

# Tef Improvement Project (by Zerihun Tadele)

December 17, 2018

## Research

1. *Mutagenized population*: About 2500 M2 mutagenized populations were generated from recently released tef variety called Dagim. Screening for diverse traits of importance will soon be carried-out using conventional and modern techniques.
2. *Candidate tef lines*: Tef lines tolerant to lodging, acid soil and soil salinity tolerant: candidate lines obtained from these screening have been sent to EIAR for crossing to high-yielding and locally adapted cultivars.
3. *Basic studies*: the mechanism of drought and waterlogging of selected tef lines is being investigated by two master students in the group. The evolution of tef and the possibility of transferring useful traits from wild related species to tef has been studied by another master students.
4. *Breeding and variety release*: candidate lines for selected traits have been hybridized to improved cultivars and the progenies have been evaluated at multiplication in Ethiopia. In addition to the release of the first lodging tolerant *Tesfa* variety in 2017, two new varieties are in the pipeline to be released in mid- 2019.

## Other developments

1. SNIS project: comments to pre-proposal (Associate member)
2. SDC project: city region food system (Advisor to the Ethiopian Project)
3. DuPont Pioneer tef workshop by Jim Gaffeny: February 21-22, 2019 in Addis Ababa & Debre Zeit.
4. SFIAR (Swiss Forum for International Agricultural Research). At the SFIAR members meeting in Bern on December 10, 2018, I discussed with Michel Evequoz, SDC representative to CGIAR, about the importance of orphan crops and the need for scientific research on these largely neglected crops. Based on the suggestion of ME, I wrote email explaining the need for funding orphan crops.

## Participation at international conferences in 2018

<i>Title of the presentation</i>	<i>Date</i>	<i>Conference name and venue</i>
Role of African Scientific Diaspora: Opportunities & Challenges	16.09.2018	Linking African Agriculture, Ghent <b>(Keynote speaker)</b>
Orphan Crops Improvement: the Need for Concerted Efforts	06.09.2018	Food for Future Conference, Cologne
Food Security and the Future of Plant Breeding	06.09.2018	Panelist, Podium discussion, Cologne
Lodging and Drought Resistant Tef	31.08.2018	Scientific Innovation in African Agriculture, Ghent
Application of Mutation Breeding to the Improvement of Understudied Crop Tef	28.08.2018	International Mutation Breeding Symposium, Vienna
Discussion on Tef value-chain	13.06.2018	Stakeholders meeting at Debre Zeit, Ethiopia <b>(Moderator)</b>

## Publications in 2018

1. **Tadele Z. 2019.** Challenges of food security for orphan crops. In: Ferranti P, Berry EM, Anderson JR. (Eds.), *Encyclopedia of Food Security and Sustainability* 1: 403-408.
2. Girma D, Cannarozzi G, Weichert A, **Tadele Z. 2018.** Genotyping by sequencing reasserts the close relationship between tef and its putative wild *Eragrostis* progenitors. *Diversity* 10(2):17.
3. Martinelli F, Cannarozzi G, Balan B, Siegrist F, Weichert A, Blösch R, **Tadele Z. 2018.** Identification of miRNAs linked with the drought response of tef [*Eragrostis tef* (Zucc.) Trotter]. *Journal of Plant Physiology* 224-225: 163-172.
4. Cannarozzi G, Weichert A, Schnell M, Ruiz C, Bossard S, Blösch R, Plaza-Wüthrich S, Chanyalew S, Assefa K, **Tadele Z. 2018.** Waterlogging affects plant morphology and the expression of key genes in tef (*Eragrostis tef*). *Plant Direct* 2018:1-22.
5. Cannarozzi G, Chanyalew S, Assefa K, Bekele A, Blösch R, Weichert A, Klausner D, Plaza-Wüthrich S, Esfeld K, Jöst M, Rindisbacher A, Jifar H, Johnson-Chadwick V, Abate E, Wang W, Kamies R, Husein N, Kebede W, Tolosa K, Genet Y, Gebremeskel K, Ferede B, Mekbib F, Martinelli F, Pedersen HS, Rafudeen S, Hussein S, Tamiru M, Nakayama N, Robinson M, Barker I, Zeeman S, **Tadele Z. 2018.** Technology generation to dissemination: lessons learned from the tef improvement project. *Euphytica* 214(2):31.
6. Tadesse L, Mekbib F, Wakjira A, **Tadele Z. 2018.** Genetic diversity in the Ethiopian garden cress (*Lepidium sativum* L.) using microsatellite markers. *Current Plant Biology*. In press. [10.1016/j.cpb.2018.11.007](https://doi.org/10.1016/j.cpb.2018.11.007)
7. Tadesse L, Mekbib F, Wakjira A, **Tadele Z. 2018.** Multivariate analysis of genetic diversity in the Ethiopian garden cress (*Lepidium sativum* L.) Genotypes. *Journal of Experimental Agriculture International* 27(3): 1-16.
8. Tadesse L, Mekbib F, Wakjira A, **Tadele Z. 2018.** Correlation and path coefficient analysis of yield and quality components of garden cress (*Lepidium sativum* L.) genotypes in Ethiopia. *Journal of Plant Breeding and Crop Science* 10(10): 290-297.
9. Jifar H, Dagne K, Tesfaye K, Assefa K, **Tadele Z. 2018.** Agro-morphological traits diversity in tef [*Eragrostis tef* (Zucc.) Trotter] genotypes from various sources. *Ethiopian Journal of Agricultural Sciences* 28(3):131-148.
10. Tadesse L, Mekbib F, Wakjira A, **Tadele Z. 2018.** Genetic diversity of seed storage protein in the Ethiopian garden cress (*Lepidium sativum* L.). *African Journal of Biotechnology* 17(37):1152-1161.
11. **Tadele Z. 2018.** African orphan crops under abiotic stresses: challenges and opportunities. *Scientifica* 2018:1-19.
12. Kebede W, Tolossa K, Hussein N, Fikre T, Genet Y, Bekele A, Gebremeskel K, Fentahun A, Daba H, Plaza-Wüthrich S, Blösch Regula, Chanyalew S, Asefa K, **Tadele Z. 2018.** Tef (*Eragrostis tef*) Variety ‘Tesfa’. *Ethiopian Journal of Agricultural Sciences* 28(2): 107-112.
13. Ferede B, Mekbib F, Assefa K, Chanyalew S, Abraha E, **Tadele Z. 2018.** Evaluation of tef (*Eragrostis tef*) somaclones for drought tolerance. *Advances in Crop Science and Technology* 6(4): 385.
14. Jörin J, Assefa K, Krütli P, Ben-Abderrazi K, Hauenstein S, Messmer L, Lulseged T, Dawoe E, **Tadele Z, Six J. 2018.** *Resilience of the Tef Value Chain in Ethiopia*. ETH Zurich, Switzerland (in English and Amharic).

**Scientific contribution:** Guest Editor of *Planta Journal*; Book Editor on Grasses (Intech)

# Tef Pelleting training and optimization by Benny Brämberg

(01.10.2018 - 05.10.2018)



*Weighing ingredients*



*Manual liquid application to pelleter*



*Manual powder application to pelleter*



*Drying pelleted seeds*



*Investigating pelleted and dried seeds*



*Sieving dried seeds*

### Visits to tef fields (October 4 and 5, 2018)



Variety screening near Debre Zeit



Tesfa variety (left) in farmer's field



Farming system in Minijar area



Candidate varieties in Minjar farmer field

### Visits to Melkassa mechanization (October 5, 2018)



Animal-drawn tef planter



Front-back tef planter

**Visit to Chefe Donsa area, Gimbichu District (28.11.2018)**



*Farmer's field, Kersa community, Chefe Donsa, Gimbichu*



*Chefe Donsa sub-station, under Debre Zeit Agric. Research Center, EIAR*