

Cultivation of Novel Medicinal Crops – Challenges of Domestication of Wild Species



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- Introduction
- General Challenges
- Specific Challenges:
 - Case Study I – *Pelargonium sidoides*
 - Case Study II – *Sutherlandia frutescens*
 - Case Study III – *Euphorbia resinifera*
- Conclusions

Parceval



Parceval Core Competencies



- Sourcing of wild harvested plants in Southern Africa – small scale as well as large scale
- Cultivation of medicinal plants on certified organic farm as well as via a spread of contract growers in different climatic regions
- Research around cultivation and crop improvement e.g. Pelargonium, Bulbine
- Extract manufacturing of homeopathic and herbal tinctures, syrups. Solid dosage forms, etc.
- Contract manufacturing of finished products of selected local brands
- Consulting – Bioprospecting Issues – Product Development – Manufacturing – Supply Chain

Parceval Profile

- Founded in 1992
- Permanent Employees: 42
- Own factory in Wellington (approx. 1600sqm)
- Own certified organic farm (33ha) outside Wellington
- Ownership: 75% private – 25% Employees of Parceval
- Registered with SA Pharmacy Council and Medicine Control Council – following and audited for GMP (Good Manufacturing Practice)
- Supply to local companies, export to EU



General Challenges of Novel Crops

... Well, they are novel....which means that there is....

- NOBODY you can ask for advise
- NO literature to look up
- NO agricultural extension officer to help
- NO research to fall back on

... Therefore YOU have to

- do it all yourself
- do all the research
- find sources of more or less relevant information
- collect plant material from the wild
- learn to propagate – cultivate – process
- do all the trials
- make all the mistakes
- carry all the costs
- be patient!!! And then write the book! (...or give a lecture... 😊)

Case Study I – *Pelargonium sidoides*



Pelargonium has been traditionally used in Southern Africa mainly for veterinary purposes. Schwabe (Germany) researched human uses in acute bronchitis and respiratory diseases. The preparation “Umckaloabo” has been marketed in Europe since the early years of the last century and has by now been introduced into 40 countries around the world.

The perennial tuberous root is used. These are both sustainably wild harvested as well as cultivated commercially on a large scale.



Pelargonium based Products in South Africa...

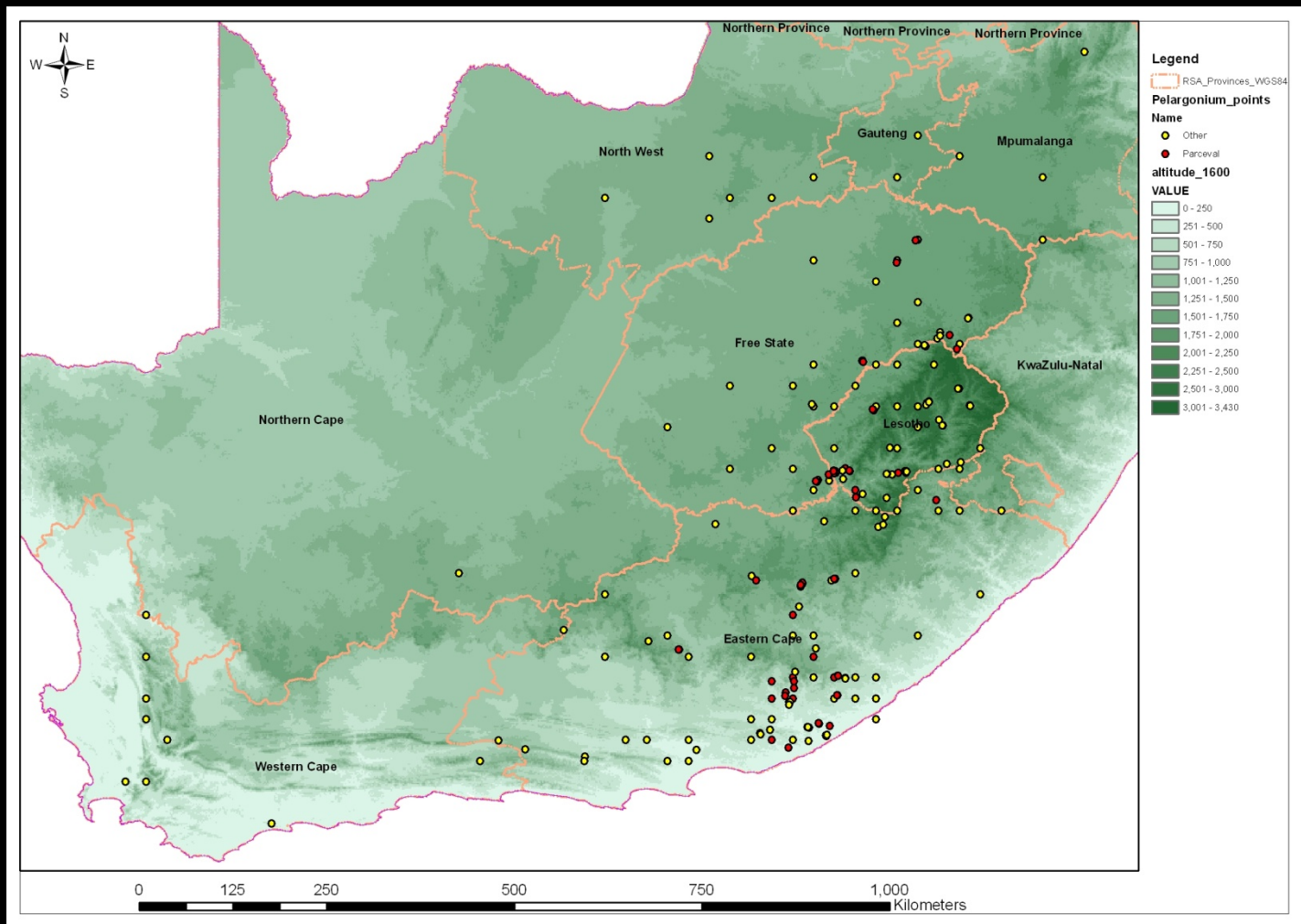


... and Schwabe's International Pelargonium Brands



From Nature.
For Health.

Dr. Willmar Schwabe Pharmaceuticals



Pelargonium sidoides is endemic to Southern Africa and occurs from near sea level in the Eastern Cape to above 2500m altitude on the “Roof of Africa” – Lesotho. The plant is adjusted to a wide range of climates, soils, geological and topographical extremes in its natural habitat.



Pelargonium sidoides
exhibits huge variations
both in it's natural habitat
as well as in cultivation





Pelargonium sidoides – the plants in each picture are the same age, same propagation, from the same field and using the same cultivation treatment

Propagation and Cultivation of *Pelargonium sidoides*



Specific Challenges we had to face and find solutions for:

- Find sufficient plant material to start cultivation
- Learn to propagate by vegetative as well as generative means
- Develop a cultivation protocol
 - how much / little water and what irrigation system
 - which fertiliser, how much and when
 - duration of cultivation – 1 – 2 – 3 or more years....
 - spacing
 - mulch or no mulch
- Understand the growth cycle – why do some plants suddenly die back and others carry on growing undisturbed...?
- Ideal soil conditions – clay, sand, loam...?
- Ideal climatic conditions – summer rainfall vs winter rainfall
- Take a risk – just try it – and suffer the consequences!
- More than one site in very different climatic and geographic regions were tried out



In parallel, many trials were conducted:

- comparison between different propagation methods
- spacing trials
- irrigation trials
- harvesting trials

Also, as a grower you always look for that elusive “Super Clone”



Pelargonium sidoides Breeding Program



27.05.2009



Superior selections are planted in randomised repetitions and nursed for three years before evaluation

25.10.2006



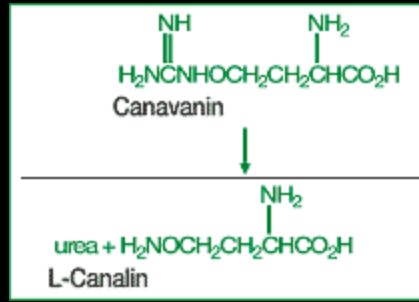
Selection evaluation



**A multitude of Selections are
constantly propagated and
evaluated**

Case Study II –Sutherlandia frutescens

- Adaptogenic tonic
- Anti-inflammatory
- Anti-fungal
- Anti-bacterial
- Immune stimulant
- Lowers blood sugar levels
- Reverses cachexia (wasting from debilitating diseases)

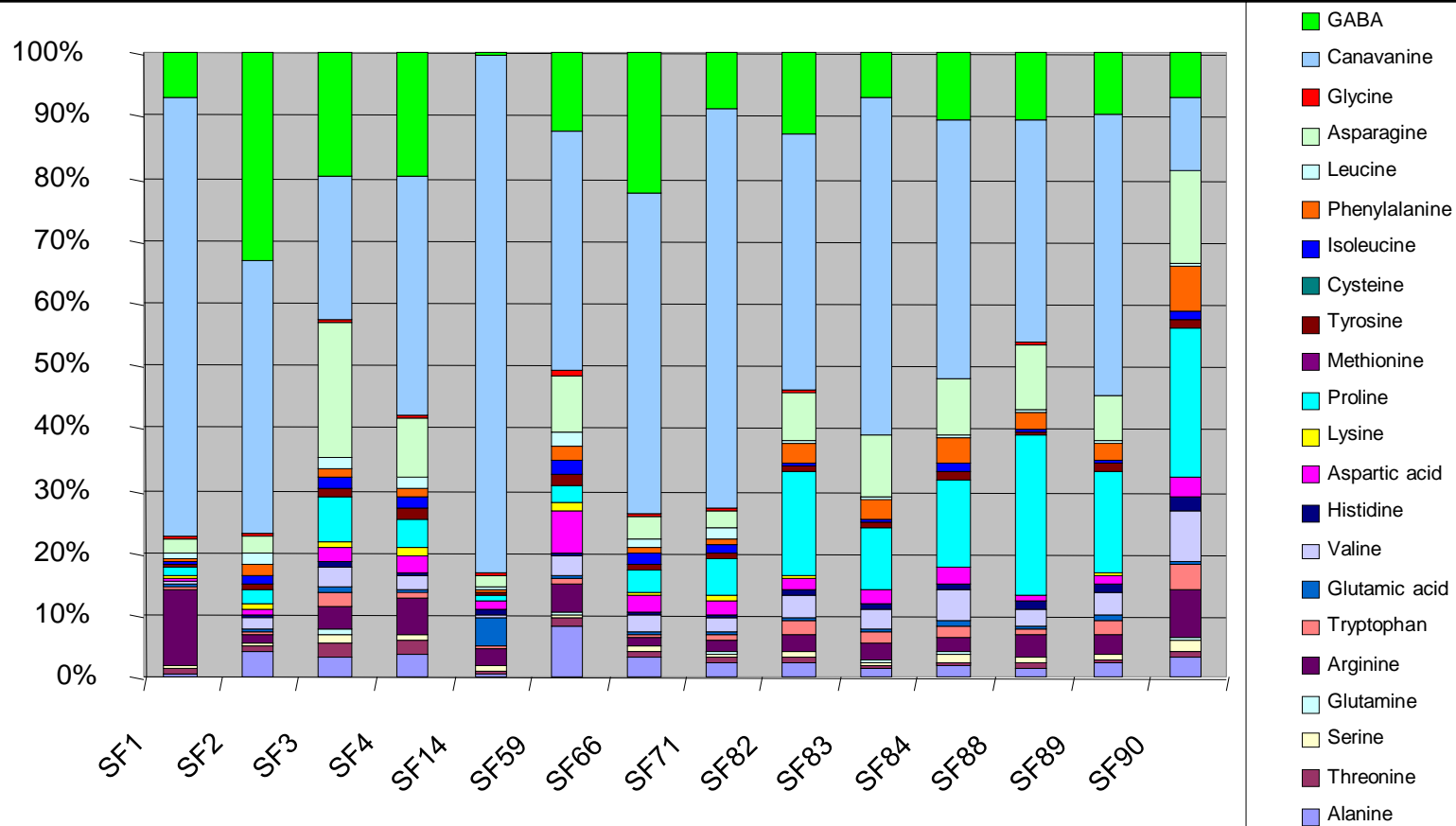


- **Sutherlandia is not a cure for cancer, AIDS, diabetes etc. but a highly effective tool in alleviating symptoms and increasing quality of life**
- **Sutherlandia is like a conductor in an orchestra – he optimizes the performance of the individual instruments as well as harmonizes the performance of the orchestra as a whole**



Sutherlandia frutescens is a member of the Fabaceae. It occurs over a wide geographical area and displays a number of geographical chemotypes that beckon to be explored.





Sutherlandia contains a large number of amino acids. The composition of these varies in different plant parts as well as between different geographical chemotypes – which one however is the best....? This remains guess work until deeper research and clinical trials have been conducted.

Case Study III – *Euphorbia resinifera*



Euphorbia resinifera is native of and endemic to Morocco. It falls under CITES as unsustainable wild harvesting threatens the survival of the species.

It is used in Homoeopathy for the treatment of rhinitis of various origins including infectious, allergic (e.g. hay fever), and rhinitis sicca, acute or chronic sinusitis.

The white milky latex is harvested, dried and then processed into the homoeopathic remedy.



Euphorbia resinifera grows extremely slowly. It is estimated that it takes at least 3-4 years until a commercial harvest can be expected. Experiments to establish whether younger plants yield the same quality are under way

Steps followed for *Euphorbia resinifera*:

- Obtain sufficient plants from credible sources with CITES certificate
- Register growing site with Nature Conservation to ensure CITES certification later for finished product
- Gather as much knowledge and information about habitat. Engage with succulent nurseries, hobbyist or anyone who may have any useful knowledge – often some key information may come from unexpected sources
- Propagate plants – evaluate different seasons, techniques, propagation media, watering regimes
- Ensure correct botanical identity once plants are flowering
- Trial cultivations with different soil blends
- Develop harvesting method to comply with GMP requirements
- Trials to confirm chemical profile is the same in cultivation as well as in natural habitat
- Record all trials, observations, notes meticulously
- Distil all this information into a draft cultivation guideline – keep adding and changing as knowledge evolves



Conclusions



Taking a new crop into cultivation is and will always remain a daunting task. However, it can be done! Ensure the following:

- Sufficient expertise is available – green fingers work wonders!
- Allow for a minimum of 3 – 5 years experimenting before some success!!!
- Allocate more cash, attention and energy than to any other cultivation
- Expect curveballs - frequently!
- Ask, ask, ask anyone who may have something to contribute – solutions often come from being humble!
- Spend lots of time with your plant – in nature, on the field, in the greenhouse – “secrets” are revealed at odd moments
- Share your knowledge and others will share theirs!
- Limit your trials to what is absolutely necessary – you will get lost in dozens of trials that may not really add to your knowledge
- Do not give up! Be patient! A solution will come!
- One day in years to come – you may be awarded the Black Belt of Novel Crop Growing

Thank You for Your Attention
and Good Luck with Your Novel
Crop!

