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# Grubs Up: Multiple Enactments of Insects as Food in Aotearoa/New Zealand

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**Abstract**
In response to growing environmental concerns and food security pressures, the idea of eating insects is gaining traction around the world. However, despite being a sustainable and nutritious source of protein, eating insects remains largely taboo in the West. A small market for edible insects exists in Aotearoa/New Zealand but the practice is not widespread and the industry is struggling to expand. This article draws on material semiotic theory, specifically the concept of enactment, to encourage consideration of edible insects as not singular, but multiple. This analysis provides some insight into how insects are 'becoming food' (or not) across different venues in Aotearoa, both in the sense of initial edibility and routine consumption.

**Keywords:** edible insects; alternative proteins; food; material semiotics; multiplicity

More than 820 million people in the world today have insufficient food (Willett et al., 2019). With a projected global population of 9.7 billion by the year 2050, this problem is only expected to grow (United Nations, 2019). Food systems must become more sustainable and release less greenhouse gas emissions (Vinnari & Tapio, 2008). However, despite international commitments, currently Aotearoa/New Zealand (henceforth, Aotearoa) is not projected to reach our target of carbon neutrality by 2050 (He Pou a Rangi, 2021). Against this backdrop, researchers in Aotearoa and around the world are intensifying their search for a solution to supply food to the world's growing population while also addressing climate change mitigation. One field gaining traction is edible insects. Insect protein has been acknowledged as a more sustainable alternative to meat (Stoll-Kleemann & Schmidt, 2017; Van Huis et al., 2013). Capable of being produced in vertically stacked boxes, insects require less land and water and release less greenhouse gas emissions than traditional agricultural livestock (Halloran et al., 2017; Ponce-Reyes & Lessard, 2021; Suckling et al., 2020). Insects are also highly nutritious, with comparable levels of protein to beef and a range of readily available vitamins and minerals (Hawkey et al., 2021; Van Huis et al., 2013).

In 2013, the Food and Agriculture Organization (FAO) issued a report proposing the adoption of insect consumption in Western populations to increase sustainability of the agri-food system (Van Huis et al., 2013). Since then, a small market has emerged in Europe, particularly in the Netherlands (House, 2018). A similar report recently released by Australia's National Science Agency calls for progress in this field in Australasia (Ponce-Reyes & Lessard, 2021). More than 2000 species of insect have been listed as edible (Jongema, 2018) with over two billion people consuming them regularly (Van Huis et al., 2013). More common in tropical areas such as Africa, Southeast Asia and Latin America, in the West insect eating remains largely taboo (Van Huis et al., 2013). In Aotearoa, nine insect species have been reported as part of traditional Māori diets, including the famous huhu grub (Miller, 1952). Today there is a small market for insects in Aotearoa, particularly locusts (Corry, 2018). However, the practice of consuming insects is not widespread, and the industry is struggling to expand (De Prospo, 2019).

Many barriers to insect eating exist in the West, with consumers often associating insects with disease and pestilence and their consumption with 'primitive' behaviour (Tan et al., 2015; Van Huis et al., 2013). In Aotearoa, views have been documented as ranging from abhorrence and disgust to curiosity and

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interest (Tucker, 2014). Many people find insects' appearance off-putting and lack the knowledge and skill to cook or prepare them. In a recent New Zealand survey, 67% of respondents were willing to try insects (Payne & Ryan, 2019). However, there is debate around how closely reported interest in eating correlates to actual eating practices (Roe, 2006b) and calls have been made for greater focus on existing insect-eating practices (House, 2016). There is also dispute regarding the difference between trying insects once and sustained insect consumption (House, 2018). Shifting the negative perception of insects prevalent in the West to one of them as a sustainable and healthy food source is described as a major goal for proponents of eating insects (Hawkey et al., 2021).

In this article I explore some of the ways in which insect consumption is currently carried out in Aotearoa. Drawing on theory from material semiotics (Latour, 2005; Law, 2009, 2019; Mol, 2002), I apply the concepts of enactment and multiplicity to gain insight into how insects are 'becoming food', both in terms of trial consumption and sustained insect eating. Focusing exclusively on Instagram posts from three different providers of edible locusts, I demonstrate how edible insects are enacted in multiple ways across different sites in Aotearoa. Superficially, the act of eating a locust may appear the same across different sites. However, analysis of material and discursive factors portrayed in Instagram posts reveals considerable differences, which influence the way locusts become food, both in the sense of initial edibility and sustained consumption.

## Literature review

### *Becoming food*

The concept of becoming food is a useful tool for exploring a novel or uncommon food such as edible insects (House, 2018, 2019; Roe, 2006a; Sexton, 2016, 2018). In contrast to purely focusing on the human or social dimension of eating, this approach seeks to trace the materiality of foodstuff to the point where it is eaten. This allows a spotlight to be turned on the practices of insect eating in Aotearoa. Outlined by Roe (2006b), this relational materialist approach shifts the focus of agri-food studies to the bodies of animals, plants and humans. With a focus on consumption rather than production, the concept explores the material practices of how food is handled, and the practice of eating itself, while also exploring the way talk shapes and is shaped by embodied consumption. Roe claims there are inherent difficulties in understanding food preference through discussion because "edibility is a process" (Roe, 2006b, p. 112). She argues that eating is not necessarily based on rational, logical reasoning; rather, it is the result of habit, and often involves little thought or consideration. Food does not become food because it is named 'food', but through the handling processes of humans and nonhumans. Roe argues that a foodstuff becomes food the moment it is eaten. She refers to this as the "definitive meaning-making event", which is the result of everyday embodied and material practices (Roe, 2006b, p. 110). In this definition, Roe equates food with edibility, with objects only becoming food to those who eat it.

However, it is possible to know something is food without eating it. Unlike Roe, House differentiates between edibility and consumption, arguing that "it is possible for food to be positioned as 'edible' without anyone actually eating it" (House, 2018, p. 83). House argues that edibility is a network effect, which is constructed by the interaction of a variety of heterogeneous human and nonhuman actors, which shape and are shaped by each other. The successful construction of edibility relies on the enrolment of relevant actors into a network. Edibility, therefore, can be viewed as being co-produced by the actors involved. In the case of Dutch edible insect company Insecta, these actors included mealworms, the existing expertise of insect breeders, academics, supermarket chains and legal policy (House, 2018). Successful construction of edibility was not pre-given but relied on the interests of these actors being translated to align with the initiative's aim. If edibility is the sum of relations of the actors in the network, House (2018,

p. 90) argues, it is not intangible cultural barriers that impede edibility, but "specific socio-material relations".

House (2016, p. 48) claims that "'acceptance' is not simply a case of getting people to try insects once but rather to integrate them into their diets". When it comes to insect consumption, "there is still a great disparity between curious trying and actual acceptance" (Tan et al., 2016, p. 222). Consumers of Insecta's insect-based convenience food reached trial consumption of products, but not sustained or routine consumption. House (2018) argues this is because the interests of Dutch consumers did not align with those of Insecta. The consumers' need for appropriate price, taste and availability was not fulfilled. Despite the insect products being edible, the networks were not assembled in a way that produced routine consumption of insects. This led to a passive rejection of products, where they were not intentionally avoided by consumers but, due to cost and availability, were not routinely eaten (House, 2016). Price and availability of insect-based protein products have been identified as barriers to repeat consumption (House, 2018). Yates-Doerr (2015b, p. 110) claims that if insects remain too expensive, "they will never move into a category of edibles". House (2018) argues the difference and relations between edibility and routinisation must be acknowledged in future explorations of things becoming food.

## *Multiplicity of edibility: A material semiotic approach*

Yates-Doerr (2015b) employs a material semiotic approach, viewing edibility as not singular, but multiple. She reveals how edibility of insects is contingent on a variety of factors such as life stage, digestibility, where insects are reared, and what they have eaten. Law (2019, p. 1) describes *material semiotics* as a "set of tools and sensibilities" for exploring how social practices form networks that are both physical and carry meaning. Instead of considering reality as singular and fixed, and drawing upon stable frameworks to explain social phenomena, this approach explores how social structures successfully (or unsuccessfully) come together (Latour, 2005; Law, 2019). Mol, for instance, applied this approach in her study of atherosclerosis, where she endeavoured to "keep the practicalities of doing disease unbracketed—in the forefront of our attention" (Mol, 2002, p. 118). In doing so, Mol demonstrated how in different sites within a single hospital, different atherosclerosis are enacted into being. In investigating enactment, an object is not isolated from the practices that form it. Instead, "objects come into being—and disappear—with the practices in which they are manipulated" (Mol, 2002, p. 5). As the object differs from one practice to another, it multiplies (Mol, 2002). Importantly, this does not imply pluralism, different perspectives on a single, passive object. Instead, enactment implies the generation of different objects (Law, 2019). However, the "manyfoldedness of objects does not imply their fragmentation" (Mol, 2002, p. 84). The different enactments of the object overlap and hang together. They relate variously, perhaps clashing in places and strengthening in others (Yates-Doerr & Mol, 2012). Multiplicity also does not imply an endless stream of different objects. Instead, objects are "*more than one and less than many*" (Law, 2019, p. 10, emphasis in original). In her discussion of atherosclerosis, Mol (2002, pp. 181–182) does not engage with the practical implications of her theorisations, asking instead: "What are you, reader, going to do with my words? That is beyond me—it is up to you." In adopting this approach, I will therefore touch only briefly on the practical implications of the multiplicity of edible insects.

Using this material semiotic approach, the edible insect is not constructed, but enacted. This is demonstrated by Lien and Law's (2011) analysis of Atlantic salmon. Rather than asking what *is* a salmon, they ask how is salmon *done*. They assume that reality does not exist outside of relations done in practice. Therefore, to understand what something is, the focus must be on the practices involved in enacting it. Lien and Law claim that the scientific category of Atlantic salmon is not simply a description of the animal, but an enactment of it, one that is performed as a stable, universal truth that does not change no matter where the salmon is transported to. Other enactments of salmon are rooted in appearance or legal

definitions. Enactment goes beyond the concept of a construction of salmon, which would consist of a socially shaped cultural product or a practical category or definition for working with the animal. By moving to a metaphor of performance, the Atlantic salmon is enacted into being by material semiotic practices.

Through this lens, edibility is not an inherent property of an insect, but instead is dependent on locally situated practices (Yates-Doerr, 2015b). Yates-Doerr (2015b) explores the difficulty edible insect producers at Wageningen University encountered when they found their definition of edible insects did not align with that of the rural Kenyan consumers they were hoping their product would be eaten by. The researchers' goal of alleviating food scarcity by disseminating their insect product around the world was based on the assumption that an effective food solution at one site can be standardised, scaled up, transported and applied at another site. The researchers assumed the local Kenyan tradition of consuming termites and lake flies would lead to acceptance of their dried mealworm product. However, many villagers presented with the mealworms responded with disgust, drawing no connection between the fresh and tasty insects they normally consume and the dry product from the researchers. The scientists' enactment of edible insects through taxonomic classification did not align with the locals' enactment of edible insects by taste, preparation and presentation. In response to this, the Wageningen scientists realised focus must be shifted to locally embedded classifications of food (Yates-Doerr, 2015b). Insects and edibility cannot be treated as singular and uniform.

## *Selling edibility*

The concept of multiplicity of edibility, however, is not always recognised by those producing edible insects, who often consider edibility a singular inherent characteristic of an object (Yates-Doerr, 2015b). The goal of proponents of eating insects, therefore, becomes convincing consumers of insects' innate edibility. To achieve this, edible insect producers often draw on several distinct but interconnected promissory narratives (Mouat & Prince, 2018; Sexton et al., 2019). In doing so, they enact the consumer as a rational and deliberative individual, who, given enough information, will make the 'right' choice (Mol, 2009; Yates-Doerr, 2015b). Narratives used by producers include healthier bodies, the ability to 'feed the world', a gentler environmental footprint, and safer, tastier food (Sexton et al., 2019). Characterised by promises of what will be achieved by the products once they are on the market, these narratives aim to increase investment. Haraway (1985) highlighted the importance of speech and narrative, and the ability of words to bend relations. Language is never neutral, and the words we use sway what we know and experience (Law, 2019). Edible insect producers often use discursive interventions to establish their products as familiar. Agricultural terms such as livestock, farms and rearing are used to situate their products within familiar practices. This reframing of insects from pest to food animal sways the way consumers know and experience insects (Sexton, 2018, p. 594).

Another strategy applied by edible insect producers is 'absenting' certain elements (Evans & Miele, 2012; Sexton, 2016, 2018; Tan et al., 2015). In absenting the body of the insect, for instance, it is hoped that factors such as food neophobia and disgust may be circumvented, allowing products to act as a gateway, increasing the likelihood of future, more-visible insects being consumed (House, 2019; Yates-Doerr, 2015b). Indeed, increased willingness to consume insects when they are made invisible has been well documented (Hartmann et al., 2015; House, 2018; Payne & Ryan, 2019; Tan et al., 2015; Tucker, 2014). The strategy of absenting has been adopted by the convenience food market in the Netherlands, where flour made from insects has been incorporated into patties, nuggets and schnitzel (House, 2018). However, speculation that convenience foods with a hidden insect component would act as a 'gateway dish' leading to increased acceptance of insects as food did not materialise in the Dutch market (House, 2018). Instead, edibility was bound to the nuggets, burgers and schnitzel, rather than the insect itself. In response to this,

it has been suggested that uptake of insect eating may be more successfully facilitated by serving whole insects.

## Methods

In Aotearoa, whole locusts are served at a small number of sites, including festivals and restaurants. Applying the above concepts to an analysis of insect consumption in Aotearoa provides insight into what is happening at these locations. Drawing on the conceptual tools of enactment and multiplicity, I demonstrate how different material and discursive practices enact edible insects differently. These different enactments each have their own implications for insects becoming food, both in terms of initial trial consumption and routine insect eating.

To illustrate this point, I have chosen to look at three examples: the Wild Foods Festival (WFF), and restaurants Vault21 and Phil's Kitchen. These venues reflect three different locust-eating contexts, which I will use to demonstrate three different enactments of edible insects. There are several other places where insects are eaten in Aotearoa. For example, chef Monique Fiso includes instructions for how to collect and prepare the huhu grub in her recent book and occasionally serves them in her Wellington-based haute cuisine restaurant (Fiso et al., 2020, p. 103). Other New Zealand restaurants where insects have been served include El C Del Mundo in Wellington, French Farm Winery in Banks Peninsula and Fools of Desire in Rangiora, as well as at festivals including The Food Show and Southland Hop'n'Vine. However, the majority of these venues do not currently serve insects. The three examples explored in this study were chosen as they all serve the same insect species—the locust—and at the time of writing, had this insect on their menu. Restricting myself to these three examples also allowed me to maintain the small scale of this study and pursue analytical depth, rather than presenting a broad overview of the Aotearoa edible insect sector.

To further bound the study, analysis was restricted to social media, specifically Instagram posts. Social media analysis provides a new and interesting window into social worlds, encouraging researchers to think differently about their sites of interest (Edwards et al., 2013). Although social media content is freely available, its use in social research presents an ethical issue as individuals depicted in posts have not consented to involvement in the research. For this reason, no images where an individual can be identified have been reproduced in this article. Permission to reprint the images was sought from the Instagram account holders. Where this was not obtained, a link to the content is provided instead.

Instagram was chosen for this study as it is used by all three edible insect retailers and provides both images and text for analysis. Unlike many social media platforms, Instagram posts generally follow a standardised format (that is, photo, caption, hashtags) which make them ideal for comparison. The Instagram accounts of the three edible insect retailers studied were manually searched for posts containing images or mention of edible insects. As only locusts were considered in this study, posts were excluded that depicted other edible insects (for example, huhu grubs). In cases where an account contained several similar posts, one or two were selected that were representative of the group. The images were analysed, as were the accompanying captions and hashtags, and used to demonstrate how insects as food are enacted in different ways by the three edible insect retailers.

However, this bounding also produces limitations. As well as exploring only a limited number of venues in Aotearoa, this study does not consider insect eating in any other country or culture. It does not (due to the nature of the data collection method) provide details as to who is eating the insects or include examples of eating insects any time prior to the advent of Instagram. Nor, in the tradition of material semiotic literature, does the study seek to identify stable social forces or frameworks that explain the phenomenon (Latour, 2005). Instead, I use these examples to demonstrate that edible insects in Aotearoa are not singular, or plural, but multiple. This analysis provides a way into thinking about insects as food and

sheds new insight into questions raised by others in the area of edible insect research. The examples I provide do not cover all possible enactments of edible insects in Aotearoa; enactments which are not endless, but are more than one (Law, 2019; Mol, 2002).

## Analysis

### *'Wild food'*

Combining food, music and fashion, Hokitika's annual Wild Food Festival (WFF) is famous across Aotearoa for serving up unconventional foods (Wild Foods Festival, 2021a). Alongside huhu grubs, fish-eye jelly shots and mountain oysters (sheep testicles), the WFF serves locusts.

In images on the WFF Instagram page, locusts are often depicted isolated from other objects. In Figure 1 (A), multiple locusts appear in a post image entirely on their own (Wild Foods Festival, 2021b). No context is provided, and no attempt has been made to situate the locusts in any way. This image could as easily depict supplies for a biology class dissection experiment or the aftermath of a pest control extermination, as it could a snack or meal. Similarly, in Figure 1 (B), the locust appears in the foreground alone on a stick, in a display that would not be out of place in a museum or insect collection. This on-a-stick display is shown in several of the WFF Instagram posts and appears to be how the insect is served to eaters. The locusts do not appear to be seasoned or cooked, and they are not served alongside any familiar food ingredients, as part of a meal, or on a plate. There is no attempt by WFF to situate the locusts in a traditional food context. And although three people are eating locusts in the background in Figure 1 (B), they are in costume and are not dressed in a way that New Zealanders typically would for a meal. The WFF hosts a wearable-arts-style "feral fashion" competition, and it is common for festival goers to dress in 'wild' costumes. Participants are encouraged to "create a wild alter ego" (Wild Foods Festival, 2021a) that comes out only at the festival. This may foster an environment where participating in new, unconventional activities becomes the norm. By removing eaters from a typical eating situation, initial insect tasting may be facilitated in those who would not otherwise be interested in edible insects.

WFF frequently uses the terms wild and feral to describe locusts. These themes are emphasised in Figure 2, where several locusts are shown alive on a log, surrounded by grass (Wild Foods Festival, 2020). By depicting locusts in what appears to be a natural environment or habitat, a direct connection is made to

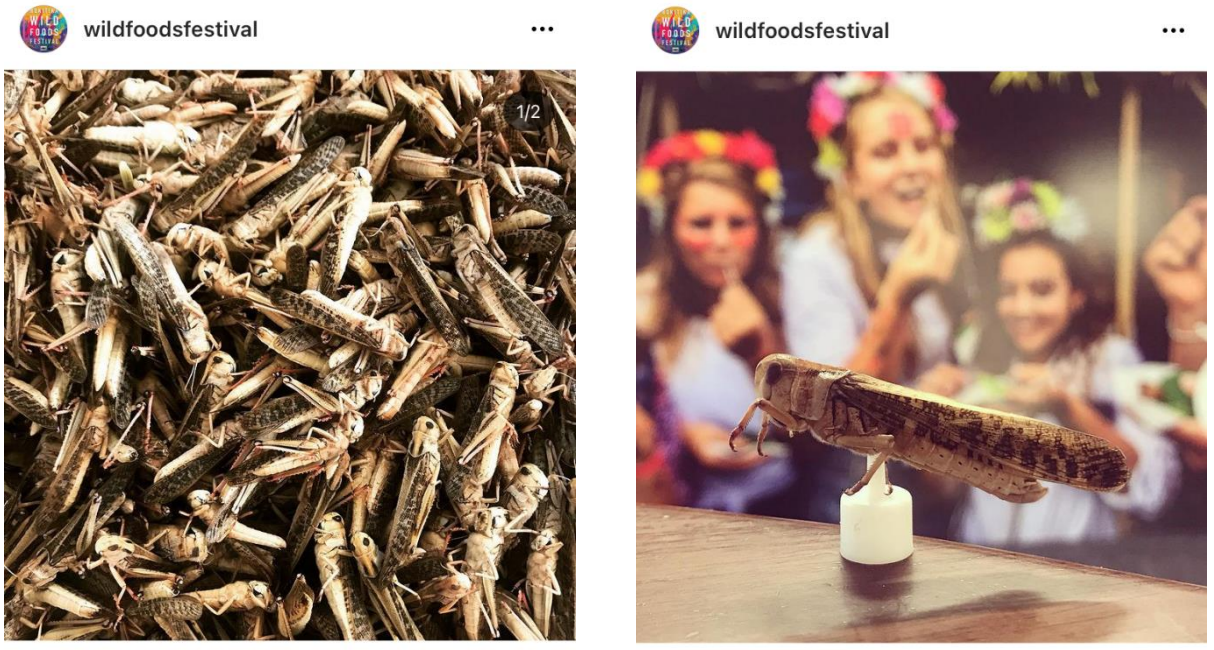


Figure 1. (A) Locusts to be served at the WFF. (B) A locust displayed at the WFF.
Images retrieved from https://www.instagram.com/p/CMOcIZlgzRV/. Copyright 2021 by Wild Foods Festival. Reprinted with permission.

the insects' wildness. WFF does not seek to shift locusts from this context to a food context, and instead draws strongly on the insects' wild origin. In doing so, WWF further promotes the idea that at the festival, attendees are removed from their normal everyday lives, and are taken to a place that is wild. Fitting with WFF's theme of being unconventional and outrageous, the locusts are perhaps being enacted as a wild challenge or novelty, rather than as food.

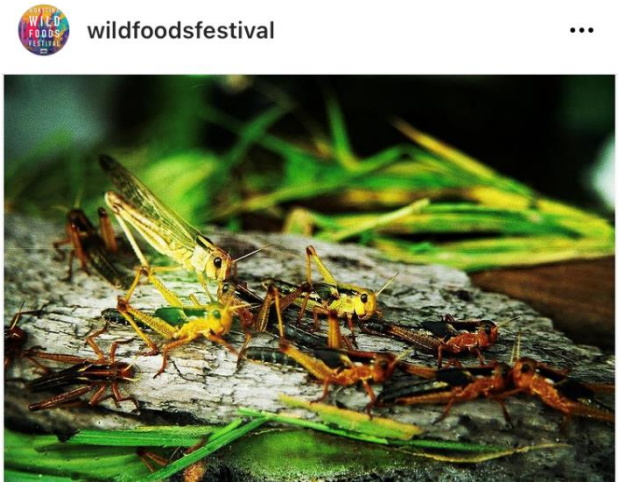


Figure 2. Locusts depicted in a 'wild' setting.
Image retrieved from https://www.instagram.com/p/CFyGhO8AGyT/.
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## *'Ambiguously food'*

My second example, Vault21, is an Asian fusion restaurant in Dunedin known for both its contemporary menu and the popular nightlife scene it provides outside of restaurant hours (Vault21, 2021). As well as chilli mayo fries and prawn dumplings, when locally available, Vault21 serves locusts in either a salad or on a sharing platter.

In a stark contrast to WFF, Vault21 has plated locusts in a familiar way, attempting to place them in a food context. In Figure 3 (A), we can see the locust platter closely resembles other, more conventional entrées served by the restaurant (Figures 3 (C) and (D)) (Vault21, 2020b). In serving the locusts as a salad, alongside a familiar ingredient (microgreens), we are invited to view the insects as a food item. In the post captions, locusts are referred to as an "exquisite delicacy" and "skyprawns" (Vault21, 2020a), language that further works to contextualise the insects as food, reframing them and swaying the way we experience them (Sexton, 2018).

The locusts are served on a sharing platter, a meal designed for sitting down with friends or family, perhaps accompanied by a beer or wine. Sharing food is widely acknowledged for its ability to foster closer social bonds and establish kin relations (Yates-Doerr, 2015a). In drawing on this familiar and familial context, eaters are reassured by Vault21 that the locusts are in fact food. Shared eating may also increase the likelihood of trying the locusts. Social judgement is known to influence food choice (Higgs, 2015) and recent research has highlighted the importance of a supportive social environment in reducing meat consumption (Kemper & White, 2021). As Tan et al. (2015) have shown, when consumers have an interest in trying insects, the influence of peers can play an important role in persuading the reluctant.

However, alongside these carefully curated food images, Vault21 has also posted to Instagram a short video of two people eating locusts, something the restaurant has not done for any other food item. In doing so, Vault21 provides evidence that locusts can indeed be eaten. The caption for this video states: "With around 70% protein, locusts are 20x more efficient as a source of protein than cattle" (Vault21, 2017). Vault21 draws on narratives of health and sustainability to provide an argument for eating locusts. Although the restaurant seeks to situate locusts as food by invoking a familiar food context, this need to

convince customers of the insect's edibility suggests this fact is still ambiguous. This is reinforced by the second part of the video's caption, which invites customers to try the locusts "if you're brave enough". The need for Vault21 to convince its customers that the insects really are food suggests that at this site, locusts are being enacted as 'ambiguously food'.

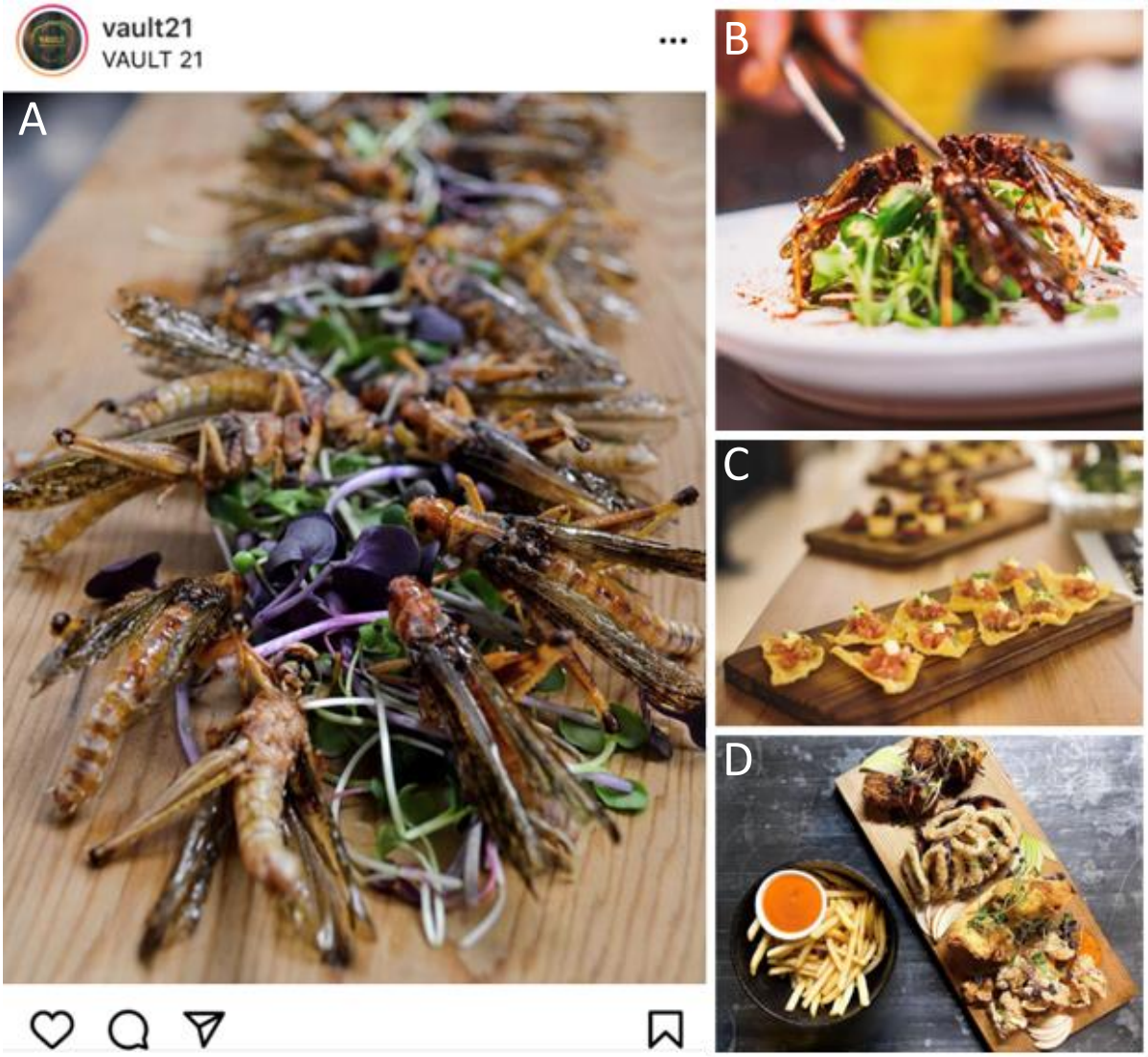


Figure 3. (A) Locusts served on a sharing platter at Vault21. (B) Locusts served as a salad at Vault21 (C) and (D) Sharing platters served at Vault21. Images retrieved from https://www.instagram.com/p/CFJdtazA9Is/. Copyright 2020 by Wild Foods Festival. Reprinted with permission.

## *'Obviously food'*

In both examples above, the focus is largely on the locust. This differs from my final example, Phil's Kitchen (https://www.instagram.com/p/CIW8-VcFEdh/). Described as adding a Kiwi twist to modern European cuisine, this high-end Auckland restaurant specialises in locally sourced ingredients and artfully plated dishes (Phil's Kitchen, 2021). At Phil's Kitchen, locusts are used alongside other high-end ingredients such as salmon and caviar as part of their fine-dining dishes.

Key to this enactment of insects as food, locusts are not the only (or even the main) ingredient in the meal. This is also demonstrated in the captions of the Instagram posts, where locust is the last ingredient mentioned. The hashtags focus solely on topics such as #bistrofood and #aucklandeats, contextualising the meal firmly within a modern, high-end cuisine setting (Phil's Kitchen, 2020). Here, the locusts are enacted as a delicious ingredient, worthy of being eaten alongside the most elite food items. Phil's Kitchen

intentionally draws attention away from the locusts in these meals. They do not attempt to convince the customer that locusts are food, any more than they attempt to convince the customer that pork or cauliflower are food. Through their elaborate plating methods and 'foodie' language, they are enacting locusts as 'obviously' already food, specifically high-end, fine dining.

## Discussion

The three examples discussed reflect different enactments of whole-insect eating. The same object, the locust, is potentially consumed across all venues. However, the Instagram posts from each retailer reveal practices, language and imagery that enact a different edible locust in both material and semiotic ways. While across all three venues the locusts have become food in Roe's (2006b) sense of the concept, in that they have been eaten, there are stark differences. These differences have different implications for routinisation of insects eating.

At the Hokitika WFF, no effort is made to contextualise locusts as a food item. The practices carried out, including the wearing of costumes, the presentation of locusts on a stick, and the language and imagery used, remove the eater from a normal eating situation. Locusts are treated as wild food and enacted as a challenge or novelty, something that requires daring to be tried, and is only undertaken in exceptional circumstances. This context may act to encourage those who have little or no interest in eating insects to try locusts as part of their wild festival experience. However, while locusts have become food in Roe's interpretation of edibility, doubt remains as to whether this amounts to House's routine consumption. If this enactment relies on the wild setting provided by the festival, it seems unlikely that eaters will continue to consume locusts when they return home to their typical eating settings. Further research to explore this would be beneficial.

At Vault21, the practices around eating insects are very different. The restaurant situates the locusts within a traditional New Zealand eating context and draws on positive narratives around insects as food to convince customers that the locusts are in fact edible. The restaurant provides a social environment that may facilitate trying insects, where customers are reassured of the locust's edibility by the familiar eating setting. By enacting locusts as food in this way, Vault21 may be helping to establish more stable edibility networks. In seeing and eating locusts plated in a familiar style and setting, customers are provided with a template of how insects may fit into their own eating habits. This may increase the likelihood of eaters engaging in routine consumption of insects. However, Vault21's attempts to convince customers of the edibility of locusts may also undermine the very thing they are trying to achieve. Elsewhere, narratives of health and sustainability have proved insufficient to promote regular insect eating (House, 2016) and, currently, sustainability does not appear to be a common motivating factor in food choice (Sanchez-Sabate & Sabaté, 2019). By drawing attention to the locust, and focusing heavily on its edibility, ambiguity is revealed around whether the insect is food. Despite Vault21's attempts to normalise eating locusts, the insect remains a novelty item. Something only eaten by the "brave" (Vault21, 2017). Ambiguity remains around whether locusts have become food in a routinised sense.

Unlike WFF and Vault21, Phil's Kitchen performs locusts as an already normalised food item. The restaurant does not seek to convince its customers they should be eating locusts; instead, the insects are seamlessly incorporated into high-end dishes. This may act to establish a sense of normality around locusts as food, as well as introducing the locust as a delicious food item in its own right. While many researchers and producers believe insects should be rendered invisible to overcome initial consumer trepidation, others are sceptical of such an approach and argue a better tactic is to "openly demonstrate that insects are delicious" (Yates-Doerr, 2015b, p. 109). House (2018) has argued that products that render the insect invisible do not act to normalise eating insects. In addition, when insects are used as an invisible protein source, they must compete with other potentially cheaper protein sources (House, 2016). Instead, whole-

insect products with a distinct appearance and taste may provide a more positive incentive for consumption. While fewer people may be willing to try these products initially, House (2016) argues, a distinct and tasty experience will lead to higher levels of consumption. If this is the case, by positioning locusts as a delicious ingredient within fine-dining meals, Phil's Kitchen may be helping to facilitate insects to become food in a more routinised sense. However, scepticism exists around the use of whole insects as a high-end product, and the trickle-down strategy associated with it. Some edible insect researchers argue that targeting the upper end of food and cuisine is not an effective way to reduce the ecological burden of agriculture (Yates-Doerr, 2015b). At $58 a meal, Phil's Kitchen's locust dish remains out of reach for most New Zealanders (Phil's Kitchen, n.d.). In addition, financial viability of this approach may be lacking in a small country like Aotearoa. Christchurch-based edible insect company Anteater, which provided premium whole-insect products to high-end restaurants across the country, recently closed after failure to expand (De Prospo, 2019).

Across all the examples discussed here, routine edibility is hampered by availability. Identified as a major barrier to repeat consumption, the lack of availability can cause what is known as passive rejection of a novel product (House, 2018). An eater may enjoy the taste of a locust or be tempted by its gentler environmental footprint or nutritional benefits, but if the product cannot be bought regularly and at a reasonable price, the insect will not become part of the eater's normal diet. The WFF only occurs once a year, and at Vault21 and Phil's Kitchen, the presence of locusts on the menu depends on local availability. Recently, Otago Locusts, the supplier to both Vault21 and Phil's Kitchen, posted that they were unable to supply locusts due to high demand and production setbacks (Otago Locusts, 2021).

## Conclusion

The goal of this study was to consider how enactment can get us thinking about edible insects as not singular, or plural, but multiple. This approach reveals that whole locusts are enacted as food in multiple ways in Aotearoa. Although on the surface the object (locust) and act (eating) may appear the same across the different edible insect retailers, the practices, language and imagery portrayed in their Instagram posts reveal considerable differences. These different enactments of edible insects have implications for the ability of locusts to become food both in Roe's (2006b) sense of edibility and House's (2016) notion of routine consumption. While in all cases the locusts became food in Roe's sense of the concept, there is doubt as to whether this will lead to routine consumption of insects. While the enactment of locusts as a wild food by WFF may encourage those with no interest in insect eating to try insects, it seems unlikely to promote ongoing consumption due to the unconventional wild context it draws on to facilitate this. Vault21 may more successfully situate locusts as a food item but has not yet succeeded in establishing the normalisation of edible insects. Phil's Kitchen, in enacting locusts as a delicious, high-end ingredient, may have normalised insects as food in their restaurant, but this remains out of reach for most New Zealanders. And in all cases, uptake of insect consumption is hampered by availability. Until locusts can be produced in higher numbers, and more consistently, there will be difficulty in establishing them as a routine food item. Further research is required to determine if consumption of insects at these venues is assisting acceptance of insects as food in Aotearoa. However, this analysis suggests that there may be no silver bullet in facilitating insect consumption. Instead, all the described enactments of insects as food, along with others not yet established, may be more successful if they work in tandem. This study, although small, demonstrates that edible insects in Aotearoa are not singular, but multiple, providing a way into thinking about insects as food.

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## References

Corry, L. (2018, April, 30). *Creepy cuisine: The rise of edible insects*. New Zealand Herald. https://www.nzherald.co.nz/lifestyle/creepy-cuisine-the-rise-of-edible-insects/AF5T6VK4IB7LHXVA2PSV6LICEE/

De Prospo. B. (2019, February, 11). *'Things got pretty weird': What went wrong with edible bug business Anteater.* The Spinoff. https://thespinoff.co.nz/food/11-02-2019/things-got-pretty-weird-what-went-wrong-with-edible-bug-business-anteater/

Edwards, A., Housley, W., Williams, M., Sloan, L., & Williams, M. (2013). Digital social research, social media and the sociological imagination: Surrogacy, augmentation and re-orientation. *International Journal of Social Research Methodology*, *16*(3), 245–260. https://doi.org/10.1080/13645579.2013.774185

Evans, A. B., & Miele, M. (2012). Between food and flesh: How animals are made to matter (and not matter) within food consumption practices. *Environment and Planning D, Society & Space*, *30*(2), 298–314. https://doi.org/10.1068/d12810

Fiso, M., Berno, T., & Corry, L. (2020). *Hiakai: Modern Māori cuisine*. Random House New Zealand.

Halloran, A., Hanboonsong, Y., Roos, N., & Bruun, S. (2017). Life cycle assessment of cricket farming in north-eastern Thailand. *Journal of Cleaner Production*, *156*, 83–94. https://doi.org/10.1016/j.jclepro.2017.04.017

Haraway, D. (1985). Manifesto for cyborgs: Science, technology, and socialist feminism in the 1980s. *Socialist Review*, *80*, 65–108. https://doi.org/10.1080/08164649.1987.9961538

Hartmann, C., Shi, J., Giusto, A., & Siegrist, M. (2015). The psychology of eating insects: A cross-cultural comparison between Germany and China. *Food Quality and Preference*, *44*, 148–156. https://doi.org/10.1016/j.foodqual.2015.04.013

Hawkey, K. J., Lopez-Viso, C., Brameld, J. M., Parr, T., & Salter, A. M. (2021). Insects: A potential source of protein and other nutrients for feed and food. *Annual Review of Animal Biosciences*, *9*(1), 333–354. https://doi.org/10.1146/annurev-animal-021419-083930

He Pou a Rangi | Climate Change Commission. (2021). *Ināia tonu nei: A low emissions future for Aotearoa.* Author. https://www.climatecommission.govt.nz/our-work/advice-to-government-topic/inaia-tonu-nei-a-low-emissions-future-for-aotearoa/

Higgs, S. (2015). Social norms and their influence on eating behaviours. *Appetite*, *86*, 38–44. https://doi.org/10.1016/j.appet.2014.10.021

House, J. (2016). Consumer acceptance of insect-based foods in the Netherlands: Academic and commercial implications. *Appetite*, *107*, 47–58. https://doi.org/10.1016/j.appet.2016.07.023

House, J. (2018). Insects as food in the Netherlands: Production networks and the geographies of edibility. *Geoforum*, *94*, 82–93. https://doi.org/10.1016/j.geoforum.2018.05.011

House, J. (2019). Insects are not 'the new sushi': Theories of practice and the acceptance of novel foods. *Social & Cultural Geography*, *20*(9), 1285–1306. https://doi.org/10.1080/14649365.2018.1440320

Jongema, Y. (2018). *List of edible insect species of the world.* Laboratory of Entomology, Wageningen University. https://www.wur.nl/upload_mm/8/a/6/0fdfc700-3929-4a74-8b69-f02fd35a1696_Worldwide%20list%20of%20edible%20insects%202017.pdf

Kemper, J. A., & White, S. K. (2021). Young adults' experiences with flexitarianism: The 4Cs. *Appetite*, *160*, 105073. https://doi.org/https://doi.org/10.1016/j.appet.2020.105073

Latour, B. (2005). *Reassembling the social : An introduction to actor-network-theory*. Oxford University Press.

Law, J. (2009). Actor network theory and material semiotics. In B. S. Turner (Ed.), *The new Blackwell companion to social theory* (pp. 141–158). Blackwell.

Law, J. (2019). *Material semiotics*. http://www.heterogeneities.net/publications/Law2019MaterialSemiotics.pdf

Lien, M. E., & Law, J. (2011). 'Emergent aliens': On salmon, nature, and their enactment. *Ethnos*, *76*(1), 65–87. https://doi.org/10.1080/00141844.2010.549946

Miller, D. (1952). The insect people of the Māori. *Journal of the Polynesian Society*, *61*(1/2), 1–61. Available from: https://www.jstor.org/stable/20703320

Mol, A. (2002). *The body multiple: Ontology in medical practice*. Duke University Press.

Mol, A. (2009). Good taste: The embodied normativity of the consumer-citizen. *Journal of Cultural Economy*, *2*(3), 269–283. https://doi.org/10.1080/17530350903345504

Mouat, M. J., & Prince, R. (2018). Cultured meat and cowless milk: On making markets for animal-free food. *Journal of Cultural Economy*, *11*(4), 315–329. https://doi.org/10.1080/17530350.2018.1452277

Otago Locusts. (2021, June 11). *We still have no stock for sale, and have had a few setbacks while trying to recover our numbers. Eggs...* [Facebook post]. Facebook. https://www.facebook.com/Otago-locusts-794741043963578/

Payne, P., & Ryan, A. (2019). *Insects as mini-livestock? A study of New Zealand attitudes toward insect consumption* (RE450/2019/034). AgResearch. Available from: https://www.agribusiness.school.nz/pluginfile.php/1696/mod_folder/content/0/agresearch-report-insects-as-mini-livestock-june-2019.pdf?forcedownload=1

Phil's Kitchen. (n.d.). *Menus*. https://philskitchen.co.nz/menu/

Phil's Kitchen [phils_kitchen_nz]. (2020, December 4). *Our roasted pork fillet main with confit leek, cauliflower risotto, roasted pears, homemade crackling and fried locust. Book directly with...* [Instagram post]. Instagram. https://www.instagram.com/p/CIW8-VcFEdh/

Phil's Kitchen. (2021). *About Phil's Kitchen*. https://philskitchen.co.nz/about-us/

Ponce-Reyes, R., & Lessard, B. D. (2021). *Edible insects – A roadmap for the strategic growth of an emerging Australian industry*. CSIRO.

Roe, E. J. (2006a). Material connectivity, the immaterial and the aesthetic of eating practices: An argument for how genetically modified foodstuff becomes inedible. *Environment and Planning A*, *38*(3), 465–481. https://doi.org/10.1068/a3835

Roe, E. J. (2006b). Things becoming food and the embodied, material practices of an organic food consumer. *Sociologia Ruralis*, *46*(2), 104–121. https://doi.org/10.1111/j.1467-9523.2006.00402.x

Sanchez-Sabate, R., & Sabaté, J. (2019). Consumer attitudes towards environmental concerns of meat consumption: A systematic review. *International Journal of Environment Research and Public Health*, *16*(7), 1220. https://doi.org/10.3390/ijerph16071220

Sexton, A. (2016). Alternative proteins and the (non)stuff of "meat". *Gastronomica*, *16*, 66–78. https://doi.org/10.1525/GFC.2016.16.3.66

Sexton, A. (2018). Eating for the post-Anthropocene: Alternative proteins and the biopolitics of edibility. *Transactions – Institute of British Geographers*, *43*(4), 586–600. https://doi.org/10.1111/tran.12253

Sexton, A., Garnett, T., & Lorimer, J. (2019). Framing the future of food: The contested promises of alternative proteins. *Environment and Planning E: Nature and Space*, *2*(1), 47–72. https://doi.org/10.1177/2514848619827009

Stoll-Kleemann, S., & Schmidt, U. J. (2017). Reducing meat consumption in developed and transition countries to counter climate change and biodiversity loss: a review of influence factors. *Regional Environmental Change*, *17*(5), 1261–1277. https://doi.org/10.1007/s10113-016-1057-5

Suckling, J., Druckman, A., Moore, C. D., & Driscoll, D. (2020). The environmental impact of rearing crickets for live pet food in the UK, and implications of a transition to a hybrid business model combining production for live pet food with production for human consumption. *The International Journal of Life Cycle Assessment*, *25*(9), 1693–1709. https://doi.org/10.1007/s11367-020-01778-w

Tan, H. S. G., Fischer, A. R. H., Tinchan, P., Stieger, M., Steenbekkers, L. P. A., & van Trijp, H. C. M. (2015). Insects as food: Exploring cultural exposure and individual experience as determinants of acceptance. *Food Quality and Preference*, *42*, 78–89. https://doi.org/10.1016/j.foodqual.2015.01.013

Tan, H. S. G., van den Berg, E., & Stieger, M. (2016). The influence of product preparation, familiarity and individual traits on the consumer acceptance of insects as food. *Food Quality and Preference*, *52*, 222–231. https://doi.org/10.1016/j.foodqual.2016.05.003

Tucker, C. A. (2014). The significance of sensory appeal for reduced meat consumption. *Appetite*, *81*, 168–179. https://doi.org/https://doi.org/10.1016/j.appet.2014.06.022

United Nations. (2019). *World population prospects 2019: Highlights*. UN Department of Economic and Social Affairs. https://www.un.org/development/desa/publications/world-population-prospects-2019-highlights.html

Van Huis, A., Van Itterbeeck, J., Klunder, H., Mertens, E., Halloran, A., Muir, G., & Vantomme, P. (2013). *Edible insects: Future prospects for food and feed security* (FAO Forestry Paper). Food and Agriculture Organization of the United Nations.

Vault21 [vault21]. (2017, September 13). *With around 70% protein, locusts are 20x more efficient as a source of protein than cattle. That is if you're...* [Instagram post]. Instagram. https://www.instagram.com/p/BY-NhEvDckw/

Vault21 [vault21]. (2020a, September 15). *Have you tried our sky prawns yet? These delicious little critters are low in fat and high in protein, and...* [Instagram post]. Instagram. https://www.instagram.com/p/CFJdtazA9Is /

Vault21 [vault21]. (2020b, December 8). *Take a seat and taste an exquisite delicacy from the Vault kitchen* [Instagram post]. Instagram. https://www.instagram.com/p/CIhlx_uAPT_/

Vault21. (2021). *Our story*. https://www.vault21.co.nz/story

Vinnari, M., & Tapio, P. (2008). Future images of meat consumption in 2030. *Futures*, *41*(5), 269–278. https://doi.org/https://doi.org/10.1016/j.futures.2008.11.014

Wild Foods Festival [wildfoodsfestival]. (2020, October 1). *Said to have a "shrimpy, nutty flavour" locusts are finding their way onto a few menus across New Zealand. Perfect...* [Instagram post]. Instagram. https://www.instagram.com/p/CFyGhO8AGyT/

Wild Foods Festival. (2021a). *Event information*. https://wildfoods.co.nz/events-info/

Wild Foods Festival [wildfoodsfestival]. (2021b, March 10). *Special delivery to the Wildfoods office today! Yum yum! #wildferalforage #wilfoodsfestival #3daystogo* [Instagram post]. Instagram. https://www.instagram.com/p/CMOcIZlgzRV/

Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., Garnett, T., Tilman, D., DeClerck, F., Wood, A., Jonell, M., Clark, M., Gordon, L. J., Fanzo, J., Hawkes, C., Zurayk, R., Rivera, J. A., De Vries, W., Majele Sibanda, L.,... Murray, C. J. L. (2019). Food in the Anthropocene: the EAT–Lancet commission on healthy diets from sustainable food systems. *Lancet*, *393*(10170), 447–492. https://doi.org/10.1016/S0140-6736(18)31788-4

Yates-Doerr, E. (2015a). Does meat come from animals? A multispecies approach to classification and belonging in highland Guatemala. *American Ethnologist*, *42*(2), 309–323. https://doi.org/10.1111/amet.12132

Yates-Doerr, E. (2015b). The world in a box? Food security, edible insects, and "One World, One Health" collaboration. *Social Science & Medicine*, *129*, 106–112. https://doi.org/10.1016/j.socscimed.2014.06.020

Yates-Doerr, E., & Mol, A. (2012). Cuts of meat: Disentangling Western natures-cultures. *Cambridge Anthropology*, *30*(2), 48–64. https://doi.org/10.3167/ca.2012.300204