



THE
toothpick
PROJECT

**THE TOOTHPICK PROJECT *USES BIOLOGY TO FIGHT BIOLOGY*
IN ONE OF THE BIGGEST BATTLES AGAINST WEEDS.**

STRIGA (WITCHWEED) IS AFRICA'S WORST PEST THREAT TO FOOD SECURITY.

**THE NOVEL INNOVATION UTILIZES A LOCAL PLANT DISEASE TO
EFFECTIVELY KILL STRIGA AND RESTORE CROP YIELD.**

THIS SOLUTION IS ONE OF THE FIRST BIO-HERBICIDES TO BE COMMERCIALIZED IN THE WORLD.

Striga (witchweed) is considered the #1 pest threat in African food security, associated with malnutrition, starvation, and land abandonment. Striga is an increasingly destructive parasitic weed on 40 million farms across sub-Saharan Africa. Attacking the roots of staple crops (maize, sorghum, millet, cowpea, dryland rice, etc.), it depletes yield by 20-100%. 50 million hectares of croplands in Africa show Striga infestation, causing \$9+ billion in crop loss annually. 85% of maize smallholder farmers in Kenya are women, making Striga a gender-sensitive food security issue.

Our bio-herbicide technology uses locally-sourced host-specific fungi to kill Striga, thereby safely and affordably increasing crop yield by approximately 42-56% (Nzioki et al 2016). Originally distributed as a fungal-coated toothpick at the village level, the product, Kichawi Kill[®], is now an effective seed coating that is environmentally-friendly and doesn't contribute to greenhouse gas emissions. This solution is one of the first bio-herbicides to be commercialized in the world (fully approved for commercial use in Kenya in November 2021). The pilot enterprise is in Kenya and is currently expanding to Uganda, Ethiopia, and Cameroon.

www.toothpickproject.org



The Toothpick Project – Toothpick Company Ltd.

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PUBLICATIONS:

Nzioki H.S., Oyosi F., Morris C., Kaya E., Pilgeram A., Baker C., Sands D.C. 2016, *Striga* biocontrol on a toothpick: A readily deployable and inexpensive method for smallholder farmers. *Frontiers in Plant Sci.* 7: Article 1121.

<https://www.frontiersin.org/articles/10.3389/fpls.2016.01121/full>

Baker, C.S., Sands, D.C. and Nzioki, H.S. (2024), The Toothpick Project: commercialization of a virulence-selected fungal bioherbicide for *Striga hermonthica* (witchweed) biocontrol in Kenya. *Pest Manag Sci*, 80: 65-71. <https://doi.org/10.1002/ps.7761>

Lüth, P., Nzioki, H.S., Sands Baker, C. and Sands, D.C. (2024), A microbial bioherbicide for *Striga hermonthica* control: production, development, and effectiveness of a seed coating agent. *Pest Manag Sci*, 80: 149-155. <https://doi.org/10.1002/ps.7522>

ALIGNMENT ORGANIZATIONS:

- World Food Program Innovation Portfolio – Farm to Market Alliance, Cereal Growers Association,
- USAID Feed the Future Innovation Lab (Current and Emerging Pest Threats): PlantVillage, DreamTeam
- Welthungerhilfe, with financial support from the German Environmental Foundation (DBU)
- Kenya Agriculture and Livestock Research Organization
- UNDP – Ethiopia
- Research Organizations: Sudan, Ethiopia, Uganda, Tanzania, Zimbabwe, South Africa, Cameroon, Benin, Ghana, Nigeria, Cote D'Ivoire
- International Center for Genetic Engineering and Biotechnology (ICGEB)

AWARDS and ACCOMPLISHMENTS:

- 2024 Sankalp Africa Award Winner
- 2024 MassChallenge Alumni Award Winner
- 2023 [Food Plant Prize Finalist](#)
- 2023 Kraft-Heinz Innovation Finalist, Future Food-Tech Summit
- 2022-present World Food Program Innovation Portfolio and WFP Sprints 1 and 2: [Climate Smart Solutions](#)
- 2022 [Milken-Motsepe Agritech Prize](#) Finalist (inaugural year, winners announced in 2023)
- 2022 Global Innovation Catalyst IX Stanford University online (Go-To-Market strategy)
- [UN Best Small Business Winner](#) "Good Food for All" (including the UN CEO Consultation, representing Small-Medium Enterprises). Interview in [Africa Agribusiness](#)
- 2021 IFT [Seeding the Future Global Food System Finalist](#)
- 2020+ [UNDP Cultiv@te Programme](#) – UNDP Ethiopia
- 2020 [MacArthur Foundation Bold Solutions Network](#)
- 2020 Roddenberry Catalyst Award
- 2019 [XPRISE](#) Future of Food Roadmap team
- 2018 Moonshot House Fellow - Mozambique, Kravis Lab for Social Impact, Claremont McKenna
- [2017 MassChallenge Finalist](#)
- 2017 Blackstone Launchpad 406Labs, Charter Entrepreneur: [Mini-Silicon Chronicle Article](#)
- [2017 Buckminster Fuller Catalyst Program](#)

MEDIA LINKS:

- 2024 Business Daily Africa: [Firm Tackles Food Insecurity with Striga Weed Bioherbicide](#)
- 2024 World Food Program Spotlight video: [The Toothpick Project Innovative Biology](#)
- 2024 World Food Program Innovation Event: [Toothpick pitch video](#)
- 2024 Forbes: [World Food Programme: Partnering for Hands Up Solutions](#) (Toothpick highlight)
- DW TV [Eco Africa](#): Scientists wage fungal warfare
- [Demonstration plots](#) with Farm to Market Alliance, March 2021
- 2023 [Temple Grandin interview](#) with David Sands
- Pa Africa Podcast: [Milken-Motsepe Interview](#)
- 2021 [I am Interchange](#) Podcast
- Plant Village - USAID "[How to control Striga weed](#)"
- [Kichawi Kil™: A Farmer's Perspectiv](#)
- [TEDxBozeman 2019](#)
- [2021 in Review](#)
- [BBC World News](#), April 5, 2021 [David Sands full interview](#); Farmer [Marygoretty Chitira full interview](#)
- [2021 Regulatory Approval](#)
- [Kilimo news 2021](#)
- [Science training 2018](#) news video
- Welthungerhilfe [Partner Page](#)
- [IFAD Rural Solutions Portal](#)

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