

Short-comings and Vulnerabilities

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In a somewhat speculative, participatory study we tried to design a consequential entanglement between people and plants. “We” refers to a PhD student (the *fermentation enthusiast*) and a product designer (the *horticulture enthusiast*) plus 22 plant-loving participants. Over two months in spring 2017 we practically explored our personal role in bio-material circulations. Yet, our negligence for the basic needs of nutrients-transforming bacteria, made us extremely susceptible to floundering plants, inconvenient confessions and postponed, little breakthroughs.

Intentional consequences

We wanted to see what happens when residents in Hong Kong grow lettuce indoors simply from their own, self-processed urine. Yes, our urine. Some voices – that we respect – told us not to implicate people in their own sanitation. We didn’t listen and prototyped a tiny niche for our nutrients-abundant outflow (Wohlgast, 1993), making it the life force it is biologically meant to be. We wanted to explore *life-serving alternatives* (Hayes, 2010) in contrast to narrow ‘waste treatment’ options where sludge is mined with costly high-tech for Phosphorous, biomass is gasified into abstract energy, and runoff is detrimental. We wanted to temporarily reclaim our “agro-ecological” selves (DuPuis, 2015) we used to be prior to modern urbanism.

We observed how people bring living plants into homes and raise them, for decoration or for food supply. Many Hong Kong residents live in tiny, dark flats, so recently these *hydroponic* plant incubators became all the rage: Plants are bred in a petrochemical, aerated nutrients solution and with LED lighting – in just half the time of soil-based growing. (Trejo-Téllez et al. 2012). Soil and sunlight are no longer needed.

We also noticed how some people are secretly adding a splash of their fresh urine to the water in the vase or pot of tomatoes as a frugal way of fertilising. Such life-hack practices produce rather mixed results. The volatile urea reacts with the air, causing malodours instead of mineralising it into plant nourishment (Jones, 1997:82).

Engaging urine and people

We went about combining this *urine prudence* with *hydroponic magic* and dared to shrink-wrap the food loop for domestic use. We gathered expertise from microbiologists. We consulted with health care specialists. We had wet horticultural dreams with ecological engineers. We perfected urine-to-hydroponics upcycling in year-long experimentations. And we gave the thing a name: ANTHROPONIX. “ANTHRO” paid tribute to things and waste emitted out by humans. “PONIX” referred to the hard labour (toil) that growing food entails. We hoped to *con-temple* – observe *together* – how lifestyles and substances penetrating our bodies impact flourishing and taste of the vegetal offspring as indicated in Figure 1.

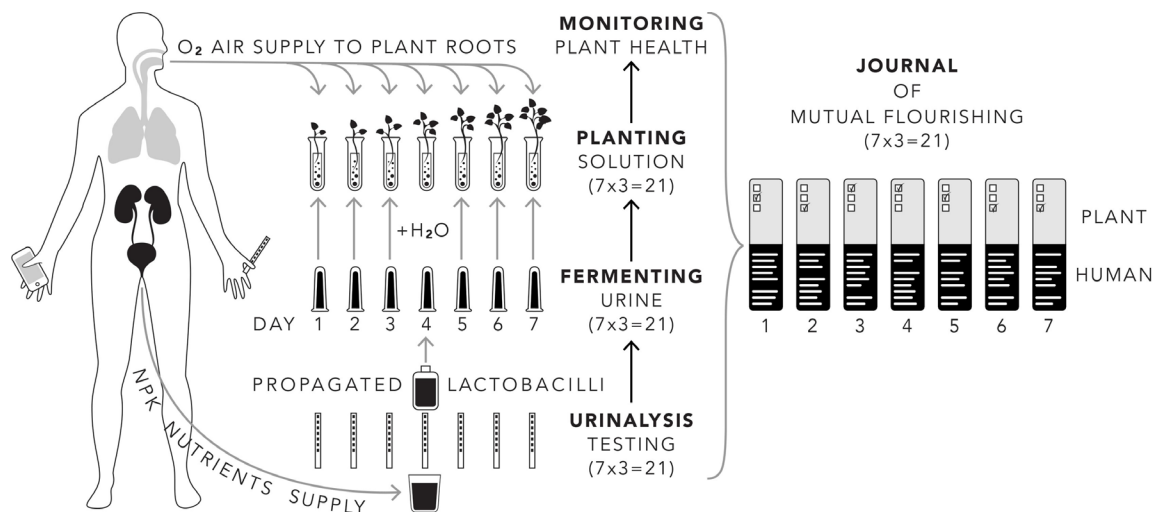


FIGURE 1: Tiny urine specimen are Urinalysis-tested, then fermented and diluted in water to grow lettuce while the welfare of human and plant is recorded in a detailed journal over a six-week period.

Adopting DIY lactic acid fermentation, akin to yoghurt cultivation, we were able to stabilise our urine (Andreev, 2017). Using bacterial cultures, in-vessel storage and three weeks of fermentation is ridding urine of its smell, making it fit for indoor use. We could not afford costly bio-lab testing, so Urinalyses dye strips let us monitor a few medical parameters. Every day we collected, tested and fermented 20ml of our morning urine at home over three weeks. After fermentation, a lettuce or watercress seed was grown in each diluted specimen. To track how one’s eating habits and emotional fluctuations impact the urine-bred plant life, we kept an elaborate journal.

We had imagined a horticultural co-design where people, plants and bacteria would happily collaborate toward shared prospering. This urine/plant cultivation was collectively held together by five bi-weekly workshops to provide instalments of supplies, skilling and sharing opportunities. Using a multi-modal aesthetic that juxtaposed scientific with philosophical considerations, the workshops intended to bridge the disconnects between human and plant, design and nature.

Reality comes more agitated

On April fool's day we launched ANTHROPONIX with 24 participants. For the consecutive 21 days, we collected tiny bits of our morning urine – 'midstream' – in centrifugal test tubes. The 'centrifugal' made us believe the tubes would contain the gases released during fermentation when we ordered them the week before. Yet, the carbon dioxide of hardworking lactic acid bacteria was stronger than our centrifugal lids. Most of us were surprised to find urine sample Number 1 dispersed in the bathroom when returning home in the evening. Only hours after the project began, the facilitators abandoned their designer's pride and launched fearlessly into damage control: admitting the lack of preparation, giving explanations, imploring participants to duct-tape the lids.

Miraculously, the participant count remained at 24 on day two and throughout the venture. The urine blow-up was a *happy accident*. The chemical reaction made the urine transformation palpable: it did *not* smell. Since everybody encountered the same problem, it was our heightened moment of group initiation, a bonding that proved to be vital for bigger challenges yet to come.

Our designerly thriftiness and overconfidence led to a second design flaw that would make the plant growing into a speculative scramble. When we down-scaled the planter size (for budgetary reasons) we ignored how nutrients-transforming bacteria could be pushed beyond operational limits. The nutrients in urine need to be first mineralised by oxygen-hungry bacteria before plants can utilise them. So to prevent suffocation from nutrients overload (eutrophy) constant air injection was needed which made it challenging to grow lettuce, beans and watercress.

Staying engaged on crisis point, most of us responded in creative ways to nurture and rescue the floundering plants. Often, *not* following the facilitators' directions proved to be most successful. One participant systematically germinated different seed varieties until she succeeded with a particular kind of bean that tolerated the restrictive planters. Others tried to better understand the biochemical processes involved and researched ways for monitoring and improving the nutrients solution. People with their own hydroponic systems began to supplement our organic solution with the petrochemical option in a desperate effort to re-nourish the starving plants. Veteran gardeners in the group funnelled their fruitless attempts into a teaching moment for the facilitators and pointed them to horticultural books and knowledge resources for considering alternative planting methods altogether.

While most of the activities took place at our homes, many referred to the project as a *camp experience* due to its intensity by overcoming uncertainties, knowledge-packed workshops and heated group discussions. These extraordinary circumstances over a limited period of time warranted extraordinary efforts in our busy lives. When our shrink-wrap food loop (Figure 2) unravelled, we realised how there was value and skill in becoming *vulnerable*.

The engaging precarity

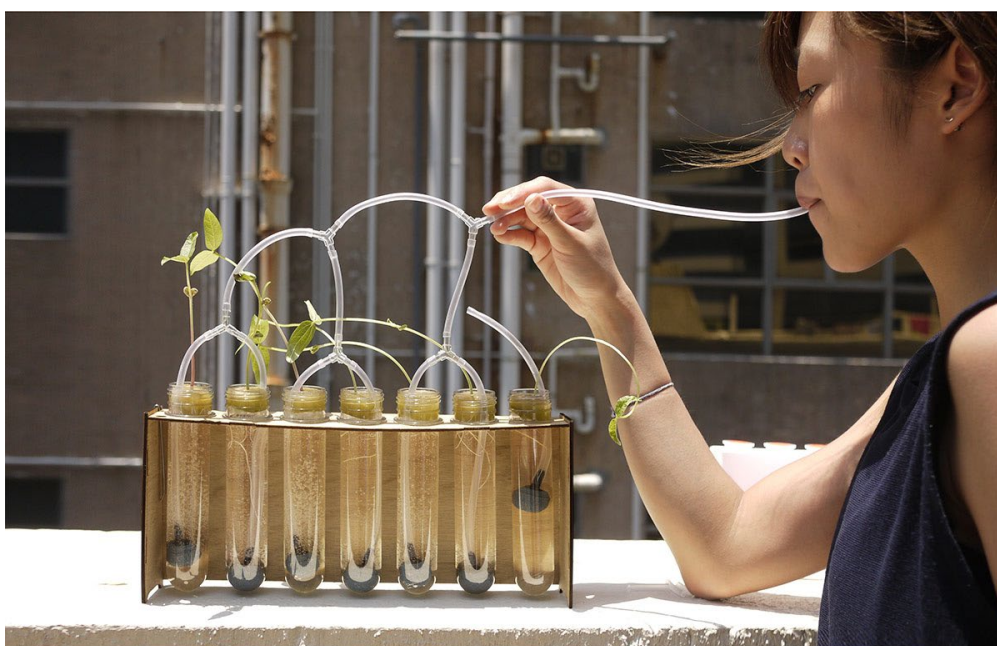


FIGURE 2: More-than-human health interaction through a closed food loop with plants growing on fermented urine.

In a venture so technically limiting, the ANTHRO, as in *humanly caused*, and the PONIX, as in *overcoming obstacles*, took on real world meaning. The open-ended struggle in this socio-vegetal precarity shifted our experience. On the flip side of precarity and distress can be joy, belonging and meaning as Brené Brown (2013) indicates. This vulner-ability has enlivened and activated us, the organismic, socio-technological, cultural, and emotional beings that we are (Sonne et Tønnesvang, 2015).

Reusing our urine made us, on a foundational level, vulner-able as *organismic beings*. Environmental toxins and non-degradable pollutants such as micro-particle plastics in our tap water (Tyree et Morrison, 2017) accumulate uncontrollably as *body burdens* (Liboiron, 2016), inevitably ending up in our urine and plants. We do have only limited control over the intake of foods, drugs and body care products. Pharmaceuticals can linger in our organisms for weeks (Mullen et al. 2015) and antibiotics are sabotaging the fermentation process for months (Sollazzo et al, 2014). One participant thoughtlessly took flu meds during collection period and found himself worrying of being trapped in an eternal pharmaceutical feedback loop if he ate the beans grown in his urine.

Trying to align our eating habits towards plant flourishing and withholding 'lucky tiny urine samples' from spilling into the sewer, made us aware how we are vulner-able as *socio-technological beings*. When weaving ourselves into the food web, we better sensed the dependency on that Australian farmer growing our organic oats and the food system in between. It made us more grateful to the sanitation worker and logistics that enable us to use a toilet. We also realised how our relationships with nonhuman actors like lactic acid bacteria and lettuce sprouts come without guarantees and are unpredictable. Yet, collaborating with them requires our dedication.

Due to the lack of tangible – edible! – outcomes, people started to worry about the legacy of the project. In this way we became vulnerable as *cultural beings* who have a need for shared sense-making. The concluding interviews became often an opportunity for charting out more radical and regenerative flora-fauna interactions in Hong Kong. Participants

expressed a desire to contribute to a larger narrative and felt obliged to the 'greater good'. Many felt like they had a stake in the wider implications of this project by taking a stand and differing from societal norms.

Witnessing the struggle and floundering of the plants made us discover our vulnerability as *emotional beings* who try to make sense of the complexity called life. The suffering of the plants was able to trigger existential confessions in some. True for all was how beyond attitudes and inhibitions we can engage on a deeper level with our urine, senses, and our personal journeys on this metabolising planet. It took courage to bring forth this vulnerability. In the least, the imperfect design of ANTHROPONIX made for rather perfect *conversations* (turning and dancing together).

Stick-with-it 'phase 2'

Through this collective stumbling-forward in uncertainty, some kind of accelerated group learning emerged. To ensure all dying plants, urine concoctions and efforts were not in vain, participants had a central role in designing a more plant-friendly 'phase 2'. In consensus with gardening-savvy group members we scrapped the original concept and aimed at a hybrid planting approach. The water-dissolved human nutrients are now drenching a coco-peat growing medium that is much more conducive to bacterial-cationic activity. It makes possible plant raising without external air supply on different scales and configurations. 'Phase 2' kicked in before the first had ended and still continues to date.

ANTHROPONIX ran contrary to a culture telling us we need to be perfect, predicting and controlling. Coming to grips with vulnerability, we needed to learn how to accept shortcomings as a mode of life-affirming agency. Together with metabolising humans and nonhumans we had redefined design as vulnerability practice where we are going-through, waiting-through the (non)outcomes and bear with all the consequences – self-inflicted or not – more wholeheartedly. Rather than distracting ourselves with right-wrong discussions, or, seeking to avoid the messiness with narrow perfectionism, we took a less glorious position of the insufficient, yet possibly more authentic designer as striving peer. We were lucky to find lettuce, urine and fellow participants who gave us the courage to be gracefully imperfect. It made it possible to enrich and complete the experience with each other

through dedication, bonding and meaning. It made the outcome so much more fermentive and probiotical.

This essay looks at design not as practice to shield us from the unpredictability of living but to engage and grow with it. Recent research in psychology and sociology demonstrate how first-hand experience of vulnerability is necessary for human flourishing (Sonne et Tønnesvang, 2015). What makes us vulnerable – our human susceptibility to discomfort, pain, failure – is not only a source of struggle, shame and inferiority. It is also the origin of pleasure, creativity, belonging and sense-making. Embracing our vulnerability – rather than eliminating it – is a potentially more integrative way of accessing change and unleashing human development that stems from within ourselves. We have a sense that this article just scratched the surface of what the fuller implications of vulner-ability in design practise might be. Peer-designing for and through the fermenting, sprouting, living world has augmented that. In the least, finding mutual support and affirmation when being biosocially exposed may help us transcend the design-nature duality.

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