

Medicinal use and social status of the soap berry *endod* (*Phytolacca dodecandra*) in Ethiopia

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Abstract

Berries from *Phytolacca dodecandra* L'Herit. (*endod* in Amharic) offer a readily available molluscicide to control schistosomiasis. Parts of the *endod* plant have been used as a detergent and as traditional medicine for centuries in Ethiopia. An interview survey was performed in the highlands of Ethiopia to provide information on the distribution of the plant, people's traditional use of it, their perception of the plant, and the potential for increased production and use of *endod* as a soap for indirect control of schistosomiasis. People of all ages report that they are familiar with the plant and its detergent and medicinal uses. The plant is largely disappearing from unprotected areas due to land clearing. Younger people appear to use *endod* as a soap whenever it is available. Older women prefer commercial soap and consider *endod* to be associated with poor people. Common medicinal uses include treatment of skin itching (ringworm), abortion, gonorrhoea, leeches, intestinal worms, anthrax and rabies. Two thirds of the people express interest in cultivating *endod* for personal use if supplied with rooted cuttings. Increased cultivation of *endod* and use of berries for washing might be possible if information about schistosomiasis and its control is disseminated among people. Preference for commercial soap and lack of land for cultivation are major obstacles for increasing the availability and use of *endod*.

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1. Introduction

The discovery of molluscicidal properties of berries from *Phytolacca dodecandra* L'Herit. (syn. *P. abyssinica* Hoffman, *Pircunia abyssinica* Mog.; *endod* in Amharic, *shibti* in Tigrigna, *handoo* in Oromigna, *haranje* in Sidamigna) (Lemma, 1965), and associated reduction in schistosomiasis incidence in rural populations (Lemma et al., 1978; Erko et al., 2002), have created a great deal of scientific interest in the plant. The active ingredient, a saponin labeled 'lemmatoxin', was identified by Parkhurst et al. (1974). Toxicological, chemical, and agrobotanical studies on *endod* were done during the period 1970 to 1990 (Lemma et al., 1983; Makhubu, 1987). Methods for cultivating *endod* have been outlined by Lugt (1986) and Wolde-Yohannes et al. (1999). After a toxicological safety clearance was provided in 1991 (Lambert et al., 1991), recent research has focused on field applications and introduction of the *endod* bush

into the farming practice in Ethiopia for local control of schistosomiasis.

Phytolacca dodecandra is a sprawling woody climber with stems reaching 5–10 m in length, with erect, racemic, dioecious flowering stalks, and pinkish or red berries. The species is widely distributed over parts of Sub-Saharan Africa, South America, and Asia (Dalziel, 1936). In Ethiopia, the plant can be found at elevations between 1600 and 3000 m above sea level (Wolde-Yohannes et al., 1986).

Berries from *P. dodecandra* have traditionally been used as a soap for washing cotton clothes in Ethiopia for centuries. Berries are ground in either fresh or dried form and used directly as soap. Ground leaves can also be used, but are less potent compared to berries. The plant is also used for various medicinal purposes (Watt and Breyer-Brandwijk, 1962; Wolde-Yohannes et al., 1988; Ndamba et al., 1989).

The introduction of commercial soap has apparently reduced the use of *endod* soap in rural Ethiopia. As a consequence, the prevalence of schistosomiasis has most likely increased. Studies on the link between changes in the use of *endod* soap and prevalence of schistosomiasis are, however, not available.

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In addition to natural streams and ponds, water reservoirs and irrigation canals serve as habitats for the vector snails (*Biomphalaria* sp. and *Bulinus* sp.) in which *Schistosoma* sp. parasites multiply. Hence, water development projects commonly introduce or aggravate the disease in affected communities.

Efforts to determine the potential for reintroducing *endod* as a soap or as a molluscicide for direct application to control the disease, has raised the following questions: (1) is the *endod* plant being eradicated in Ethiopia by deforestation, intensified cultivation, and droughts? (2) Is the traditional use and appreciation of the *endod* plant disappearing with the older generation? (3) Is there a possibility to raise interest among rural people in protecting and cultivating *endod* plants for medicinal use? (4) Is there a potential for re-introducing the *endod* soap? The present study attempts to provide some information needed to answer these questions.

Other on-going studies in Ethiopia attempt to determine the benefit of *endod* used as a molluscicide on the schistosomiasis incidence in selected villages, establish suitable techniques for *endod* cultivation, as well as develop methods for viable community-based *endod* treatment of waterways infected by *Schistosoma*.

2. Materials and methods

The survey is based on interviews with 255 people encountered along main roads in large parts of the Ethiopian highlands from January to March 1998 (Fig. 1). The

interview objects were selected semi-randomly among people in villages and in the countryside. Informants were selected to ensure a representative gender and age distribution. The interviews were semi-structured into five categories of questions. Informants were also encouraged to bring forward any other information they might have.

The following questions were presented:

1. Familiarity
 - Are you familiar with *endod*?
2. Habitat and distribution
 - Does *endod* grow wild or is it cultivated in your area?
 - Where do *endod* plants grow (fence, field margin, river side, forest, hills, mountains)?
 - Do you protect *endod* plants in any way?
 - Do farmers cut down *endod* to clear land for cultivation?
 - Has the overall occurrence of *endod* plants changed over time?
3. Use of *endod* for washing
 - Has your family used *endod* to wash clothes (cotton clothes or all clothes)?
 - Which part of the plant do you mostly use (berries or leaves)?
 - How often do members of your family use *endod* for washing clothes (never, sometimes, often, always when available)?
 - Would you use more *endod* if it were (1) available at the market, (2) available in the vicinity, or (3) cultivated near the house?



Fig. 1. Travel route used for interviewing.

4. Other uses of *endod*

- Do animals feed on *endod* (cattle or goats in dry season only; cattle or goats in all seasons)?
- Do people in the area use *endod* for purposes other than soap (firewood, abortion, gonorrhoea, rabies, leeches, anthrax, intestinal worms, skin itching/skin fungus)?

5. People's interest in cultivating *endod*

- Have you, or someone in your family, tried to cultivate *endod*?
- If yes, where and how (close or far from house; propagated vegetatively or by seed)?
- If no, why not (lack of interest, shortage of land, lack of awareness, avoid misuse (abortion or suicide), enough wild *endod*, prefer commercial soap, available at the market, *endod* is not socially accepted)?
- If provided with small *endod* plants, would you be interested in cultivating them?
- If yes, for own use, for sale or both?
- If no, due to land shortage, to avoid misuse, there is enough wild, or prefer commercial soap?

In addition to these questions, region, village name, altitude, and age and gender of interview objects were recorded.

The link between abdominal pains and snails in rivers is not known to most rural people. The use of *endod* to control schistosomiasis was, therefore, not brought up by the research team during the interviews.

Most questions required a yes/no answer. The data are presented as proportions of yes or no answers in percent of total. Responses by the interviewed people were split by administrative regions as of 1996, age groups (11–25, 26–40, 41–55, and 56–85 years), and gender. Although the data are presented on a regional basis, no attempt was made to obtain representative sampling within regions. For some regions, only a small part of the total area was covered. Some of the regions also contain a low number of observations resulting in a low level of data reliability. Since all informants were met near major roads, the sampling excluded people living in remote areas.

3. Results and discussion

3.1. Background data

Of the 255 interviewed people, 123 were women and 132 were men. Their age ranged from 11 to 85 years with 38 years as overall mean. The age distributions for interviewed women and men are similar (Fig. 2). Within each region, close to half were female and half were male (ratio ranging from 58% female and 42% male to 45% female and 55% male). Slightly deviating age distributions among regions (Fig. 3) may have influenced the regional data. The interviewed people were met within 1400 and 3200 m elevation (average 2176 m) which includes the natural growth range of *endod*. All the interviewed people were familiar with the *endod* plant.

3.2. Habitat and distribution

Nearly all people interviewed reported that the plant grows wild in their vicinity to some extent. The highest proportion of answers that *endod* does not grow wild were given in Shewa (8%) followed by Keffa (7%), Tigray (4%) and Wollo (4%). Most frequently recorded habitats for *endod* plants were along fences (87%), followed by forest (84%), river side (84%), hills/mountains (70%), and field margins (62%). It seems that *endod* bushes often serve as a live fence, shield against the wind, and as a source of soap and medicines.

Almost half of the informants (42%) reported that *endod* plants growing near their houses are protected. Wild bushes are less protected (17% affirmative). Almost 80% of the respondents reported that farmers sometimes cut down *endod* bushes to clear land for agriculture. On the other hand, in Bale and Gamo Gofa 57 and 43%, respectively, stated that farmers did not clear *endod* bushes.

A majority (77%) of all informants reported that the occurrence of *endod* bushes in their vicinity has decreased, 14% reported constant number, and 9% reported an increase. The highest incidence of decreasing occurrence of *endod* bushes were found in Arsi and Bale (100%) followed by Gonder (92%) and Gojam (83%) (Fig. 4). The reported decrease in

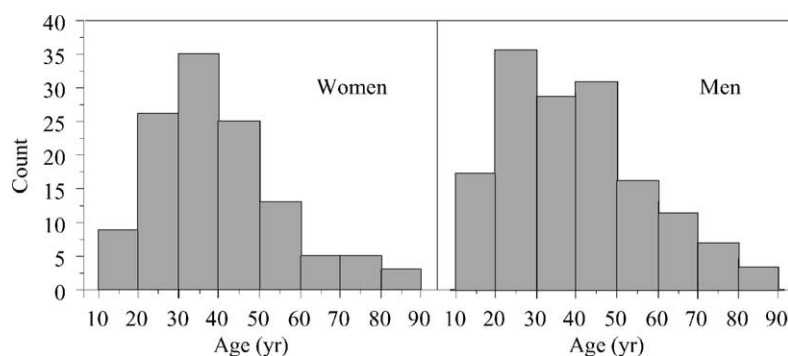


Fig. 2. Age distribution among interviewed men and women.

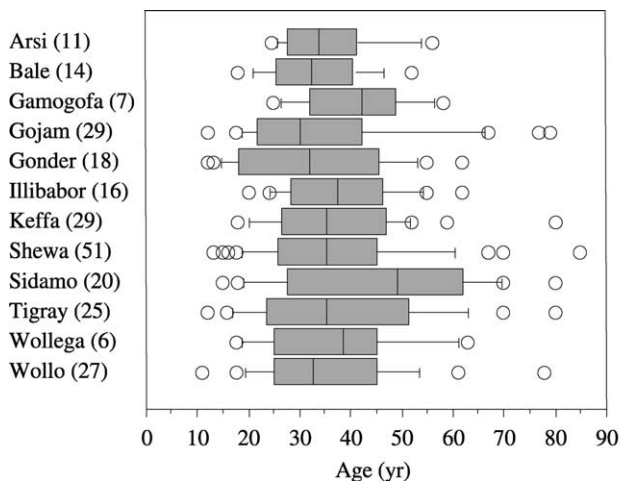


Fig. 3. Age distributions of interviewed people in each region (bar represents lower and upper quartile separated by median, lower line represents lower quartile minus 1.5 times interquartile range, upper line represents upper quartile plus 1.5 times interquartile range, circle represents extreme value; number of interviewees for each region in parenthesis).

plant distribution seems to be caused primarily by clearing of land by farmers. Some farmers in Wollo indicated that most of the remaining *endod* plants in the Bati area were cut down and used for fodder during the drought in 1984. Highest incidences of increasing distribution was observed in Wollega (33%) followed by Gamo Gofa (29%) and Illibabor (19%). Farmers claim that the plant can sometimes be a nuisance since it sprouts rapidly after being chopped down. Once established, the *endod* plant can be difficult to get rid of since it is deeply rooted. *Endod* bushes also cause problems for farmers by serving as shelter for birds and rats.

3.3. Endod used for washing

In most families (89%) someone has used *endod* for washing clothes at some time. Half of them use or have used *endod* both for cotton and synthetic fabrics, whereas the other half use *endod* only for cotton clothes and commercial soap for clothes of synthetic fibers. For the purpose of washing, berries are mostly used, but ground leaves have also a cleaning effect.

Almost half of the respondents (46%) use *endod* soap “whenever available”. The period when *endod* is naturally available lasts for 2–4 months. If people dry and store berries, *endod* can be available all year. The statement that people use *endod* “whenever available” should be considered more an expression of people’s attitude than their actual use of *endod* soap relative to commercial soap. In the Wollo region, plants produce berries during November to January and June to August. Racemes of berries ripen individually during these periods. We do not have information to what extent people store *endod* for off-season use. A third of the people (35%) answered that they use *endod* soap “sometimes” whereas 14% “never” use it.

Nearly all the people (79%) would use more *endod* for washing clothes if more berries were available near the house or in the vicinity. Only 45% would use more if more berries were available at the market. This indicates that only about half the people will spend money buying *endod* although it is very cheap. The other half will only use *endod* if it can be picked freely near their homes. People in Gonder (94%), Tigray (92%), Gojam (72%), and Gamo Gofa (71%) seem most willing to buy *endod* at the market. Since people in these regions expressed relatively low medicinal application of *endod*, we can assume that they are willing to buy *endod*

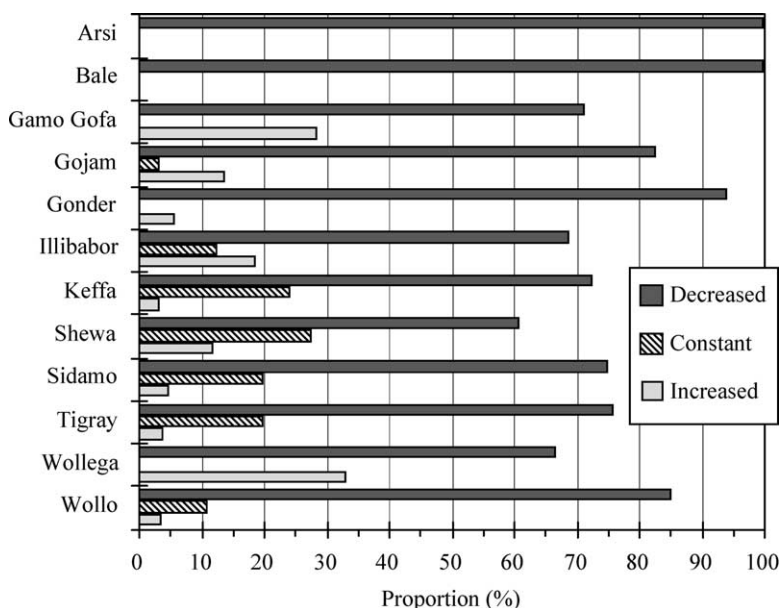


Fig. 4. Proportion of people with the impression that the distribution of *endod* has decreased, remained constant, or increased in the respective regions.

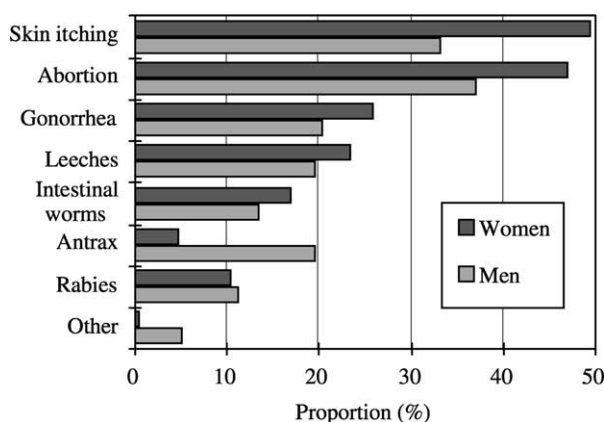


Fig. 5. Medicinal uses of *endod* among men and women.

primarily for the purpose of washing. In many areas, *endod* is offered for sale only in remote markets and not in markets close to major roads or towns.

3.4. *Endod* used as fodder

Endod is certainly not the first choice of fodder for browsing animals. Cattle do not feed on *endod* in the wet season when more palatable plants are available. Goats, however, feed on *endod* all seasons according to 13% of the people asked. In the dry season, 37% answered that cattle feed on *endod*, whereas 50% stated that only goats feed on it. Great regional differences are evident probably due to differences in livestock density and fodder availability. In Arsi and Gamo Gofa, 72 and 57%, respectively, responded that goats feed on *endod* all year.

3.5. Medicinal uses

People are generally familiar with the use of *endod* for medicinal purposes. Berries, leaves, and roots are used for various human and animal ailments. The use of *endod* against abortion and skin itching (including ringworm) is most common, followed by treatment of gonorrhoea, leeches, intestinal worms, anthrax, and rabies (Fig. 5). The medicinal uses of *endod* differ appreciably between the regions. The use of *endod* against skin itching was reported by 94% in Illibabor, followed by 79% in Bale and 76% in Keffa as opposed to none in Gamo Gofa and Gonder and only 4% in Tigray (Fig. 6). The use of *endod* for abortion is more evenly distributed with highs of 67 and 64% in Wollega and Arsi, respectively, and lows of 14, 15 and 15% in Gojam, Sidamo, and Gonder, respectively. In Gamo Gofa, Gonder, and Tigray, low frequencies were recorded of *endod* used against gonorrhoea (0–4%) compared to the average of 23%. Highest reported use of *endod* against gonorrhoea was found in Bale with 71%. People in Gonder, Gojam, Gamo Gofa, Sidamo, and Wollega reported no use of *endod* against leeches, whereas the proportions of yes-answers in the other regions

ranged from 12% in Tigray to 45% in Keffa. Significant use of *endod* against anthrax seems limited to Gojam (52%), Gonder (46%), and Shewa (14%). The other regions show 0–3% affirmative answers. The use of *endod* against rabies was reported in Illibabor (31%), Keffa (24%), Bale (21%), Shewa (17%), and Gojam (14%). *Endod* used against intestinal worms ranges from 33% in Shewa to none in Gamo Gofa. We do not know whether the regional differences reported here reflect differences in the regional distributions of the diseases or differences in traditional use of *endod*.

3.6. Other uses

Although *endod* bushes were observed with trunk diameters up to 35 cm, the plant is not commonly used for firewood. This might partly be due to the soft consistency of the wood, but also due to the belief that the smoke from burning *endod* drastically reduces the male sexual ability. This belief is probably based on the abortifacient effect of *endod*. Due to the long and soft branches of the *endod* bush, the plant is often cut down and used for making fences.

3.7. People's interest in cultivating *endod*

Overall, few of the interviewed people or members of their family (15%) have attempted to cultivate *endod* plants. Regional differences seem to exist, however. In Wollega, 33% have tried propagation followed by people in Gonder (31%), Gojam (24%), and Tigray (20%). Among those who had attempted to cultivate *endod*, all had planted the bush in the vicinity of their house, probably along fences to serve both as a source of *endod* berries and as a physical barrier. Vegetative propagation is the most common method of new establishment (73% of those who had tried) whereas 54% had used seed propagation alone or in combination with vegetative propagation. Among those who had not tried to cultivate new plants, 70% reported “prefer commercial soap” as a main reason, followed by “lack of interest” (55%), “lack of awareness” (48%), view that *endod* is “not socially acceptable” (37%), and “enough wild plants” are available (22%). Few people stated that a reason was “shortage of land” (12%), “plenty at the market” (5%), and to “avoid misuse” (2%). The overall low social status of *endod* is apparently based on its image as a poor-man's soap rather than its use to induce abortion.

The general understanding of schistosomiasis is low in Ethiopian rural communities. The issue of cultivating *endod* for the purpose of schistosomiasis control is, therefore, not easily understood by people. In contrast, a similar study in Zimbabwe suggests that people are more aware of the disease, and 77% of interviewed people were prepared to cultivate *endod* for local schistosomiasis control (Ndamba et al., 1989).

If provided with small, rooted *endod* plants, 63% of the people answered that they would be interested in planting them for soap production. The relatively high proportion

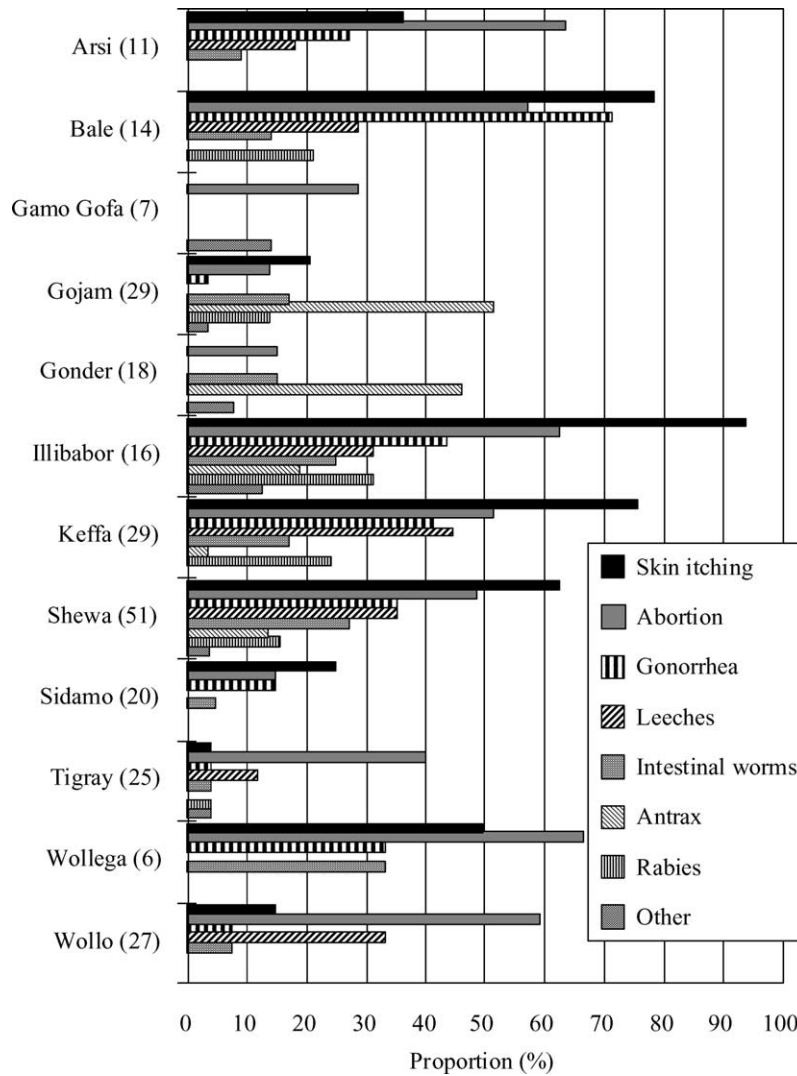


Fig. 6. Medicinal uses of *endod* in each region.

of affirmative answers may be a result of people’s cultural inclination to accept offers and express appreciation. Whether they would take care of the plant or not, remains to be seen. People in Gonder (100%), Gojam (89%), Gamo Gofa (86%), and Tigray (76%) were particularly positive to the idea of *endod* cultivation. These regions appear also to have relatively high rates of reduction in the natural distribution of *endod* plants. All those responding positively to cultivation, would grow *endod* for their own supply. Sixty-one percent of the interested people would also consider sale of *endod* berries despite its low price. People in Gonder (100%), Gojam (87%), and Tigray (79%) were most interested in sale of *endod* berries if they had enough plants.

The main reason for not being interested in cultivating *endod* is people’s preference for commercial soap (93%; Fig. 7). Less important were the reasons “shortage of land” (34%), “enough wild *endod*” (11%), and “avoid misuse” (2%). Only people in Illibabor (71%) stated that “enough

wild *endod*” is an important reason for not planting *endod*. This view may be related to the higher rainfall and more natural vegetation in Illibabor compared to some of the other regions. “Shortage of land” is listed as a major reason among people in Gojam (100%), Bale (87%), and Tigray (79%). The main reason for not being willing to cultivate *endod* for

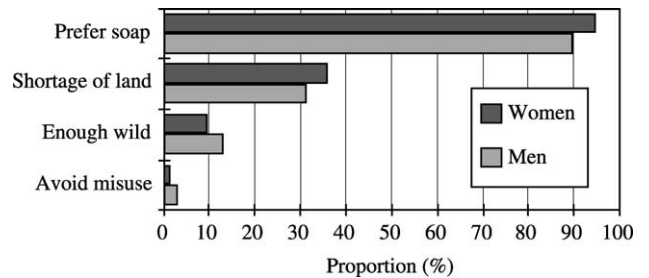


Fig. 7. Reasons given by women and men for not being interested in cultivating rooted *endod* cuttings if provided.

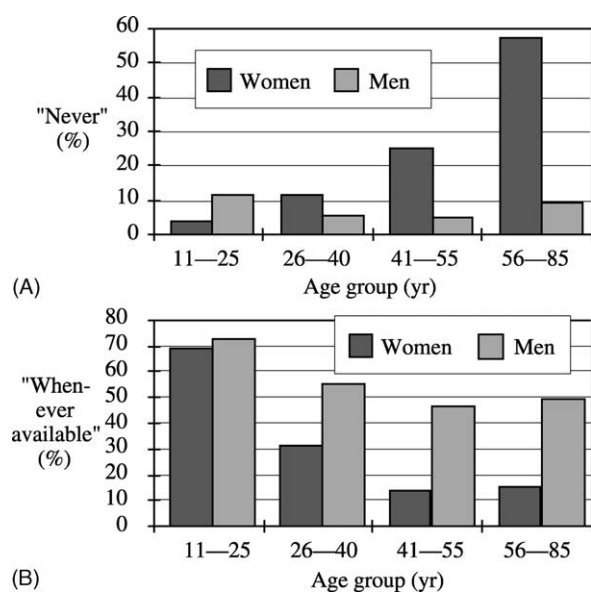


Fig. 8. Proportion of women and men in the four age groups stating that they "never" use *endod* for washing clothes (A) and "whenever available" (B).

schistosomiasis control in Zimbabwe (Ndamba et al., 1989) is shortage of land (48%), lack of knowledge (21%), lack of confidence (11%) and indifference due to old age (20%).

3.8. Differences between age groups

The distribution of men and women in each age group was very close to fifty-fifty except for the group 11–25 years which had 35% women and 65% men. Slightly more of the older people appear to have attempted to cultivate *endod* than younger ones (16–17% for the two oldest groups versus 11% for the youngest). The main reason given for not planting *endod* ("not socially acceptable") seems to be the same across age groups, whereas the older people to a lesser extent give the reason "lack of awareness". More middle-aged people do not consider planting *endod* for the reason that they prefer commercial soap. This might be due to better economic status compared to the other age groups. The different age groups gave quite similar accounts of the medicinal uses of *endod*, suggesting that the traditional knowledge is transferred to new generations. The highest proportion of affirmative answers to the questions whether *endod* is used for abortion and to treat gonorrhoea were given by the age groups 26–40 and 41–55 years.

A consistent increase with age appears to be present in the proportion of women who state that they "never" use *endod* for washing (Fig. 8). The opposite trend is seen for those who answered that they use *endod* soap "whenever available". The proportion of people expressing interest in using more *endod* if more were available, decreases with increasing age—particularly among women (Fig. 9). The younger generation is also more interested in cultivating *endod* if given rooted cuttings, and they express more interest

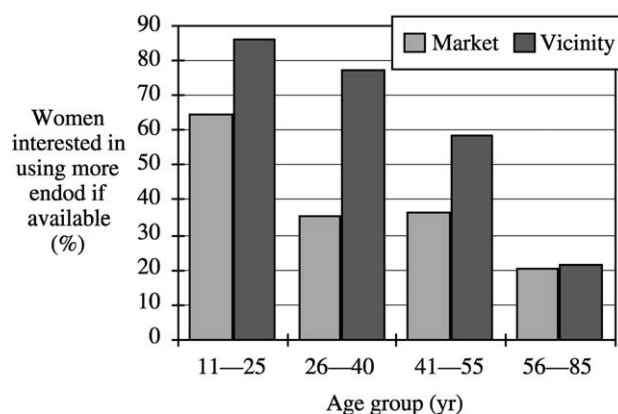


Fig. 9. Proportion of women who expressed interest in using more *endod* for washing if available at the market or on bushes in the vicinity.

in growing *endod* for sale. The older generation—and particularly older women—do not appear to see any reason for using *endod* as long as commercial soap is available. Maybe the positive attitude among the younger people is based on an assumption that cultivation of *endod* may save and make money. One may also speculate whether young people are less self-assured and thus are more inclined to answer positively to the older surveyors. The statistical data do correspond, however, with statements made by some people that it is mostly the younger people who use *endod* for washing. On the other hand, a few people expressed the opposite view; that mostly older people use *endod*.

3.9. Differences between women and men

Women and men have very similar views on the distribution of *endod* and on questions concerning cultivation of the plant. The two groups are also in agreement on reasons for not attempting to grow *endod*, except that women answered more frequently that they prefer commercial soap (79% for women versus 61% for men). Women also seem to find *endod* less socially acceptable than men.

More men than women (87% versus 72%) have the impression that *endod* bushes are being cleared, probably because men do most of the bush clearing work. Men and women are in agreement concerning the type of fabric washed with *endod*. More women than men answer affirmatively on the use of *endod* for abortion, gonorrhoea, and skin itching, whereas men are more familiar with *endod* used against anthrax (Fig. 5). Women use primarily the berries of the plant for washing, while men apparently use relatively more leaves and roots for medicinal purposes.

Men are more interested than women (75% versus 50%) in planting rooted *endod* cuttings. Among those interested, men and women have about the same motivation in terms of using the *endod* for own use or for sale. Among those who are not interested, women give the reason "prefer soap" slightly more frequently than men (95% versus 90%).

3.10. Statements about *endod*

Statements made by interviewed people may give further insights into some of their views and attitudes towards the *endod* plant. Different people may express conflicting views. Some statements are presented below:

- “The root of the plant is used for abortion. Berries are available only a short time. People in the area take rooted runners for planting. Bushes act as windbreaks.” (Shewa)
- “Chopped *endod* leaves mixed with *injera* (teff pancake) serve as medicine for cows. Bushes were recently cleared to make better passage along a path but sprouted vigorously.” (Shewa)
- “Women prefer to grow *endod* for their own use because they don’t like to buy *endod*.” (Shewa)
- “*Endod* is also used to prepare animal hides (*zopina*). Young people prefer to wash with *endod*. *Endod* is used to wash *shema* and *gaba* (traditional cotton clothes). Commercial soap has better washing quality, but *endod* is more gentle to the clothes. Some people would use more *endod* if it were available at the market all year.” (Wollo)
- “*Endod* is grazed only during drought. Old people use *endod*, young people prefer soap. *Endod* can cause death if drunk for abortion. The plant does not get attention by the people. No one cultivates *endod* on their farms.” (Wollo)
- “*Endod* is decreasing due to deforestation. Chopped leaves are used for abortion, but may cause death. Animals eat *endod* only when there is shortage of fodder. People use soap due to lack of *endod* during most of the year. *Endod* is sometimes preferred over commercial soap. *Endod* regenerates naturally by vegetative means.” (Wollo)
- “*Endod* has disappeared due to deforestation mainly since 1985. *Endod* is unwanted around houses because children and women will drink leaf suspension and die, partly due to family conflicts (suicide). *Endod* cannot survive in hot climate. *Endod* grows near rivers and water.” (Wollo)
- “Very dirty clothes are washed with *endod* regardless of fiber. Animals rarely eat *endod* leaves. The bush grows near water next to other trees (chat, coffee, *Euphorbia*, etc.).” (Wollo)
- “Leaves are effective for abortion until 3 months of pregnancy, but may cause death at later stages.” (Wollo)
- “*Endod* grows along roads. It is not effective on modern fabrics. Not used as firewood because it does not give good heat.” (Wollo)
- “If we cultivate *endod*, people will come and take the berries since it is considered a wild plant.” (Wollo)
- “Wood of *Endod* is also used for house construction.” (Wollo)
- “I am not interested in production and sale of *endod* berries because some people consider it to be a witch doctor’s medicine, and it is only for the poorest people. Leaves of male *endod* plants are used to control dactylosporium/filiariasis.” (Wollo)
- “*Endod* has decreased due to deforestation. Almost all *endod* bushes that grew on the farm land have been cleared.” (Tigray)
- “People used *endod* earlier for cotton clothes, but later Omo (commercial soap). Mostly poor people use *endod* now. I may consider cultivating *endod* if given instructions. There are many *endod* bushes in the area. People collect them to sell in Mekelle.” (Tigray)
- “*Endod* is more accepted by people born in the countryside than in towns.” (Tigray)
- “Increasing areas of protected land (area closure) lead to more *endod* plants. *Endod* is poisonous for animals.” (Tigray)
- “*Endod* is used against snake bites and rabies. Chopped roots are soaked for a short time and the filtered suspension is drunk. It then causes vomiting and dysentery for a short time. *Endod* is also used against hepatitis.” (Tigray)
- “Suspensions of leaves are used to treat swollen wounds” (anthrax/blackleg, locally known as *shewa kuruba*). We do not clear *endod* bushes because it is important for medicine and washing. “Earlier we used *endod* soap often, but now we do not use it.” (Gonder)
- “*Endod* is usually not available.” (Gonder)
- “Roots of male *endod* are used to remove gastrointestinal worms. Use for abortion may cause sickness and death.” (Gonder)
- “Leaves are used for both human and animal intestinal worms.” (Gojam)
- “We would not buy at the market because we buy soap; *endod* is for poor people.” (Gojam)
- “Roots of male *endod* is crushed and mixed with honey to treat anthrax. Roots of male plant is used for abortion.” (Gojam)
- “Young leaves are cooked and eaten as a vegetable.” (Gojam)
- “The leaf is chopped and mixed with crop (barley) to increase alcohol content in local *areki* (local barley liquor).” (Gojam)
- “My husband will cultivate *endod* when he gets convinced about its uses other than washing.” (Gojam)
- “People who can’t afford to buy soap use *endod* often. Leaves are used for skin itching.” (Illibabor)
- “Since this area is a cash crop area, *endod* has to be as advantageous as the other crops to be of any interest.” (Illibabor)
- “It is a wild plant and not accepted by society for cultivation.” (Illibabor)
- “*Endod* is not used for firewood because the smoke of the wood will retard the motivation of men’s sex organ.” (Keffa)
- “My husband is interested in cultivation of *endod* even if the area may not be suitable for the plant.” (Keffa)
- “Women use *endod* for abortion, but it is very dangerous and has killed some women in the village. Abortion is not accepted by followers of the Muslim religion.” (Bale)

- “*Endod* is completely removed (destroyed) in our area.” (Arsi)
- “*Endod* needs too much space. If it grows around the farm, we chop it down, otherwise it will affect the crops by shading and serving as a nest for birds. There is no more *endod* around my village.” (Arsi)
- “We don’t protect *endod*. If it grows along the fence or along our fields, other people will not harvest it without our permission.” (Arsi)

3.11. Biased data

Many people in Ethiopia live in remote areas with difficult access to markets. A population sample taken from people living near roads constitutes a bias towards communities with a monetary economy and relatively easy access to modern products. When asking for *endod* in town markets, the study team was often referred to village markets in the hills. If more remote-living people had been included in the study, a higher proportion of the population sample would presumably answer that they use *endod* as a detergent on a more regular basis. Similarly, the use of *endod* for medicinal purposes is most likely more common in areas far from dispensaries. The types of ailments treated with *endod* in remote areas are, however, most likely similar to those reported in this study. We would expect that *endod* carries less of a poverty stigma in roadless areas than in areas with easier communications.

4. Conclusions

People of all ages are familiar with the *endod* plant. The plant distribution appears to be decreasing in most parts of Ethiopia due to land clearing. Locally, it seems to have disappeared completely, whereas a few areas have seen an increase. Although people use its berries for soap and its berries, leaves, and roots for various medicinal purposes, the plant has a low status in society. Berries are used for laundry whenever they are readily available by about half the people, but trade with berries seems to be a poor-woman’s business of low respect. There is, however, an expressed interest among two-thirds of the people in growing the plant for their own use if they were provided with small plants. The interest in cultivating *endod* and using its berries as soap appears to be greatest among the younger generation. The convenience of commercial soap and lack of land for cultivation are the main reasons given for not cultivating *endod*. In addition, the low social status of *endod* makes many people uninterested in production and sale, notably in the western and south-central parts of the country. The interest in *endod*, and social acceptability of it, can probably be promoted among all age groups by information about schistosomiasis and *endod*’s ability to control the disease.

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