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CONSUMPTION OF WILD EDIBLE PLANTS IS COMMON AMONG WOMEN IN A RURAL AREA IN TUNISIA: THE SIDI BOUZID CASE STUDY

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Introduction and objectives

- Tunisia is facing the challenge of a double burden of malnutrition combining adiposity and micronutrient deficiency [1,2].
- There is an increasing recognition of the contribution of Wild Edible Plants (WEPs) to building sustainable food systems where they could play a significant role for prevention of malnutrition [3].
- The Sidi Bouzid case study is part of the MEDINA research project “Promoting sustainable food systems in the Mediterranean for good nutrition and health”.
- Agriculture in the Sidi Bouzid governorate is undergoing a transition: small-holder family agriculture is still predominant but large private farms using modern agricultural techniques are developing. The objective of the study was to assess the prevalence of consumption of WEPs among women and to relate it to sociodemographic characteristics of the population.

Conclusion

- A large majority of women consume WEPs in this rural area of Tunisia and more women consume WEPs during the winter than during the autumn.
- Wild fennel is the most commonly consumed WEP and consumption seems to be neither influenced by age, anthropometry nor by sociodemographic characteristics of the women and their households. The only two factors that appear to play a role is the geographic area of residence and access to products of a vegetable garden. These factors could be related to agroecological conditions, market availability of the WEPs or familial network.
- The preliminary analysis of consumption of wall rocket tends to show similar results (data not shown), but the geographical area of consumption is distinct from that of wild fennel.
- Results suggest that WEPs could play a significant role in women’s nutrition in this area. Their actual contribution to nutrition will be evaluated by studying their frequency of use and quantities consumed.

Methods

Sampling design: 3-stage cluster sampling.

- 1st stage:** 36 districts sampled randomly from all the administrative delegations of the governorate (with oversampling of rural delegations and probability of selection proportional to population size).
- 2nd stage:** random sample of 20 households per district.
- 3rd stage:** selection of one woman aged 20 to 49 years per household (n=720).

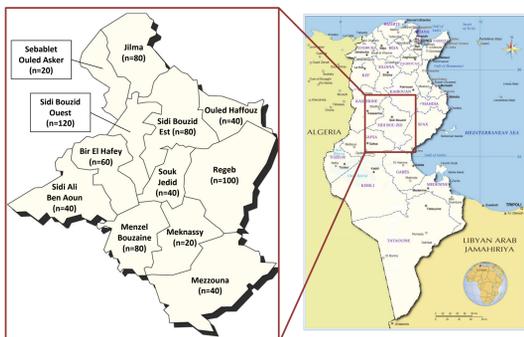
Data collection.

- 1st round (October-November):** household sociodemographic characteristics, women’s anthropometry and dietary intakes (n=718, response rate 99.7%).
- 2nd round (February-March):** women’s dietary intakes (n=660, response rate 91.5%).
- Household sociodemographic characteristics.** Composition of the women’s household, urban or rural residence, professional occupation and level of education of household members, housing characteristics and ownership of appliances. A household economic score was computed by multiple correspondence analyses from the matrix of binary variables coding for six variables describing the characteristics of the dwelling and eleven variables coding household ownership of appliances.
- Dietary intakes.** Women’s consumption of WEPs was assessed using a 3-month retrospective food frequency questionnaire (FFQ). A list of WEPs, their season of availability and common cooked dishes including them were determined in a previous qualitative study. In the FFQ, WEPs were listed as a simple food (e.g. consumption of jujube fruit) or as an ingredient of a mixed dish (e.g. leaves of wild fennel as part of kneff). Several common cooked dishes were listed for each WEP where relevant. The number of FFQ items varied according to the seasonal availability of the WEPs: 56 items related to 11 WEPs in the 1st round of survey, assessing autumnal WEP consumption; 91 items related to 19 WEPs in the 2nd round, assessing wintry WEP consumption.
- Anthropometry.** Women’s height was measured to the nearest 0.1 cm with a stadiometer, weight was measured to the nearest 0.1 kg on a calibrated scale and waist circumference (WC) was measured at the midpoint between the lower rib and the iliac crest. Body mass index (BMI) was calculated (kg/m²).

Data analysis.

- Analyses were performed by using specific survey data procedures (surveymeans, surveyfreq and surveylogistic) in SAS 9.4 software (SAS Institute Inc). Associations between the consumption of wild fennel (dependent variable) and anthropometry and sociodemographic characteristics (independent variables) were assessed in a logistic regression model after adjusting where appropriate. P<0.05 was considered significant.

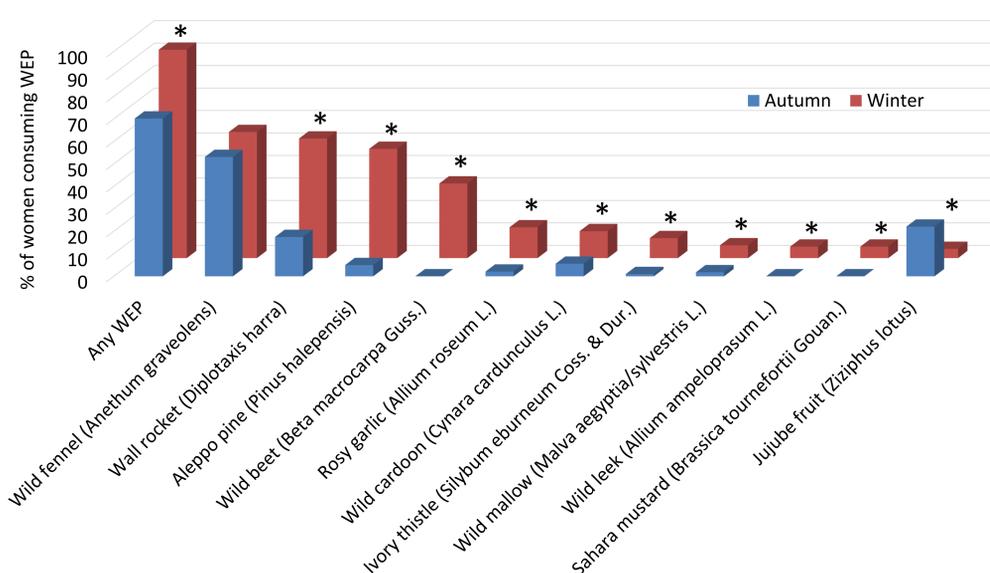
Figure 1. Number of women from the 12 delegations of Sidi Bouzid



Results

Consumption of WEPs.

Figure 2. Percentage of WEP consumers as a function of season among women (n=660) of Sidi Bouzid^a



^a WEPs which were consumed by less than 5% of the sample in both seasons are not shown. * Significant difference of percentage of women consuming WEP according the season using McNemar’s test.

- More women consumed WEPs during the winter than during the autumn (93% vs. 72%, P<0.0001). This pattern was true for each WEP, except for jujube fruit where percentage of consumers was higher in autumn and for wild fennel where there was no significant difference (Figure 2).
- Wild fennel is the most consumed WEP in both autumn and winter (resp. 53% & 56%), usually consumed as part of a vegetarian couscous dish named *kneff* (resp. 85% & 93%).

Wild fennel consumption, anthropometry and sociodemographic characteristics.

- When comparing women consuming wild fennel at least once in the past 6 months (71%) with the non-consumers (29%), there were no differences in terms of age and anthropometry (BMI and WC), and the only differences in terms of sociodemographic characteristics were having more access to products of a vegetable garden (P<0.0001) and living in specific geographic area (P<0.0001).
- Using a logistic regression model, the consumption of wild fennel was found to be mainly influenced by geographic area and then modulated by access to products of a vegetable garden (Table 1, Figure 3).

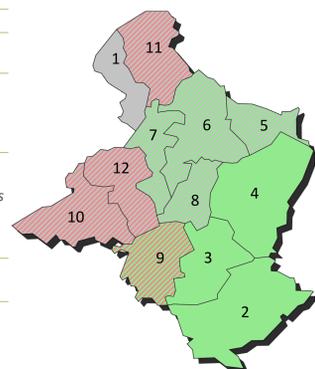
Table 1. Associations of characteristics with the consumption of wild fennel among women (n=660) of Sidi Bouzid^b

Characteristic	DF	Wald χ^2	Pr > χ^2
Geographic area	11	499.78	<0.0001
Access to products of a vegetable garden	1	57.52	<0.0001
Geographic area x Access to products of a vegetable garden	11	237.97	<0.0001

^b Model including women’s age, BMI, WC, professional occupation and level of education, household economic score, geographic area and access to products of a vegetable garden. A significant interaction was found between geographic area and access to products of a vegetable garden.

Figure 3. Interaction between geographic area and access to products of a vegetable garden (Follow-up Table 1)

Geographic area	Interaction
1- Sebalet Ouled Asker	Reference area (RA, 50% of consumers), having access to products of a vegetable garden increased the chances to consume wild fennel
2- Mezzouna	More chance to consume wild fennel compared to RA, whatever the access to products of a vegetable garden
3- Mekkassy	
4- Regeb	
5- Ouled Haffouz	
6- Sidi Bouzid Est	More chance to consume wild fennel compared to RA, modulated by the access to products of a vegetable garden
7- Sidi Bouzid Ouest	
8- Souk Jedid	
9- Menzel Bouzaine	Chances to consume wild fennel depended more on having access to products of a vegetable garden than on geographic area
10- Sidi Ali Ben Aoun	
11- Jilma	Less chance to consume wild fennel compared to RA, modulated by the access to products of a vegetable garden
12- Bir El Hafey	



References: [1] El Ati et al. Gender obesity inequities are huge but differ greatly according to environment and socio-economics in a North African setting: a national cross-sectional study in Tunisia. PLoS One (2012) 7: 10. [2] El Ati et al. Zinc and copper status in childbearing age Tunisian women: Relation to age, residential area, socioeconomic situation and physiologic characteristics. Chemosphere (2016) 149. [3] Powell et al. Improving diets with wild and cultivated biodiversity from across the landscape. Food Sec. (2015) 7. [4] Fungo et al. Factors influencing consumption of nutrient rich forest foods in rural Cameroon. Appetite (2016) 97.

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