

Michaela von Freyhold
ENRO – University of Bremen

Some comments on the situation of seed-supply for production of artemisia annua in Africa

Although there have been strands of artemisia annua grown in many countries, few of them have a high yield of artemisinin. (0,1% -0,6% artemisinin per kg dry leaves is common). Since the eighties most reports on seeds of high quality have mentioned the fact that such seeds are scarce. Furthermore producers of such seeds are either active in the extraction themselves or only supply to selected customers who keep their source confidential. China apparently has a high yielding variety cultivated in Szechuan Province, which is not available in larger quantities to anybody else.

The only variety which has been thoroughly tried and tested in Africa, is Artemis from Mediplant (Conthey,Switzerland), a hybrid. The newest variety Madiplant is producing has an artemisinin content as high as 1,5 % per kg dry leaves and up to 40 kg of Artemisinin per ha (although in practice 1-1,2% per kg of dry leaves and 20 –25 kg per ha is common on African farms.) The price is quite high: 140,00 € per gram. At least 2 g are required for one hectare but only suffice if multiplication by cuttings is practiced. (see appendix on example for cultivation practices). Mediplant so far is a very small enterprise (only 3 senior staff), can satisfy only a few customers, does not even have enough staff to handle the formalities of more than half a dozen contracts. We have managed to convince DEZA, the Swiss development agency, to offer Mediplant assistance in case they are willing to expand their production of artemisia seeds, but Mediplant as an autonomous association would have to decide to apply for such assistance. It remains to be seen, whether they do.(A new director has taken office in February).There is another institute in Brazil (CPQBA-UNICAMP), which produces a hybrid suited to tropical conditions as well with yields slightly lower than Mediplant (25 kg per ha), but they are not interested in any co-operation outside of Brazil. Unless Mediplant does decide to expand considerably, lack of seeds would constrain expansion of artemisia production in Africa in the foreseeable future.

Apart from Mediplant, there is an NGO-network by the name of Anamed, who distribute seeds to farmers who want to grow artemisia for brewing tea as a natural remedy. Costs of the seeds are currently 70,00 € in Europe, the local partner in Uganda (Namedo) seems to have a lower price, which could not be ascertained. Yield of artemisinin per kg dry leaves is about 0,5 to 0,75%. The seeds are probably F2 generation of a hybrid (the source is confidential, it might be Mediplant as well), the plants are of uneven characteristics and obviously neither a hybrid nor a stable composite. Anamed also only produces very small quantities of seeds and buyers have to sign a commitment that they will not use the seeds for commercial and industrial production.

Other European companies experienced in the production of hybrids might be capable of more or less repeating the success of Mediplant since the methods of selecting appropriate parent plants and screening are now known, but due to the long growth cycle of artemisia it would take them about four or five years to do so (estimated development costs around 100000.00 €), which would be much too late to address the current need for sufficient and affordable ATCs..

Given the high technical demands regarding the production of hybrids plus the costs and logistical problems of re-supplying smaller farmers with seeds each year, the ideal solution

for a country like Tanzania would be the availability of a composite that could be locally multiplied and would give reasonably high yields.

It has been possible to obtain a sufficient amount of seeds for experimentation and seed multiplication from one source in Vietnam. This is a composite. Yield might be between 0,5 and 0,8% of artemisinin per dry mass. So far they have not been tested in Africa. Since seeds are relatively cheap (yield of seeds per plant is, however, not published), the Vietnamese do not transplant cuttings, but take the seedlings directly from the seedbeds, which allows for a shorter cultivation period.

An even promising source of seeds is an Indian composite developed by an institute called CIMAP (Central Institute of Medicinal and Aromatic Plants in Lucknow, India. It is supposed to have a yield of artemisinin above 0,8% and a very high yield of biomass so that yields per ha could be as high as 60 kg of artemisinin. CIMAP also only distributes to a few selected partners in India and not to privately interested companies or institutes outside India. Since it is an institution under the Indian Ministry of Science and Technology, it should be possible for Tanzania to get access to these seeds and instructions how to grow the plants and multiply the seeds via technical assistance, particularly since India is not a net exporter of artemisinin and does not intend to become one. We have advised the official responsible at the Tanzanian ministry of agriculture to apply for such technical assistance. These seeds have not been tested.

Preliminary impressions gained only from correspondence, suggest that although there are several agricultural or horticultural research institutes in Tanzania which would be climatically suitable for the testing of new varieties of seeds and for starting seed multiplication (after which, presumably, private companies could pick up seed multiplication too), these stations are apparently not in a position to engage in a venture like this on their normal budget and without outside financial and technical support. If this impression is confirmed, this would be a very urgent case for outside financial support.