

Notes on Economic Plants

Your Poison in My Pie—the Use of Potato (*Solanum tuberosum* L.) Leaves in Sakartvelo, Republic of Georgia, Caucasus, and Gollobordo, Eastern Albania

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Introduction

This paper reports on a subset of data of two independent ethnobotanical studies in Georgia and Albania/Macedonia. As part of the broader ethnobotanical interviews, participants were asked about their use of plants in general. When discussing the interviews of both regions, the authors found an interesting shared use of potato (*Solanum tuberosum* L.) leaves in parts of both study regions, that had never been reported before, and decided to combine their data in this paper. While potatoes are widely grown for regular food purposes (use of the tubers) at all researched altitudes (from 500 to 2335 m) in both regions, potato leaves are normally regarded as toxic (Turner and von Aderkas 2009). We hypothesized that using them as food would be a custom of isolated high altitude villages, where fresh herbs would be rare, especially after the long winter, and that second, this custom would have been discontinued with increasing accessibility of the region after the construction of roads.

The territory of modern-day Georgia (Fig. 1) has been continuously inhabited since the early Stone Age, and agriculture was developed during the early Neolithic era (Javakhishvili 1987). In Georgian, the name of the country is “Sakartvelo,” and “Georgia” is semantically linked to Greek (γεωργία) meaning “agriculture” (Javakhishvili 1987). Human occupation, however, started in the Early Pleistocene. The 1.7-Myr-old

hominid fossils of Dmanisi in Southern Georgia are the earliest known hominid-site outside of Africa (Gabunia and Vekua 1995; Gabunia et al. 2000; Finlayson 2005). Late Middle Paleolithic and Early Upper Neanderthal and modern human occupation are well documented (Adler and Bar-Oz 2009). The archeological findings from Neolithic and Early Bronze periods are rich with plant fossils and seeds of both wild species and local landraces (Melikishvili 1970). The earliest grapevine seeds indicating cultivation were excavated in southern Georgia and date to ~8,000 years BP (Ramishvili 1988). Due to its long tradition, agriculture in Georgia is characterized by a great diversity of landraces and endemic species of crops, as well as crop introductions (Bussmann et al. 2014). Early research documented this great variety (Ketskhoveli 1928, 1957; Dekaprelevis and Menabde 1929; Menabde 1938, 1948; Ketskhoveli et al. 1960), but a rapid loss of local cultivars of cereals, legumes, and flax began in the 1950s with Stalinist agricultural reform (Akhalkatsi 2009; Akhalkatsi et al. 2010). Despite the long cultural history, recent studies on cultivated plants in Georgia are rather scarce (Zhizhizlashvili and Berishvili 1980; Pistrick et al. 2009).

Although the mountainous territory of Eastern Albania and NW Macedonia (Fig. 1) is separated from Georgia by hundreds of kilometers, it is characterized by similar livelihoods and environments. Like in mountainous Georgia, the



Fig. 1. Study area Republic of Georgia and Albania (based on United Nations, modified).

populations rely on small-scale farming and pastoralist activities. A significant portion of the

population migrates seasonally to city centers, in some cases only returning to their villages for a few

months during the late spring and summer. According to the Albanian Institute of Statistics data, Gollobordo and the entire Eastern Albania (covering both Peshkopia and Kukës counties) are among the economically poorest areas of not only the country, but also all of Europe. All of the villages in the Gollobordo are nowadays permanently inhabited only by families of Islamic faith, while until the 1990s, most of the Macedonian villages also had an important Christian Orthodox component. The local dialect of the Macedonian minority is now spoken by less than 3000 inhabitants. The climate of the Eastern Albanian and Western Macedonia area is continental, with very harsh temperatures and snowfall during the winter season.

Materials and Methods

ETHNOBOTANICAL INTERVIEWS

Fieldwork was conducted in Khevsureti, Samtskhe-Javakheti, Tusheti, Svaneti, and Racha-Lechkhumi in July–August 2013, July–August 2014, and September–October 2015. Interviews using semi-structured questionnaires were conducted with 170 participants (80 women and 90 men) after obtaining their oral prior informed consent Samtskhe-Javakheti: 34 participants (10 Armenian speakers/23 Georgian speaker/1 Greek/Russian speaker); Svaneti and Racha: 63 participants (all Georgian/Svan and Rachian speakers); and Khevsureti, and Tusheti: 74 participants (all Georgian/Tush and Khevsuer speakers). The participants were selected by snowball sampling, trying to reach gender balance and represent members of different ages (13–93 years). However, most participants were over 50 years old, as interviews targeted remote villages where only very few younger people remain. All interviews were carried out in the participants' homes and gardens by native speakers of Georgian and its local dialects (Svan, Tush, Khevsur, Phshav) or where participants spoke these as their native language, Armenian, and in one case Greek. Russian, which all participants and interviewers were fluent in, was used as the lingua franca in some interviews involving Armenian and Greek participants. Interviews were subsequently translated into English. In Albania data were gathered during several weeks in the spring and summer months in 2012, 2013, and 2014. In Eastern

Albania and NW Macedonia 94 elderly locals were interviewed.

STATISTICAL ANALYSIS

Because the underlying studies used different methodologies, we tabulated informant reports of *S. tuberosum* leaves and *S. tuberosum* tubers used as food only for each community within three regions of Georgia: Tusheti-Khevsureti, Samtschke-Kavaketi, and Svaneti-Racha. We then tested whether the distribution of elevations at which informants reported eating *S. tuberosum* leaves differed from the distribution of elevations at which informants reported eating tubers, constructing box-and-whisker plots comparing the first, second, and third quartiles (boxes) and the data extremes (whiskers).

Results

Of the 170 participants in Georgia, only 21 reported to know of the consumption of potato leaves, in contrast to 160 who reported to regularly eat potatoes (Table 1). All reports about leaf eating came from participants from Tusheti-Khevsureti. Within this region, only participants from the highest villages (Fig. 2) reported to have eaten potato leaves. The seven participants from Samtskhe-Javakheti (who lived in the lower villages of this region), who indicated leaf consumption had all been born in Tusheti and recalled the custom from their youth (Figs. 2 and 3). None of the participants ate potato leaves nowadays, but all agreed that for consumption young leaves had to be collected in early spring, should be boiled in water, and after discarding the liquid the remaining herb material could be used for *pkhali* (herb pie). All indicated that with increased market access the custom has been abandoned.

The same practice of consuming young potato leaves was found in our study area in Eastern Albania and Western Macedonia (Fig. 1), where it is restricted to the highest elevation inhabited villages (above 1000 m). In Western Macedonia and the Mokra area of Eastern Albania, this practice is only remembered by the elderly. However, ethnic (Muslim) Macedonians in Gollobordo (one of the poorest areas of Europe) still practice it. Young leaves are collected in April–May, shortly boiled, and used, mixed together with sour cream, or sour ricotta, or cheese or butter, and sometimes onions (possibly to balance the taste) as a filling for salty

TABLE 1. REPORTS OF USING *SOLANUM TUBEROSUM* LEAVES IN GEORGIA

Region	Community	Elevation	<i>N</i> (leaf)	<i>N</i> (root)
SK	Bakuriani	1650	2	13
SK	Mzetamze	1150	5	5
SK	Moliti (Armenian)	2200		1
SK	Tabatskuri (Armenian)	2200		14
SR	Khophuri	660		2
SR	Oqhureshi	716		6
SR	Gvimbrala	800		4
SR	Babili	850		2
SR	Lahamula	1050		3
SR	Nakuraleshi	1100		10
SR	Mananauri	1150		3
SR	Tskhekvani	1320		3
SR	Labsqhalidi	1530		1
SR	Ebuthi	1550		10
SR	Chvabiani	1600		2
SR	Leli	1660		2
SR	Tzvrimi	1850		2
SR	Zeskho	1920		2
SR	Murqhmeli	2050		2
SR	Zhibiani	2125		8
TK	Shtrolta	NA	1	
TK	Barisakho	1300	1	14
TK	Ortskali	1350		2
TK	Kobulo	1400		1
TK	Shatili	1450		4
TK	Atabe	1750		1
TK	Chagsopeli	1780	2	2
TK	Dartlo	1780	2	3
TK	Aragvispiri	1800		3
TK	Ardoti	1800		1
TK	Diklo	1900		1
TK	Dino	1900	2	2
TK	Jarvoseli	1900		2
TK	Juhta	1900		1
TK	Omalo	1900		10
TK	Shenako	1900		3
TK	Beghelas Tchala	2000	2	2
TK	Roshka	2000	2	5
TK	Tchesho	2000		1
TK	Girevi	2085		1
TK	Gogrulta	2100	2	2
TK	Bochorna	2335		4

Total number of reports for each community of the use of potato leaves and potato roots as food are given (SK Samtskhe-Javakheti, SR Svaneti-Racha, TK Tusheti-Khevsureti)

pies (börek), or even as wrapping leaves for *sarma* (Pieroni et al. 2013, 2015a, b).

Discussion

The use of potato leaves has not before been reported in the literature, whereas the use of fruits and leaves of other *Solanum* species, e.g., members of the *Solanum nigrum* L./*S. americanum* L. complex is common around the globe. In Hawai'i, *S. americanum* leaves and berries were used as famine foods (Krauss 1976, 1993; Abbott 1992). Similar uses are reported for *S. nigrum* in Tanzania (AVRDC 2001, 2003), Uganda (Bukonya and Carasco 1995, 1999; Bukonya 1996; Katende et al. 1999), Kenya (Maundu et al. 1999), and Africa in general (Schippers 2000). Crowe (1990) reported *S. nigrum* leaves as food for New Zealand, and Henderson (1974) and Symon (1981) indicated Australian aboriginal use of the species as food, while Reid (1946) reported food use of the species from old sources in China, Schilling and Andersen (1990) for India, and Singh and Kachroo (1976) specifically for high altitude regions in Jammu and Kashmir. Niebuhr (1970) mentioned the use of *S. nigrum* leaves as food in the Aegean. Some of the authors of this paper (Bussmann and Paniagua-Zambrana) frequently ate *S. nigrum* leaves as vegetables in Madagascar. Both *S. nigrum* and *S. americanum* are reported as foods on a global scale (Edmonds 1977, 1979, 1984; Hedrick 1972; Huxley 1992; Edmonds and Chweya 1997) and *S. americanum* is also widely known as a food plant among Native Americans (Moerman 1998).

In contrast, the use of leaves of *S. tuberosum* seems to be a very restricted custom in high mountain communities in Europe. No references on this custom could be found in the literature for Georgia, and no references seem to exist for high mountain regions beyond Europe, especially Andean South America. The author's personal experience of several decades of fieldwork in the Andes, whence *S. tuberosum* originates, excludes any observations of potato leaf use as food. *S. tuberosum* leaves clearly represent an emergency staple, at times when no other fresh food is available, in particular in very isolated mountain communities. The preparation of potato leaves for food does in most cases involve careful selection of young leaves—which may be significantly less toxic (Brown et al. 1999; Pieroni et al. 2014)—and preparation to leach out any toxins, a clear indication of the adaptive ingenuity of mountain populations. We believe that the emergence of this practice in remote areas of the Southern Balkan Mountains is the result of an

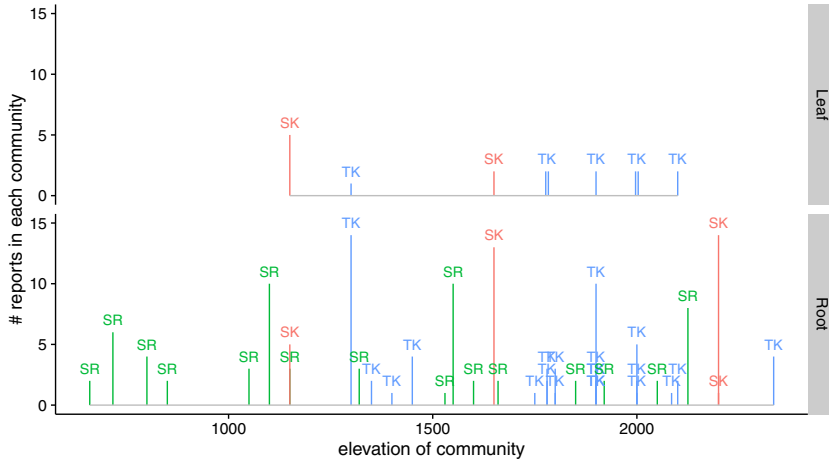


Fig. 2. Elevational distribution of use reports of *Solanum tuberosum* leaves vs. roots. Each vertical line represents a community; its height represents the number of reports within that community (SK Samtshke-Javakheti, SR Svaneti-Racha, TK Tusheti-Khevsureti).

extreme adaptation due to the spring food shortages affecting high elevation villages, especially in the past. Interestingly, many of the highest villages originated in the Southern Balkan study area about one century ago, as an adaptation to demographic increase generated in the lower villages when potatoes were introduced as crop. In other words, the arrival of potato as a crop may have simultaneously brought locals to high elevation communities and given them the resources for the practice of consuming young potato leaves. In Georgia, the practice is restricted to mountain regions that did not have any road access until a few decades ago

(Tusheti, Upper Khevsureti). In regions that for centuries had good accessibility (e.g., Svaneti), potato leaves never played a role in local diet.

Conclusions

The consumption of potato leaves is clearly a custom restricted to high-altitude villages with very limited access, and isolation due to snow closure of mountain passes. Local inhabitants use carefully processed leaves of *S. tuberosum* as one of the first vegetables in spring, when forest areas are still

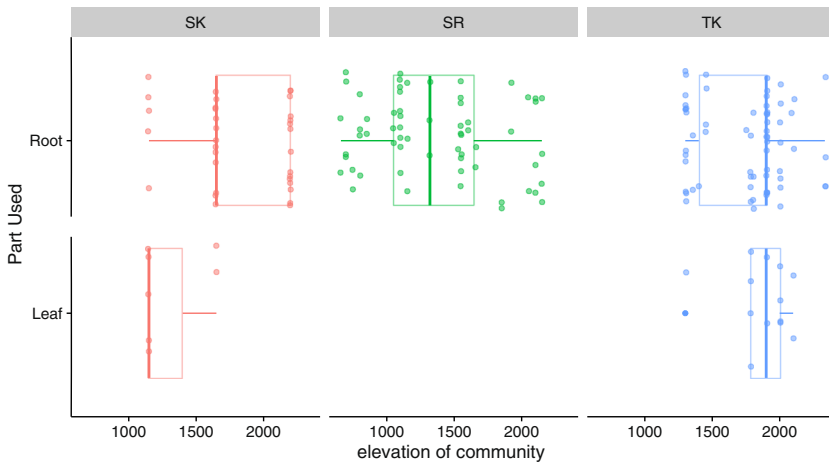


Fig. 3. Elevational distribution of use reports of *Solanum tuberosum* leaves vs. roots. Each point is an individual use report (SK Samtshke-Javajheti, SR Svaneti-Racha, TK Tusheti-Khevsureti).

inaccessible. New access roads, abandonment of villages during winter, and better storage options have largely made the custom obsolete. This cryptic practice has remained previously undescribed due to the isolation, which previously necessitated it. The fact that the practice has been discontinued in most of Georgia, as well as in Macedonia, highlights the urgency of traditional knowledge documentation in rapidly changing mountain communities.

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