the books twice and counted any reference made, noting what was referred to on each page. The books were then downloaded to an e-reader where vocabulary was searched for to check the number of references in context before we came together to discuss and agree the ways plants were referenced: in relation to foodstuff, for craft making, building material and as cultural symbols. There were also references to plants as both wild and cultivated, as climate changers, as well-being enhancers and as invaders/killers.

Having noted the different ways plants were being referred to in the books, we also considered their agency. Here we agreed on three representations: plants as active improvers of the environment (with human assistance); plants as part of a passive landscape under attack from human actions; and plants as invader.

***The Promise* by Nicola Davies (2013) or Plants as Active Improvers of the Environment (with Human Assistance)**

Of the three texts considered in this paper, *The Promise* is the only one that acknowledges positive plant agency with regard to human well-being, suggesting that this narrative is based on a broader scientific understanding of human-plant relationships. There is a growing interest in the positive emotional and health promoting outcomes of interactions with plants (see for example, Maller et al. (2006); Soga et al. 2017) in what Sempik et al. (2010) calls 'green care'. As more plants become visible in the illustrations, people are seen to be happier and more communicative with each other. Scientific phenomena, which occurs due to an increased biodiversity of plant life, is also more explicitly mentioned later in the book when it refers to: 'Green spread through the city like bird song, breathing to the sky, drawing down the rain like a blessing'. Here, there is an understanding that plants are critical to both meteorological and climate processes of creating rain and oxygen. While there are no extended references to these processes, the agency of plants in these climate processes is briefly identified.

Trexler (2015) notes that fiction has a problematic relationship with scientific climate truths, whilst Boggs et al. (2016) argue that for climate fiction to be worthwhile it must be based on science. Referring to the work of Bruno Latour (1999) allows Trexler (2015) to consider science as a social construct. In *The Promise*, renaturing is made possible by human help and scientific knowledge (in recognizing plants' importance to both climate and human health and well-being). Through an identification of individual human agency, the thief is transformed and undertakes direct action in

Table 1 Reference to plants in *The Promise* (Davies, 2013).

Theme	Comprising	Number of references
Food stuff	Tea	1
Craft / building material		0
Symbolic	Seeds of change Dead tree A forest in my arms Like a blessing	4
Wild landscape	Trees	1
Cultivated landscape	Parks, gardens, balconies, rooftops	5
Climate changer	Giving oxygen 'breath' to the sky. Rain inducer 'bringing down the rain'.	2
Well-being enhancer	Felt lucky. Rich beyond wildest dreams. People came together and smiled, talked, laughed.	6
Invader / threat		0
Specific named plant / seed	Acorn	2
Other		0
		Total 21

the form of guerrilla gardening (Hardman et al. 2015), redirecting cultural and environmental awareness away from their former life. Using a lens of eco-didacticism (Cucuzzella et al. 2020), the narrative could be seen within the familiar fable form: the reader being persuaded into prioritising environmental actions. The moral action (planting seeds) is tangible to the audience – echoing Boggs et al. (2016) who argues that climate literature should provide actions that people can do in their real lives in order to help mitigate eco-anxiety.

The cyclical nature of the narrative – with the beginning and end of the story being focussed on the theft of a bag of seeds - alludes to the need for constant vigilance and environmental action through a life course, and the passing of knowledge about environmental care to further generations.

This story offers a simple narrative with the importance of plants being embedded in both words and illustrations. *The Promise* is the only one of the three texts analysed that explicitly recognises the role of plants in the process of being rainmakers, earth coolers and environmental balancers (see Table 1).

Plants as food are only mentioned in *The Promise* in relation to tea; a cultivated species. There is a lack of reference to building materials in the text that makes it impossible to determine whether any are derived from plants – though the grey tones of the early urban landscape illustrations are perhaps more representative of manufactured products such as concrete and brick. The reference to plants that border on the symbolic are those that use plants as a metaphor and simile. Here, trees and acorns can be identified as a saviour from a higher power with the phrase 'bringing down rain like a blessing'.

Table 2 Reference to plant in *Boy in the Tower*, by Polly Ho-Yen (2014).

	Comprising	Number of references
Food stuff	Broccoli, ice cream, roast dinner, McDonalds, lollipop, bread, mouldy food, cereal, biscuits, carrot, rice, onions, tomatoes, pasta, walnuts, yams, coconut milk, chocolate, cooking oil, potatoes, leeks, mushrooms, beans, porridge, golden syrup, toast, crackers, orange and apple juice, cake, pie, pastry, sweets, tea, jelly	104
Craft/building material	Wooden houses	1
Symbolic		0
Wild landscape	Bushes, trees, grass, forest	25
Cultivated landscape	Parks, lawns	2
Climate changer		0
Well being enhancer		0
Invader/threat	Bluchers	148
Specific named plant/part of plant/seed	Sunflowers, spore, stem, head, stalk, leaves, grasses, flower, marigolds	50
Other (clothes and paper)	Newspaper, shopping lists, books, map, playing cards, scarves, notebook,	54
		Total 384

***Boy in the Tower* by Polly Ho-Yen (2014) or Plant as Invader**

Unlike the other two books analysed in this paper, *Boy in the Tower* sees plants represented through the language of invasive species; where plant agency is presented as dangerous. Lorimer (2012) notes that more-than-human geography has tended to focus on positive relations between humans and non-humans with little interest in lethal or antagonistic characteristics. Head et al. (2014) provide an interesting example of rubber vine in Australia - endemic to Madagascar, it was introduced in Australia as a consequence of failed colonial experiments in rubber plantations (Meve and Liede, 2002). As experimental sites were abandoned, the rubber vine naturalised and spread. It is now considered such a threat to biodiversity that the Australian biosecurity strategy identifies it as a 'weed of national significance'. As invasive species, both the rubber vine and the Blucher of the story can both be understood as active agents, shifting between being an object (a plant to tend to, study, kill) and subject (as an active participant in the landscape). While this text does give greater attention to what Head et al. (2014) refer to as 'plantiness', we would argue the attention to this floral agency is counterproductive to the development of positive plant encounters, and could reinforce a feeling of colonial otherness and difference (Agyeman, 1995). However, this is the only book of the three that identifies a landscape where the

removal of the human would see the promotion of greater plant biodiversity. Without humans the roads and pavements in *Boy in the Tower* become awash with plants as they grow uninhibited. While *The Promise* sees increased biodiversity as the direct result of people planting seeds rather than being left to grow untended, *Melt* does not refer to any change in biodiversity. Instead of directly engaging with the specificities of climate change, *Boy in the Tower* focuses on questions of justice, survival and a nature versus humanity dichotomy where only one side can survive. The Bluchers provide a re-writing of the landscape on an almost biblical scale. Through their domination and subsequent removal of humans and buildings, the locality returns to an Edenlike form. However, instead of people wanting to return to paradise, they are banished and in need of escape from this plant retribution. Trexler (2015) notes that the use of biblical ontology is common in climate fiction and the place of heavy rains and plagues are particularly well used. At the start of the story, before the first sighting of the Bluchers, there is heavy rain, which comes again at the climax of the story when Ade's tower is under threat of destruction. In both the Bible and Qu 'ran, floods and heavy rains are used to understand "the limits of humanity, its ethical boundaries, and our ultimate dependence on the land since the beginning of civilisation" (Trexler 2015, p84). Thus, *Boy in the Tower* evokes the deluge novel where climate is seen to restore the organic inheritance destroyed by humanity. There is a focus on (human) loss caused by more-than-human plants rather than salvation, thus challenging the boundaries of social order.

Boy in the Tower undermines the human authority within the setting. While the acorns in *The Promise* and the Bluchers in *Boy in the Tower* both act without the permission of the cities' inhabitants, plants in the latter erase geographical details that Ade once recognised, while *The Promise* enhances the detail and social connection. In *Boy in the Tower* there is a demise in outside communication – plants effect? a total breakdown of telephone, electricity and television transmission. This plummets the setting into one of terror and feelings of amputation from the outside world. With plants having the power, communication failure at such a scale questions the authority of both scientific and government intervention. This interrupts a sense of rooted specificity and disrupts a sense of place – making climate change a knowable narrative effect. The book entangles literary strategies that include plants enmeshed in wish fulfilment (Ade wanting his mum to be well and hoping to be reunited with his best friend), surrealism and a sense of foreignness (caused by the appearance of the strange, alien like Bluchers), media failure (as all contact with the outside world is lost due to a lack of television, phone, and radio) and social unrest (as local residents call for more to be done as the Bluchers take hold). The Blucher spores are identified as lethal if inhaled and so position the narrative in a post-apocalyptic future with direct reference to atmospheric pollution, similar to a plague narrative. Science and the hope that scientific experts will help is rendered pointless in the face of communication breakdown. Instead, a memory that plants and salt don't mix by an older character saves the inhabitants of the tower, along with homemade headgear of scarf and goggles to protect against spore inhalation. Here the similarity of narrative with Wyndham's 1951 post-apocalyptic novel, *The Day of the Triffids* is stark: an aggressive plant species kills people and is only destroyed by sea water. The importance of place and plant transformation are highlighted in both *The Promise* and *Boy in the*

Tower, but positions plants and their future for human success at different ends of a spectrum. The final scenes in *Boy in the Tower* see the surviving group move up the remaining tower as the lower levels are attacked by the demonised plants. Finally, they reach the roof where they are, at the very last moment, all saved by rescue teams in helicopters and go on to live in a safer place, by the seaside, away from this threat – stark imagery similar to souls drifting up to heaven and being reborn/living in paradise.

While the wild Bluchers may be demonised in *Boy in the Tower*, cultivated plants hold a different place in the story and are central to developing a sense of social harmony for the survivors in the tower. The group spends a lot of time collecting food (much of which is plant based) from empty flats in the tower, cooking and sharing meals. These meals are a time when Ade feels calm, and through the sharing of prepared plants at meal times he is able to be himself and relax. At the end of the book Ade looks back at these times with affection, post the crisis. Manufactured plants such as paper and fabric are also important. Playing cards offer entertainment, and Ade creates a paper map which is used to build tension as each day he adds more and more towers that have fallen, realising that his tower will soon be the only one left standing. Plants as clothing are protectors – the survivors wrap themselves in multiple scarves to go outside with the dangerous spores in the air. This positioning of Bluchers vs. cultivated plants amplifies the dichotomy between wild plants=bad, cultivated plants=good and positions these elements of Nature as dangerous.

Plants in *Melt* by Ele Fountain (2021) or Plants as part of a Passive Landscape Under Attack from Human Actions

While *The Boy in the Tower* might be considered to be preoccupied by genetics and the development of new and dangerous species like other climate change fiction for older readers (such as Margaret Atwood's *Oryx and Crake*), of the three texts, *Melt* is the only one that presents perhaps a more familiar climate change novel setting. Here, humans are in a melting polar landscape with a threat of other humans further upsetting the 'natural' balance through industrial developments. In this text, although the links to climate change are more immediately noticeable than the previous two stories, the agency of plants are at their weakest.

Expert scientists were excluded from *Boy in the Tower* and *The Promise*, but in *Melt*, the geologist is the protagonist Bea's father. Explicit alliances and connections between spaces and cultures, funding bureaucrats and traumatised geologists bring the potential impact of climate and people together. This acknowledges what Latour (1999) would call 'assemblages of actants' (both human and non-human). In this example, the social and the scientific become continually entwined and messy. While Latour's model of connections is useful in articulating the networks of association that result from scientific authority in children's climate fiction (whether intentionally obvious or not), it also helps us think through issues of climate change and anxious concern. Peterson (2014) reminds us that there are over 1,700 species of plants found in arctic environments, dominated by mosses, grasses and woody shrubs. However, due to the insignificant place of plants in this text, we question whether the relation-

Table 3 References to plants in *Melt* by Ele Fountain (2021).

	Comprising	Number of references
Food stuff	Bread, tea, pasta, cereal, bannock bread, berry mix, berries, apple, banana, cake, pancakes	53
Craft/building material	Wooden roof, driftwood door, panels, walls, cabin, wooden box, moss, fence	14
Symbolic	Safety	1
Wild landscape	Forests, tree line, pine trees, spiny, thicket	15
Cultivated landscape	Garden	4
Climate changer		0
Well-being enhancer	As fuel, as safety	2
Invader/threat		0
Specific named plant/seed	Berries, spruce, branches, grasslands, trunks	0
Paper/book	Books, text books, papers, wrapper, newspaper, pad	23
Other (clothes)	Leggings, clothes	5
		Total 117

ship with the botanical is more difficult to identify for the younger reader. What this text does is combine the science with how climate change impacts on human culture. There is an identification that climate change will lead to a loss of a traditional way of life, and by the end, not only are economic issues laid to rest, but personal agency for climate mitigation is practised in the form of more sustainable travel (a shift to train from plane when Bea and her family revisit Yutu).

As already noted, there is an absence of plant agency in *Melt*, but there remains a number of references to plants and their by-products. In this book, the majority of references to plants refer to those used for the benefits of humans, such as food or paper, or for the construction of traditional houses in the North. Paper holds significance as a knowledge holder (in school textbooks) and a secret keeper (as letters and notes). The secret keeper role is also given to a wooden box in Yutu's home. Reference to plants with regard to the wilderness occurred in only three of the 34 chapters, and only in chapter five was this described in any detail – referring to 'spruce', 'branches' and 'trees.' This was to give clarity to the copse that was to offer shelter and safety to Yutu. Well-being was also noted in the use of wood to create fire in order to warm the young people when they are struggling with extreme cold. Throughout the descriptions of the North, plants are very much background objects of a passive landscape rather than subjects with individual agency.

What is interesting in *Melt* is the author's choice of name for Bea – a homophone of bee. Many climate change novels refer to climate change and the relationship to reduced pollination and bee death (for example, Gaarder, 2013 and Lunde, 2017). This connection is not explored, though Bea's survival is entangled in the survival of the ice sheets, so could be interpreted as metaphorical.

Discussion

In this paper we have discussed how children's relationships with nature and their opportunities for botanical encounters may be diminishing. Botanicals are essential for the survival of all life on Earth, but despite this, Louv (2009) found that there is a 'crisis of detachment' occurring as children have reduced access to outdoor spaces, resulting in a loss of connection with plant life. This detachment is echoed by Barkham's (2020) book *Wild Child*, which argues that we are raising a generation alienated from nature, exacerbated due to lockdowns.

Through the analysis of three books we have identified that the presentation of plantiness (Head et al. 2015) varied significantly and only in *The Promise* was a reconnection with Nature explicitly presented as beneficial to the lives of the characters. This contrasted with *The Boy in the Tower*, where connections between botanicals and humans were unwanted and deadly, and *Melt*, where these relationships are ambiguous and not explicitly defined. Where direct botanical agency is stated, a plants' impact upon the environment is fleeting, for example how plants help with the precipitation processes in *The Promise*. These references are subtle, and may not be inferred by children or adults without a respectful facilitator.

We mapped plant references throughout the texts, considering the different ways in which they are represented, for example as a food, building material or clothes. By doing so, we noted that the agency of living plants varies across the texts. In comparison to Guanio-Uluru's (2020) reflection of three Nordic cli-fi stories for young adults, the type of plants referred to are also different. In Guanio-Uluru's analysis, paper is the most common reference to plants in all texts (serving as both record and truth keepers with regard to climate change), but this was not the case in these books for younger people.

In all three storylines we have seen protagonists develop more sustainable behaviours (albeit anthropocentric). In *Boy in the Tower* the protagonist is protecting themselves, their family, and friends in order to sustain their own lives in the face of invasive plants. In *Melt*, endangered cultures and (planty) landscapes are being fought for and protected. However, it is in *The Promise* that sustainable behaviour equates directly to engagement with plants - planting seeds. Boggs et al. (2016) suggest that offering readers their own ways of acting to help protect the environment is fundamental, however it is only *The Promise* that offers a real suggestion for children to take action. While direct sustainable action may not be readily identifiable in all the books, there is an underlying message of hope. To integrate a hopeful narrative is considered positive for young readers in that it is the foundation for teaching about the environment (Tapia-Fonllem et al. 2013; and Corner et al. 2015; and Scoffham, 2021).

Given books may offer young people a window into being with plants and a way of understanding their significant importance to our climate, the three books considered in this paper present plants more as motifs, and not entities based on scientific knowledge which Boggs et al. (2016) call for. Whilst non-fiction might be bounded by the need for scientific accuracy, within cli-fi, authors and illustrators have the opportunity to explore any imaginative planty perspectives and associated agency. As such, reading facilitators might benefit from being *critical* identifiers of children's climate

literature on behalf of their readers and present questions and enquiry regarding the placement, use and positioning of plants (and their products) within a narrative. This could provide opportunity for readers to consider how adult authors may themselves present plant blindness or use plants as subtle motifs.

In a recent interview with children's authors of climate fiction (Pushkin's Children Books, 2021), Piers Torday noted that there was a lack of plants as central characters in this genre and recognised the need for authors to begin to rethink this balance in their storytelling and reflect on the importance of the botanical. While this call is welcome - and we would argue necessary - if we are to use climate fiction with young people to harness botanical encounters, those books already within the genre need to be facilitated and their plantiness (Head et al. 2015) acknowledged. This would shift plants from being lumped together as a singular entity, and instead recognise individual and collective agency as part of a 'thick hybridity' (Lulka 2009) that could be drawn on explicitly or as a literal device.

The research undertaken for this paper considered three cli-fi books for children, chosen by children. They represent a diversity of plantiness in both form and transformational motif through the genres of: dystopia (Boy in the Tower), fable (The Promise) and what might be considered a more traditional climate change tale (Melt). We recognise the need for more critical reflection of plant encounters in a wider array of books for younger audiences of different stages in reading, and consider how plants have been both used as metaphors and understood by children through a growing understanding of literary device and climate change awareness. While Guanio-Uluru's (2020) paper calls for a research focus on the botanical content of young adults' books from different geographical regions, this needs to be extended to, as noted, different age groups (to develop age-appropriate pedagogies). Added to this we would welcome the consideration of the botanical content of curriculums with reference to the climate crisis; to the interpretation of plants in the classroom; to the subject knowledge and confidence of teaching botanical encounters (both literal and literary?) by teachers and trainee teachers. As young people's lived experiences of place and space changes, it is important to consider how each botanical encounter is experienced and how literary representations of plants provide opportunities for us to understand and explore our world. We suggest that such exploration would benefit from extending inquiry through literary fiction and into other mediums. Further work should also consider the representation of botanicals in, for example, age-appropriate film, television, and gaming platforms. With reference to climate change being entirely overlooked in England's Primary National Curriculum (Department for Education, 2013) and access to the outdoors being limited to irregular geography field trips (Ofsted 2021), it falls to teachers to ensure there are other more regular experiences about the environment for children both within the classroom and, if there is the opportunity to, in green spaces. This teaching could highlight plants and their various important roles to the environment directly and metaphorically, thus helping children to become more curious and aware of living more sustainable, hopeful lives in the face of the climate emergency.

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Declarations

Conflict of Interest None to declare.

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