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GENERAL MANAGEMENT ASSISTANCE CONTRACT (GMAC)

**Contract No: 674-C-00-01-00051-00**

**Potential use of Indigenous Plants in Treatment of Zoonotic Helminth Diseases**

Contract or Grantee number: 0130-1003-G-GA38

**Krecek and Krecek Target Management Activities CC**

This report was produced for review by the USAID. It was prepared as a performance milestone under Mega-Tech, Inc.'s prime contract. The contents of this report address activities performed under USAID/South Africa's Strategic Objective No. 6: Increased Access to Shelter and Environmentally Sound Municipal Services

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### **Activity Summary and achievements:**

The current grant was designed to generate new opportunities to help reduce poverty and inequality and increase profitability of historically disadvantaged agribusinesses and SMMEs. This was done by helping emerging farmers and entrepreneurs to access new markets through the identification of indigenous plants used for the treatment of zoonotic helminth disease. Establishing business linkages was used because it is an effective tool for developing agribusiness and SMMEs. Linkages between resource-poor farmers and businesses with larger established entities were another aim of this grant and included identification of potential markets, transfer of information, technologies and skills and access to finance. Identification and a better understanding of the indigenous plants used by farmers for the treatment of zoonotic helminth diseases in RSA expands the number of ‘tools in the toolbox’ to be used for managing these diseases. This improves the quality of life for the people and their animals in rural communities in the Eastern Cape and other emerging farming areas throughout RSA, the value of animals in production and the marketplace, reduces the risk of human disease and creates a potential commercial use of plants for emerging agriculture and commercialization.

The following outcomes were achieved during this grant:

- 231 plants were identified in the treatment of helminth diseases for livestock, including zoonotic helminths in RSA;
- 226 plants were identified with potential anthelmintic efficacy and availability;
- At least 13 of 226 plants were identified for their market popularity, part used and rarity status;
- 41 stakeholders were identified and have communicated an interest in the market niche of plants and the commercial potential;
- Many of the 41 stakeholders are actively working with emerging farmers and have communicated an interest in this market niche of plants and the commercial potential.

**Contents of this report:**

- 1) Tranche 5, Milestone 8 Report (August 2005);
- 2) Grant Completion Report; and
- 3) Annual Narrative Summary (FY2005).

**Final Report  
Milestones 8 and 9**

**Grant name: Potential use of indigenous plants for zoonotic helminth diseases in  
South Africa**

**Grantee: RC Krecek**

**Grant reference number: 0130-10030G-GA38**

**August 2005**

**krecek  
krecek**

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UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

**Grant name: Potential use of indigenous plants for zoonotic helminth diseases in South Africa. Grant reference number: 0130-10030G-GA38**  
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## Final Report Milestones 8 and 9

**Grant name:** Potential use of indigenous plants for zoonotic helminth diseases in South Africa.

**Grant reference number:** 0130-10030G-GA38

**Grantee:** RC Krecek

**Background:** The pork tapeworm, *Taenia solium*, is one of the zoonotic worm parasitic diseases recognized as a public health and agricultural challenge worldwide, in the Sub-Saharan subregion and in South Africa. This disease is considered as one of the “neglected diseases of neglected populations” by the World Health Organization. It was identified as a potentially eradicable disease, yet remains an emerging disease of eastern and southern Africa. During 2004, a mobilization of stakeholders took place initiated at an international conference “Establishing a Global Campaign for Combating Cysticercosis” held in Italy. At this landmark meeting, an International Cysticercosis Coordination Center was formed and action plans formulated to attack the burden of this disease.

Novel sustainable approaches for managing such diseases are urgently needed. This is due to the resistance of organisms to remedies and pressures as a result of environmental awareness to reduce the levels of chemicals used in animals. In the developing world, rural poor use numerous ethnoveterinary plants for the treatment of worm diseases in livestock and in humans. One use of plants is for the treatment of pork tapeworm. This parasite causes serious disease in humans, neurocysticercosis, which results in epilepsy and often death. The highest prevalence of juvenile neurocysticercosis in the world is in the Eastern Cape Province of South Africa. The pork tapeworm life cycle also leads to porcine cysticercosis which seriously limits emerging pork production and is a serious public health threat.

There are several recent reports of indigenous plants used by resource-poor farmers in Tanzania and Kenya to treat cysticercosis in pigs and the adult stages of *T. solium* in humans. One example is “lodwa” (*Embelia schimperi*) given by farmers in the treatment of this disease in Tanzania. The Masai people crush the seeds of this plant and drink it in tea and milk. *Embelia* spp also grows in South Africa and the status of its use by local farmers needs investigation. There are also reports in Tanzania of a root being used by farmers to “cure” their pigs of infection with cysts (H Ngowi, 2003, personal communication). Another zoonosis, hydatidosis is being treated by Turkana tribesmen in northern Kenya and people in southern Sudan with use of an indigenous plant herb or root (*Echinococcus* spp) (E Zeyhle, 2004, personal communication; L Willingham, 2003, personal communication).

A study was conducted with 224 pig owners in the Eastern Cape (Krecek, 2005). They were interviewed about the practices they use for the management of porcine cysticercosis and 15% indicated that they use indigenous plants and traditional remedies to treat this disease (Krecek et al., 2004; Krecek et al., unpublished results, 2004). The potential for the use and development of indigenous plants relies on the availability of the current information and relevant databases. The World Health Organization

estimates that 80% of the populations of developing countries rely on traditional medicine, mostly plant drugs, for their primary health care needs.

An inventory of 231 species was compiled with supporting information (genus and species, family name, plant part used, plant preparation, chemical activity known, common names etc.) of plants used for the treatment of helminths in animals and humans in South Africa. This also includes 43 species used for tapeworms and 19 for the treatment of epilepsy. All of these plants were considered for their trade, trade popularity and distribution. To test this inventory with the enduser in the field a questionnaire was used to gather information about the plant usage in the endemic areas for the pork tapeworm. Throughout the grant results were disseminated to stakeholders and posted on this web site (<http://www.africabio.com/status/zoonotic.htm>).

**Strategic objective:** This grant aimed to identify indigenous plants, which are currently used for the treatment of zoonotic helminth diseases and to assess their potential to successfully treat these diseases in livestock and humans. This has led to the identification of opportunities for emerging farmers and entrepreneurs to grow and market these plants. Numerous studies led by the grantee reported that resource-poor livestock owners do not have easy access to information or technological inputs. There is a demand from these owners however, for further information and relevant skills training to aid with prevention and control of animal and human diseases as well as to improve animal production. Indigenous plants are used by these owners and farmers to improve the health of their animals. Therefore, identification of these plants, compilation of information about their availability and determination of the highest probability of producing anthelmintic drugs were aims of this grant.

**Milestones 8 and 9 achieved:** Milestone 8 identified biotechnological entities interested in plants with anthelmintic properties and efficacy against zoonotic helminths and a final report circulated to stakeholders. Linkages with emerging farmers and interested biotechnological entities were made. Milestone 9 is currently being finalized. Posters are being printed and distributed.

**Tasks and milestone deliverables:**

All tasks, quarterly and semi-annual reports were delivered timeously (details are in Addendum A).

**Proposed and achieved outcomes with impact indicators for this grant:**

- a) Proposed: list a minimum of 50 indigenous plants being used in the treatment of helminth diseases for livestock, including zoonotic helminths in South Africa.  
Achieved: 231 plants were identified.
- b) Proposed: identify a minimum of 30 plants with potential anthelmintic efficacy and availability.  
Achieved: 226 plants were identified.
- c) Proposed: determine which plans are potentially profitable.  
Achieved: at least 13 of 226 were identified for their market popularity, part used and rarity status. Additional market assessments are needed to update this list as more are estimated to have market and trade popularity leading to their potential profitability.

- d) Proposed: identify a minimum of 5 biotechnological entities with interest in this market niche of plants and in the development of the commercial potential.  
Achieved: 41 stakeholders were identified and have communicated an interest in this market niche of plants and the commercial potential.
- e) Proposed: link emerging farmers with biotechnological firms and institutions through established linkages.  
Achieved: many of the 41 stakeholders are actively working with emerging farmers and have communicated an interest in this market niche of plants and the commercial potential.
- f) Proposed: identify opportunities in the chain from production, processing and marketing of wild and domestic plants to the development, future commercialization of these ethnoveterinary plants for emerging livestock producers and their communities.  
Achieved: this was achieved throughout the grant with regular networking, communications and linkages established to identify the opportunities.

**Overall statement of grant impact:**

The six outcomes were achieved beyond the impact indicators set for this grant. For example, when the numbers of plants used for treatment of zoonotic helminth diseases were compiled the list was almost seven times more than predicted. This was also true for the plants identified with potential anthelmintic efficacy and availability.

This project proposed to generate new opportunities to help reduce poverty and inequality and to increase profitability of historically disadvantaged agribusinesses and SMMEs. This was achieved by helping emerging farmers and entrepreneurs to access new markets through the identification of indigenous plants used for the treatment of zoonotic cestode diseases. The list of plants highlighted in this study enables emerging farmers together with biotechnological industries to consider which plants are available in specific regions. Though not an initial objective of the current study, information such as whether the plants were traded, where they were traded and market popularity were compiled. This screening effort was a first in prioritizing the most promising and potentially most profitable plants. This was a very preliminary effort but highlighted the need for future detailed market assessments to fully examine the promise of these plants, and ultimately the opportunities for emerging farmers.

Women are the owners of free-range pigs, the domestic livestock animal species in the pork tapeworm life cycle which infects pigs and humans. "Safe pork" increases livestock production and also reduces the public health hazard to communities dependent on the raising of this animal. The husbandry, management and animal health needs of these pigs are the responsibility of these owners, who are largely women. Therefore they will gain directly from the knowledge generated in the current grant. The staff in the daily operation of the grant was also mostly women (e.g. animal health support, administration, bookkeeping, statistical support etc.)

Relationships of mutual benefit were developed with more than 40 biotechnological entities who have an interest in this market niche of plants and in the development of the commercial potential of these plants. This was achieved through networking,

dissemination of the findings and promotion of the results at national and international meetings in 10 presentations in four countries.

**Supporting key documents in this report are in Addendums A-J:**

Addendum A Details of tasks, quarterly and semi-annual reports and Implementation plan for grant

Addendum B List of identified stakeholders

Addendum C Record of meetings with stakeholders

Addendum D Scientific posters, presentations and papers produced during this project. The first two included with this report and the Pork tapeworm poster developed in the USAID/South Africa grant "Project: An epidemiological study on porcine cysticercosis in an emerging farming area of South Africa (Grant contract number: PIL-S09AG-674-0326-06) are included here.

- 1) Xhosa and English life cycle on pork tapeworm designed and produced for technology transfer with communities in the Eastern Cape Province.
- 2) Scientific poster. Plants in South Africa used as anthelmintics for the treatment of zoonotic helminths. R.C. Krecek\*, J.B. Githiori and R. Peter (\*Presenting author). 4<sup>th</sup> International Workshop: Novel approaches to the control of helminth parasites of livestock. Worm control or worm management: new paradigms in integrated control. University Cultural Center, Universidad Autonoma de Yucatan, Merida, Yucatan, Mexico (10-12 January 2005).
- 3) Scientific poster. Let's break the pork tapeworm life cycle with 6 easy steps. Krecek, R.C.\*, Willingham, A.L., J.E. Fincham and L. Lake (\*Presenting author). UK Department for International Development Livestock Production Programme (LPP) meeting. 12-15 September 2005. Pietermaritzburg, South Africa (Invited).
- 4) Scientific poster. An inventory of plants used to treat zoonotic helminths in South Africa. Krecek, R.C.\*, Githiori, J.G. and Peter, R. (\*Presenting author). UK Department for International Development Livestock Production Programme (LPP) meeting. 12-15 September 2005. Pietermaritzburg, South Africa (Invited).
- 5) Scientific poster. Which plants in South Africa used as anthelmintics for the treatment of zoonotic helminths? Krecek, R.C.\*, Githiori, J.G. and Peter, R. (\*Presenting author). 20<sup>th</sup> International Conference of the World Association for the Advancement of Veterinary Parasitology, Christchurch, New Zealand (16-20 October 2005).
- 6) Invited workshop contribution. Establishing a global campaign for combating cysticercosis. Willingham, A.L., Carabin, H., Mukaratirwa, S. and Krecek, R.C. \* (\*Presenting author). 20<sup>th</sup> International Conference of the World Association for the Advancement of Veterinary Parasitology, Christchurch, New Zealand (16-20 October 2005).
- 7) Scientific paper. Monetary impact of *Taenia solium* cysticercosis in four countries. Carabin, H.C.,\* Krecek, R.C., Cowan, L.D., Willingham, A.L., Nash, T., Sanchez, A.L., Rajshekar, V. and Foyaca-Sibat, H. (\*Presenting author). 133<sup>rd</sup> Annual Meeting of the American Public Health Association, New Orleans,

Louisiana, USA (5-9 November 2005).

- 8) Scientific peer review paper. Krecek, R.C. and Waller, P.J. 2005. Towards the implementation of the "basket of options" approach to helminth parasite control of livestock: emphasis on the tropics/subtropics. *Veterinary Parasitology* (Accepted).
- 9) Scientific peer review paper. Pearson, R.A. and Krecek, R.C. 2005. Delivery of health and husbandry improvements to working animals in Africa – considerations in planning activities. *South African Journal of Agricultural Extension* (Under review).
- 10) Scientific peer review paper. Carabin, H., Krecek, R.C., Cowan, L.D., Michael, L., Foyaca-Sibat, H., Nash, T. and Willingham, A.L. 2005. Estimation of the monetary burden of *Taenia solium* cysticercosis in the Eastern Cape, South Africa. *Tropical Medicine and International Health* (Submitted).

Addendum E Questionnaire: Plants used for the treatment of worms in animal and humans in South Africa

Addendum F Report of questionnaire survey

Addendum G Responses to the questions asked about plants used in the treatment of worms and zoonotic helminth diseases

Addendum H African names given in interviews and questionnaires for plants used for anthelmintic properties

Addendum I List of plants, plant parts, status of plant, trade, popularity of trade in market and distribution of plants used as anthelmintics for animals and humans in South Africa

Addendum J Inventory of plants used for the treatment of helminths in animals and humans in South Africa (Note: More than 20 tables have been generated in this plant species inventory. Five key tables are included in this report).

- 1) Common names of plants used for the treatment of helminths
- 2) Plants used against cestode parasites
- 3) Plants used against nematode parasites
- 4) Plants used against trematode parasites
- 5) Plants used for treatment of epilepsy

#### References:

GenStat for Windows. 2000 Release 4.2 (5th edn), Oxford: VSN International.

Getchell, J.K., Vatta, A.F., Motswatswe, P.W., Krecek, R.C., Moerane, R., Pell, A.N., Tucker, T.W. and Leshomo, S. 2002. Raising livestock in resource-poor communities of the North West Province of South Africa - a participatory rural appraisal study. *Journal of the South African Veterinary Association* 73: 177-184.

Krecek, R.C. 2004. Final Report USAID/South Africa. PIL-SO9AG-674-0326-06. An epidemiological study on porcine cysticercosis in an emerging farming area of South Africa. 50 pp.

Krecek, R.C., Michael, L.M., Willingham III, A.L. and Schantz, P.M. 2004. Questionnaire results from a community-based project on porcine cysticercosis in the Eastern Cape

Province of South Africa. *Southeast Asian Journal of Tropical Medicine and Public Health* 35: 271-274.

Krecek, R.C. and Tobin, P. 2004. An analysis of opinions from veterinarians in South Africa regarding business management skills. *Journal of the South African Veterinary Association* 75: 24-29.

Letsoalo, S.S., Krecek, R.C., Botha, C.A.J. and Ngetu, X. 2000. Animal husbandry in Moretele 1 of North-West Province: implications for veterinary training and research. *Journal of the South African Veterinary Association* 71: 92-96.

Saunders, M., Lewis, P. and Thornhill, A. 2000. Research methods for business students (2<sup>nd</sup> edn), Harlow, England. Pearson Education.

Wells, D. and Krecek, R.C. 2001. Socioeconomic, health and management aspects of working donkeys in Moretele 1, North West Province, South Africa. *Journal of the South African Veterinary Association* 72: 37-43.

**Acknowledgements:**

Thanks are due to: USAID/South Africa for financial support; MegaTech for management support; Lulama Ntanjane, Liesl Morey, Marie Watson, Jenny Roos, Jhoy Meade, Rose Peter, Dana Mullins, Janina Wooding, Charles Meyer, John Githiori, Miles Mander, Neil Croucher and Steve McKean and Eddy Krecek for technical and professional services.

**Addendum A Details of tasks, quarterly and semi-annual reports and Implementation plan for grant**

**Tasks:**

- Task 1 (Milestones 1, 2 and 3) Programme setup  
 Task 2 (Milestones 4 and 5) Compile focused inventory of plants for zoonotic helminth diseases  
 Task 3 (Milestones 6 and 7) Survey to gather more knowledge on plants and usage  
 Task 4 (Milestone 8) Identification of biotechnological entities  
 Task 5 (Milestone 9) Printing and distributing of posters

**Quarterly reports:**

- First Quarterly Report (November 28, 2003 - February 28, 2004)  
 Second Quarterly Report (February 28 - May 31, 2004)  
 Third Quarterly Report (June 1 – July 31, 2004)  
 Fourth Quarterly Report (August 1, 2004 - September 30, 2005)  
 Fifth Quarterly Report (October 1, 2004 – December 31, 2005)  
 Sixth Quarterly Report (January 1– March 31, 2005)  
 Seventh Quarterly Report (April 1- June 30, 2005)

**Semi-Annual reporting:**

- GMAC Grantee Narrative Report Final (October 1, 2003 - September 30, 2004)  
 GMAC Grantee Narrative Report Biannual (October 1, 2004 - March 31, 2005)

**Implementation plan for grant**

Task	Description	Milestone(s)/Deliverables  (Indicator of task completion and supporting documentation to be delivered to MTI - Max 3 per task) Verification as milestone completed.	Funding Required by Source (South African Rand)	Timeframe (d-mm-yr)
1	<u>Programme set-up</u> Layout research workplan, contact key stakeholders and identify key staff. Set up needed infrastructure.	1. Workplan, 2. Identification of stakeholders and key staffing and personnel, 3. Report of needed infrastructure and/or plans to acquire.	GMAC R236,697  Krecek R57,000  3 <sup>rd</sup> Party	Start date: December 2003   End date: March 2004
2	<u>Compile Focused Inventory of Plants for Zoonotic Helminth Diseases:</u> Identify plants used to treat worm diseases, especially cestodes, nematodes and	4. Inventory of plants used to treat worms.  5. Record of meetings with stakeholders.	GMAC R294,156  Krecek R42,750	Start date: April 2004  End date: June 2004

	trematodes that are zoonotic. Interview stakeholders in resource-poor communities for information and to engage participation in study. Identify gaps in current knowledge on existence, cultivation/gathering and use of plants.		3 <sup>rd</sup> Party	Start date: July 2004  End date: August 2004
3	<u>Survey to gather more knowledge on plants and usage:</u> Design questionnaire; test; revise questionnaire; conduct field work in Eastern Cape; analyze questionnaire results. Validate findings with emerging livestock producers, botanists and veterinary staff. Internal evaluation of progress and results to date (IERTD).	6. Report of survey including description of methodology, results, sample questionnaires, numbers surveyed; etc.  7. Report of Internal Evaluation and results to date (IERTD).	GMAC R296,335  Krecek R42,750  3 <sup>rd</sup> Party	Start date: September 2004  End date: November 2004  Start date: December 2004  End date: February 2005
4	<u>Identification of biotech entities</u> interested in products with anthelmintic properties and efficacy against zoonotic helminths. Prepare final report and circulate to stakeholders. Arrange linkages with emerging farmers and interested biotech entities.	8. Final report (peer review): including results of study and of linkages with biotech entities.	GMAC R276,812  Krecek R71,250  3 <sup>rd</sup> Party	Start date: March 2005  End date: July 2005
5	<u>Printing and distributing</u> Technology transfer material on the pork tapeworm and how this zoonotic helminth is being transmitted and can be prevented.	9. Proof of printing and distribution of posters	GMAC R40,372  Krecek R10,000  3 <sup>rd</sup> Party R3500	Start date: August 2005  End date: September 2005

## **Addendum B List of identified stakeholders**

### **South Africa**

1. **AfricaBio**  
Professor Jocelyn Webster
2. **Afriplex**  
Mr Danie Nel
3. **Agricultural Research Council-Onderstepoort Veterinary Institute, Onderstepoort**  
Dr Dibungi Luseba, Dr Adriano Vatta, Dr Johan Grobbelaar
4. **Agricultural Research Council-Biometry Unit, Silverton**  
Mrs Marie Smith, Mrs Liesl Morey
5. **Appropriate Technology India**  
Dr Jack Croucher
6. **Argos Veterinary Science**  
Dr Rose Peter
7. **Mr Athol McLaggan (Landscape Architect)**  
Johannesburg
8. **Bedson Africa Pty (Ltd)**  
Dr Laura Lopez-Rebollar
9. **Cedara College, Pietermaritzburg**  
Ms Maria de Figuiero, Researcher Biochemistry of Essential Oils
10. **Chemtin, Port Elizabeth**  
Mr Colin Mkhonta email: colinmkhonta@chemin.co.za
11. **CSIR Bio/Chemtek**  
Bioprospecting  
Dr Marthinus Horak, Dr Vinesh Maharaj, Dr Hans Vahmeijer, Dr Gerda Fouche,  
Dr Louis Ackerman, Dr Marina van der Merwe
12. **Commercial Products from the Wild Consortium**  
Mr Cori Ham
13. **DAI**  
Ms Bronwyn Irwin, Maryland, USA
14. **Eastern Cape Directorate of Veterinary Services**  
Dr Luba Mrwebi, Dr Zonde, Mrs Lulama Ntantjane
15. **FutureWorks**  
Mr Myles Mander
16. **Lesheba Wilderness**  
Mr Nicholas Heinemann, Limpopo
17. **Nathan Associates Inc**  
SEGA/MESP Project  
Dr Roland Mirrilees
18. **National SPCA, Alberton**  
Ms Celeste Houseman, Mr Malcolm Woolmore
19. **Natural Botanicals, South Africa**  
Ms Marianna Smith
20. **Medical Research Council (MRC)**  
Indigenous Knowledge Systems  
Dr Gilbert Matsabisa, Dr Bronwen George
21. **Medical Research Council (MRC)**  
Technology and Business Development Directorate  
Professor Peter Folb, Dr Niresh Bhagwandin

22. **Rhodes University**  
Selmar Schonland Herbarium  
Botany Department  
Mr Tony Dold
23. **Scientific Roets**  
Dr Merida Roets, Eastern Cape
24. **SOIL Organic Essential Oils, Zululand, South Africa**  
Mr Grant McMurray, Ms Karen Swanepoel, Mr Willie Alberts
25. **South African National Botanical Institute**  
Dr Neil Crouch
26. **University of Fort Hare**  
**Agricultural and Rural Development Research Institute**  
Dr Patrick Masika
27. **University of Pretoria**  
Professor Kobus Eloff, Dr Lyndy McGaw, Dr John Githiori
28. **University of Pretoria. Department of Botany**  
Professor Marion Meyer
29. **Stellenbosch University**  
Professor Gerrit van Wyk, Professor of Silviculture, Department of Forest Science
30. **Tswane NSPCA, Pretoria**  
Ms Morgane James
31. **Woolworths, Previously with the University of Free State and the Agricultural Research Council-Roodeplaar (Western Cape)**  
Dr Cobus Coetzee

#### **Kenya**

32. **African Medical Research Foundation (AMREF), Nairobi**  
Mr Eberhard Zeyhle, Project Manager, Hydatid Disease Control Project
33. **DEVCOM, Nairobi**  
Mrs Leslie Duckworth
34. **International Livestock Research Institute (ILRI)**  
Dr Tom Randolph, Dr Lee Willingham, Dr John McDermott, Dr John Githiori
35. **Jomo Kenyatta University of Agriculture and Technology**  
Professor Japhet K Magambo

#### **Mexico**

36. **Facultad de Medicina, UNAM, México DF. 2. Hospital General "Dr. Manuel Gea González", SSA**  
Dr Ana Flisser
37. **Departamento de Etología y Fauna Silvestre, Facultad de Medicina Veterinaria y Zootecnia, Ciudad Universitaria, Universidad Nacional Autónoma de México (UNAM), 04510 México, DF**  
Professor Aline de Aluja

#### **Sweden**

38. **Swedish University of Agricultural Sciences and the National Veterinary Institute (SWEPAR), Uppsala**  
Dr Peter Waller

**Switzerland**

39. **Novartis Animal Health Inc., Basel**  
Dr Jennifer K Ketzis

**Denmark**

40. **WHO/FAO Collaborating Center for Parasitic Zoonoses Coordinator**  
Dr Lee Willingham, Copenhagen

**USA**

41. **North Carolina State University**  
Dr Deon van der Merwe

**Addendum C Record of meetings with stakeholders**

<b>Record of meetings RC Krecek held with stakeholders December 2003 – August 2005</b>			
<b>Date</b>	<b>Activity</b>	<b>Venue (South Africa unless otherwise specified)</b>	<b>Persons who participated</b>
Dec 15, 2003	Discussions on plants used for their anthelmintic properties and current models for testing efficacy. Discussion on possible agreement with CSIR.	CSIR	Marthinus Horak, Bioprospecting
Dec 22, 2003	Discuss the Animal Health for Developing Farmers. Ethnoveterinary Plant Programme and its current Projects.	OVI-ARC, Onderstepoort	Dibungi Luseba (OVI)
Feb 3, 2004	First notice of project posted on AfricaBio website.	Pretoria	<a href="http://www.africabio.com">http://www.africabio.com</a>
Feb 9, 2004	Discussed Regional Indigenous Plant Commercialisation and Domestication Workshop.	Stellenbosch	Gerrit van Wyk
Feb 22, 2004	Discuss the plants used by the Turkhanas in East Africa.	Nairobi, Kenya	Eberhard Zeyhle (AMREF Project Manager, Hydatid Control Project) and Jahet Mgambo (Jomo Kenyatta University of Agriculture and Technology) and Ernest Njoroge
Feb 22, 2004	Discuss ethnoveterinary projects at University of Zimbabwe.	Nairobi, Kenya	Samson Mukaratirwa (University of Zimbabwe)
Feb 25-27, 2004	Workshop "Defining Ethnoveterinary Medicine in Southern Africa".	Dikhololo	Forty colleagues from SADC countries participated. Specific discussions with Dibungi Luseba (OVI) and Patrick Masika (University of Fort Hare, Alice, Eastern Cape)
March 31, 2004	Discuss project with EC/Africa Promoting Agribusiness Linkages (PAL). Introduced Myles Mander (KZN) as a potential biotech resource person.	Wendywood, Gauteng	Gary Mullins

Record of meetings RC Krecek held with stakeholders December 2003 – August 2005			
Date	Activity	Venue (South Africa unless otherwise specified)	Persons who participated
April 7, 2004	Visited Useful Plants Exhibit and added information to the current database and inventory.	Kirstenbosch Gardens, Cape Town	Eddy Krecek (EK)
Apr 18-24, 2004	Discussion about inventories for project.	Denmark	JB Githiori (ILRI, Kenya)
May 28, 2004	Planned database and inventory, and field visit to Eastern Cape with ethnobotanist and traditional doctors.	CSIR, Pretoria	Solomon Mahlaba and Longway Kwelemthini (LK) (National African Healers Association) (NAHA); Vinesh Maharaj, Gerda Fouche, Marina van der Merwe and Louis Ackerman (CSIR); Rose Peter (RP) (Argos Veterinary Science); and RC Krecek (Krecek and Krecek CC)
May 28, 2004	Meeting with Medical Research Council (A National and Research and Development Platform for Novel Drug Development from Indigenous Medicinal Plants); workshop to consolidate the current information available on plants used for anthelmintic properties and models/tools used for validating was proposed.	CSIR, Pretoria	Peter Folb, Niresh Bhagwandin and Sarah Pirrie (MRC) and RP
May 28, 2004	Invited as a discussion leader of the session "Combination/integration of several approaches "basket of options" for control of helminths at 4th Intl Workshop: Novel approaches to the control of helminth parasites of livestock, 10-12 Jan 2005; presented a poster on the current zoonotic plant project.	Pretoria	Session co-presented with P Waller; paper co-authored with RP and JBG
Jun 1, 2004	Discussion about project with traditional leaders and explained objectives.	CSIR, Pretoria	SM and LK; VM, GF

Record of meetings RC Krecek held with stakeholders December 2003 – August 2005			
Date	Activity	Venue (South Africa unless otherwise specified)	Persons who participated
Jun 6-11, 2004	Workshop "Diagnosis and surveillance Cysticercosis /Taeniosis Awareness and Training" Workshop on <i>Taenia solium</i> infection, its epidemiology, diagnosis, treatment, surveillance, prevention and control.	Umtata, Eastern Cape	Sixty persons from 14 countries took part including medical and veterinary colleagues and traditional surgeons
Jun 14, 2004	Discussion on project and response about proposed workshop.	USAID/SA Pretoria	Dorvin Stockdale and Kimberley Lucas (USAID in South Africa) and A Willingham (ILRI, Kenya and RVAU, Denmark)
Jun 28, 2004	JB Githiori (JBG) in Phytomedicine Laboratory with Kobus Eloff (UP); JBG gave presentation on plants used for their anthelmintic properties in Kenya.	Onderstepoort, Gauteng	Adriano Vatta and Dibungi Luseba (Onderstepoort Veterinary Institute, Agricultural Research Council); Kobus Eloff and Lyndy McGaw (University of Pretoria); Peter Waller (SWEFAR, Sweden); JBG (ILRI, Kenya) and Rose Peter (Argos Veterinary Science)
June 29 - Jul 1, 2004	Farmer's Day and Workshop in association with a goat project together with KZN Veterinary Services.	Nkwezela, KZN	12% of the 60 farmers indicated that they are using plants for their anthelmintic properties
Jun 29 - Jul 1, 2004	Discussions on MicroAccess Inventory and questionnaire for traditional healers.	Pretoria	JBG
July 5-6, 2004	Visit to St Elizabeth's Hospital and traditional healers.	Lusikisiki, Eastern Cape	Hans Vahrmeijer (CSIR), LK (NAHA) and Gilberto Serrano-Ocaña
July 6-7, 2004	Discuss the remedies used for neurocysticercosis.	Umtata, E Cape	Humberto Foyaca-Sibat (University of Transkei) and Nelson Mandela Academic Hospital
July 9, 2004	Meeting about Jan 2005 meeting in Mexico.	UP, Pretoria	Felipe Torres-Acosta (Mexico), Hervé Hoste (INRA, France) and AV (OVI)

Record of meetings RC Krecek held with stakeholders December 2003 – August 2005			
Date	Activity	Venue (South Africa unless otherwise specified)	Persons who participated
July 16, 2004	Meeting with National African Healers Committee to consider future opportunities.	Johannesburg	EK, SM
August 23, 2004	Update of project on AfricaBio web site.	Pretoria	<a href="http://www.africabio.com/cgi-bin/viewnews.cgi">http://www.africabio.com/cgi-bin/viewnews.cgi</a>
August 24, 2004	Applied queries to the merged inventory and abstract for Mexico meeting.	Pretoria	JBG
Sept 6-10, 2004	Meeting about project and WHO's potential involvement and support.	Italy	Dirk Engels (WHO)
Sept 24-29, 2004	Reviewed final CSIR report, drafted 3 letters and sent.	Pretoria	JBG
Oct 3, 2004	Communications. Prepared and delivered CSIR report.	Pretoria	Vinesh Maharaj (CSIR)
Oct 5-8, 2004	GMAC Annual Report and Inventory.	Onderstepoort	JBG, Andrew Taylor, Rose Peter
Oct 18, 2004	Discussion about inventory.	Onderstepoort	JBG
Oct 19, 2004	Meeting to discuss activities.	Johannesburg	S Mahlaba and JBG
Nov 8, 2004	Discussion about African network	Onderstepoort	Kobus Eloff and JBG
Nov 17, 2004	Meeting on inventory, poster and questionnaire.	Pretoria	JBG
Nov 19, 2004	Discussed questionnaire with statistician and data capture specialists.	Silverton	Liesl Morey (ARC), Marie Smith (ARC)
Nov 26, 2004	Travel to Alberton SPCA for questionnaires going to Middelburg, Eastern Cape.	Alberton	Celeste Houseman
Nov 30, 2004	Met with statisticians.	Silverton	Liesl Morey and Marie Smith
Dec 1, 2004	Promoted findings at Annual Conf Eastern Cape Vet Services as invited speaker.	Port St Johns	Luba Meweni, John Allwood, H Foyaca-Sibat
Dec 1, 2004	Discussed questionnaire and promoted results.	Silverton	Liesl Morey

<b>Record of meetings RC Krecek held with stakeholders December 2003 – August 2005</b>			
<b>Date</b>	<b>Activity</b>	<b>Venue (South Africa unless otherwise specified)</b>	<b>Persons who participated</b>
Dec 2, 2004	Discussed questionnaire with Tshwane SPCA.	Pretoria	Morgane James, Theo and Maggie
Dec 9, 2004	Meeting about financial audit.	Pretoria	Nomonde Mdhuli and Mike Crosbie
Dec 10, 2004	Meeting with artist. Meeting about potentially profitable methodology with economist.	Midrand	Janina Wooding Dana Mullins
Dec 13-14, 2004	Questionnaire feedback with NSPCA.	Alberton	Malcolm, Celeste Houseman. Phoned Schalk Burger
Dec 20, 2004	Inquiries to NSPCA, Tshwane SPCA and E Cape Vet Services about progress on questionnaires.	Pretoria	Luba Mrwebi Morgane James
Dec 27-28, 2004	Discussions with, botanist and about "economic plants" model.	Pretoria	Priscilla Swart Rudi van Aarde Dana Mullins
Jan 6, 2005	Met to give first 3 questionnaires from the E Cape.	Silverton	Liesl Morey
Jan 8-15, 2005	Presentation, poster and discussions with colleagues on plants used to treat zoonotic helminths. Emails & faxes about meeting planned January 21, 2005.	Mexico	Jennifer Ketzis (Novartis), Malcolm Knox (CSIRO), F Terres Acosta (Mexico), AA de Aluja and A Flisser (UNAM), Myles Mander and Dana Mullins (Mexico)
Jan 21, 2005	Travel to Durban for meeting on potentially economic plants.	Durban	Dana Mullins, Myles Mander, Neil Crouch
Jan 27, 2005	Questionnaire follow-ups and typing.	Silverton	M Watson, L Morey
Jan 28, 2005	Questionnaires discussion.	Silverton	L Morey
Jan 29, 2005	Meeting with botanist.	Pretoria	P Swart
Feb 7, 2005	Meetings.	Pretoria	P Swart
Feb 15, 2005	Posted the updated project report with AfricaBio.	Pretoria	Gloria Motaung
Feb 16-20, 2005	Meetings on questionnaires.	Pretoria	L Morey

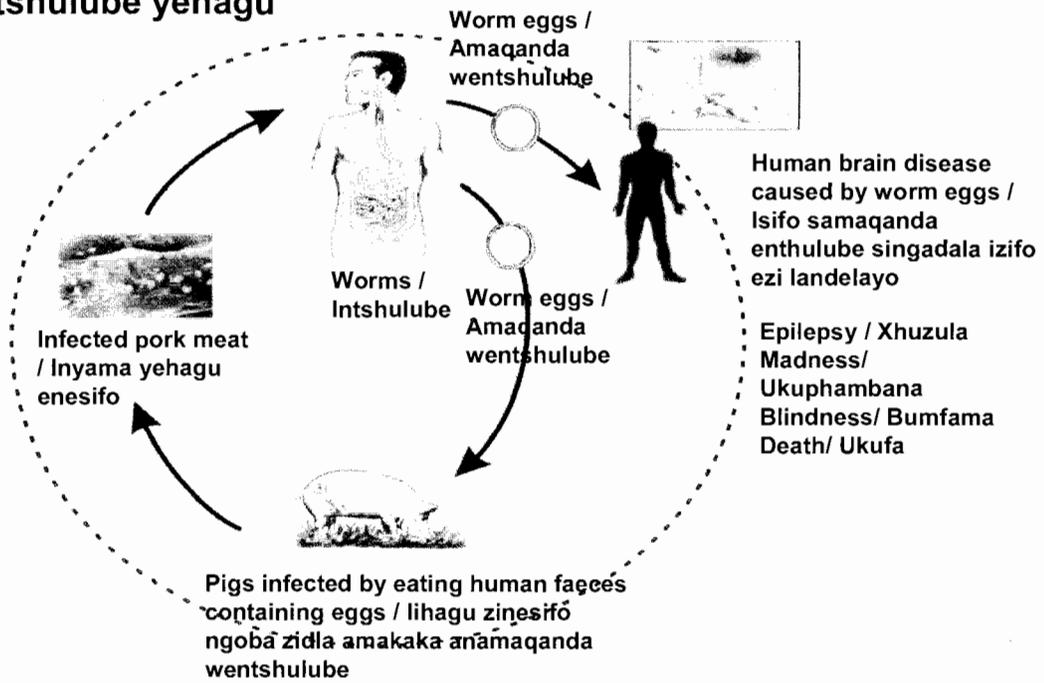
**Record of meetings RC Krecek held with stakeholders December 2003 – August 2005**

Date	Activity	Venue (South Africa unless otherwise specified)	Persons who participated
Mar 15, 2005	Meeting with economist about framework.	Pretoria	Jack Croucher (Appropriate Technology India), Eddy Krecek
Mar 16-17, 2005	Phone call to network and discuss potential interests.	Pretoria	Mariana Smith, Afriflex
Mar 21, 2005	Sent update to 15 stakeholders.	Pretoria	
Mar 23, 2005	Meeting to discuss methods to prioritize plants used as anthelmintics.	Midrand	D Mullins
Mar 31, 2005 – August 28, 2005	Discussions with ecologists and botanists to develop list of plants with most potential based on distribution, trade and trade popularity.	Pretoria	Steve McKean, John Githiori

Annexure D Scientific posters, presentations and papers produced during this project

Xhosa and English life cycle on pork tapeworm

**Pork tapeworm /  
Intshulube yehagu**







**Annexure E Questionnaire: Plants used for the treatment of worms in animal and humans in South Africa (Krecek et al., 2005)**

**Instructions: Please ask the owner each question and write their answer(s) in the blank spaces. Thank you.**

The sections below are:

- A. Basic information**
- B. Household identification**
- C. Respondent**
- D. Diseases important in humans**
- E. Diseases important in animals**

**A. Basic information**

1) Date \_\_\_\_\_

2) Person(s) doing the interview

1	2	3	4	5

3) District

1	2	3	4	5

4) Village

1	2	3	4	5

**B. Household identification**

5) Household identification number (stand number, plot number)

\_\_\_\_\_

6) Name \_\_\_\_\_

7) Gender 1) Female \_\_\_\_\_ (2) Male \_\_\_\_\_

8) Ethnic background

1	2	3	4	5	6

9) Age

1	2	3	4	5	6	7
Under 20 yr	20-30 yr	31-40 yr	41-50 yr	51-60 yr	61-70 yr	Above 70 yr

10) Highest education level

0	1	2	3	4	5	6
No formal education	Standard 2-4	Standard 5-7	Standard 8	Matric	Diploma	Degree(s)

11) Main income

1	2	3	4	5
Salary	Pensions (disability, children, husband, other)	From outside (relative, friend)	Selling farm produce	Other

11.1) If self-employed indicate what type of employment \_\_\_\_\_

11.2) If unemployed, indicate last time you worked and the type of work \_\_\_\_\_

11.3) If pensioner, indicate what your occupation was before pensioner \_\_\_\_\_

Additional comments spoken by the owner during this section of the interview, if applicable \_\_\_\_\_

12) Number of inhabitants in this household

1	2	3	4	5
Less than 3	4-7	8-12	13-16	Above 17

Additional comments spoken by the owner during this section of the interview, if applicable \_\_\_\_\_

**Respondent (If different from Section B)**

13) Name \_\_\_\_\_

14) Gender 1) Female \_\_\_\_\_ (2) Male \_\_\_\_\_

15) Ethnic background

1	2	3	4	5	6

16) Age

1	2	3	4	5	6	7
Under 20 yr	20-30 yr	31-40 yr	41-50 yr	51-60 yr	61-70 yr	Above 70 yr

17) Position relative to household

1	2
Representative	Other

17. 1) If other please specify \_\_\_\_\_  
 \_\_\_\_\_

18) Highest education level in household

0	1	2	3	4	5	6
No formal education	Standard 2-4	Standard 5-7	Standard 8	Matric	Diploma	Degree(s)

19) Occupation

1	2	3	4	5	6
Self employed	Farmer	Home maker	Unemployed	Pensioner	Other

19.1) If self-employed indicate what type of employment

19.2) If unemployed, indicate last time you worked and the type of work

19.3) If pensioner, indicate what your occupation was before pensioner

Additional comments spoken by the owner during this section of the interview, if applicable \_\_\_\_\_  
 \_\_\_\_\_

**D. Diseases important in humans**

20) Which human diseases are most important? (List 5 most important to respondent)

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

21) Who do the listed diseases affect most?

1			2			3		
Children			Teenagers			Adults		
F		M	F		M	F		M

22) How are the diseases mentioned above managed?

1	2	3	4	5	6
Medical doctor	Traditional doctor	Medical and traditional doctor	Home (own) medication	All four (Numbers 1, 2, 3 and 4)	No treatment sought

If you use 2, 3 and 4 specify type of treatment and how often? \_\_\_\_\_  
 \_\_\_\_\_

23) If plants are used in treatments, how often are they used?

Always \_\_\_\_\_ Most times \_\_\_\_\_ A few times \_\_\_\_\_ Never \_\_\_\_\_

24) Which plants do you use? List all plants used. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

25) List all worm types that occur in you and your family, plants that have been used to treat worms and how these plants are used.

Worm types	Plants	How plants are used

Additional information \_\_\_\_\_  
 \_\_\_\_\_

26) How often are plants used to treat worms?

Always \_\_\_\_\_ Most times \_\_\_\_\_ A few times \_\_\_\_\_ Never \_\_\_\_\_

27) After what length of time are these plants used? \_\_\_\_\_

Daily \_\_\_\_\_ Weekly \_\_\_\_\_ Monthly \_\_\_\_\_ Once a year \_\_\_\_\_

28) Who is most affected by worms?

1			2			3		
Children			Teenagers			Adults		
F		M	F		M	F		M

Additional information \_\_\_\_\_  
 \_\_\_\_\_

29) Where do you get the plants from?

1	2	3	4	5
Muthi market	Veldt or forest	Traditional doctor	Own garden	Don't know

30) What is the importance of traditional medicine in human treatment?

1	2	3	4	5
Very important	Important	Not important	Backwards	Don't know

**E. Diseases important in animals**

31) Which animals do you have (give number) and which ones do you consider most important (rank of 1 is most important)?

	1	2	3	4	5	6	7	8	9	10
	Dog	Cat	Cow	Horse	Pig	Sheep	Goat	Donkey	Mule	Poultry
Number										
Rank										

32) What diseases are most important in your animals? List 5 most important diseases for each of the animals mentioned. (Rank 1 is most important disease)

Disease	1	2	3	4	5	6	7	8	9	10
	Dog	Cat	Cow	Horse	Pig	Sheep	Goat	Donkey	Mule	Poultry
1										
2										
3										
4										
5										

33) How do you manage diseases in animals?

Animals	1	2	3	4	5	6
	Veterinary doctor	Traditional doctor	Veterinary and traditional doctor	Home (own) medication	All four (numbers 1, 2, 3 and 4)	No treatment given
Dog						
Cat						
Cow						
Horse						
Pig						
Sheep						
Goat						
Donkey						
Mule						
Poultry						

34) Which diseases in animals are you confidently able to treat?

---

35) How often are plants used? \_\_\_\_\_  
 Always \_\_\_\_\_ Most times \_\_\_\_\_ A few times \_\_\_\_\_ Never \_\_\_\_\_

36) List all worm types that occur in your animals, plants that have been used to treat worms and how these plants are used.

Worm types	Plants	How plants are used

37) Which animals and ages are most affected by worms?

	1	2	3	4	5	6	7	8	9	10
	Dog	Cat	Cow	Horse	Pig	Sheep	Goat	Donkey	Mule	Poultry
Young										
Mature										

38) How often are plants used for treatment of worms?  
 Always \_\_\_\_\_ Most times \_\_\_\_\_ A few times \_\_\_\_\_ Never \_\_\_\_\_

39) After what length of time are these plants used?  
 Daily \_\_\_\_\_ Weekly \_\_\_\_\_ Monthly \_\_\_\_\_ Once a year \_\_\_\_\_

40) Where do you get the plants from?

1	2	3	4	5
Muthi market	Forest	Traditional doctor	Own garden	Don't know

41) What is the importance of traditional medicine in animal treatment?

1	2	3	4	5
Very important	Important	Not important	Backwards	Don't know

Thank you for your time in assisting with this information.

## Addendum F Report of questionnaire survey

Question 7: Sex of respondent

Male	Female
61	34

Question 8: Ethnic background

Bhaca	Xhosa	Fingo	Mpondomise	Hlubi	Sotho	Mpondo	Coloured	Mthembu	Unknown
33	11	1	2	3	2	13	1	0.4	35

Question 9: Age of respondent (years)

<20	20-30	31-40	41-50	51-60	61-70	>70
0	3	9	21	33	24	8

Question 10: Highest education level in household

No	Std 2-4	Std 5-7	Std 8	Matric	Diploma	Degree
22	21	30	8	11	5	1

Question 11: Main income

Salary	Pensions	From outside	Sell farm produce	Self-employed	Other
15	54	8	8	3	8

Question 12: Number of inhabitants

1-3	4-7	8-12	13-16	>17
8	53	25	5	4

Question 20: Important human diseases

Worms	Diarrhoea	Epilepsy	Stomach ache	Headache	Eye problems	Madness
16	20	41	7	14	3	7

Question 21: Who do the diseases affect most?

	Children	Teenagers	Adults
Male	52	46	72
Female	55	47	76

Question 22: Disease management

Medical doctor	Traditional doctor	Medical and traditional	Home medication	All four
66	0	25	1	5

Question 23: How often are plants used as treatment?

Always	Most times	A few times	Never
8	14	9	41

Question 25: Which worm types occur in your family?

Tapeworm	Roundworm	Wireworm	Hookworm	Ascarids	Nodular	Liver fluke
74	64	5	2	0.4	1	4

Question 26: How often are plants used as treatment for worms?

Always	Most times	A few times	Never	When needed
3	9	10	45	4

Question 28: Who is most affected by worms?

	Children	Teenagers	Adults
Male	76	23	22
Female	82	22	24

Question 29: Where do you get the plants from?

Muti market	Veld or forest	Traditional doctor	Own garden	Don't know
9	19	14	2	30

Question 30: What is the importance of traditional medicine in human treatment?

Very important	Important	Not important	Backwards	Don't know
13	19	7	18	24

Question 31: Which animals do you have?

Dog	Cat	Cow	Horse	Pig	Sheep	Goat	Donkey	Mule	Poultry
85	42	80	27	59	53	59	5	1	68

Question 31: Total number of animals

Dog	Cat	Cow	Horse	Pig	Sheep	Goat	Donkey	Mule	Poultry
530	155	2140	144	597	4002	2382	63	6	2730

Question 32: Which diseases are important in your animals?

Worms	Cough	Diarrhoea	Appetite	Vomiting	Cysts	Measles
42	3	4	1	1	2	6

Question 33: How do you manage diseases in animals?

Veterinary doctor	Traditional doctor	Vet & trad doctor	Home medication	Vet, trad & home	No medical treatment
67	2	14	7	5	2

Question 35: How often are plants used to treat animals?

Always	Most times	A few times	Never	When needed
2	8	10	44	4

Question 36: Which worm types occur in your animals?

Tapeworm	Roundworm	Wireworm	Ascarids	Liverfluke	Lungworm	Hookworm	Nodular
66	51	16	3	13	9	3	5

Question 37: Which animals and ages are most affected by worms?

	Dog	Cat	Cow	Horse	Pig	Sheep	Goat	Donkey	Mule	Poultry
Young	34	8	26	8	13	22	17	4	4	8
Mature	3	1	6	4	3	3	3	0	0	4
Both	15	5	26	4	11	22	17	1	1	14

Question 38: How often are plants used as treatment for worms?

Always	Most times	A few times	Never
3	9	9	52

Question 40: Where do you get the plants from?

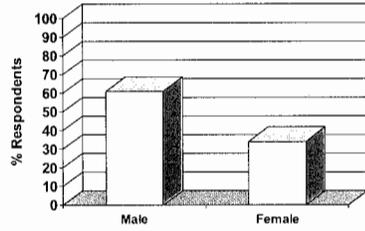
Muti market	Veld or forest	Traditional doctor	Own garden	Don't know
4	12	13	2	35

Question 41: What is the importance of traditional medicine in animal treatment?

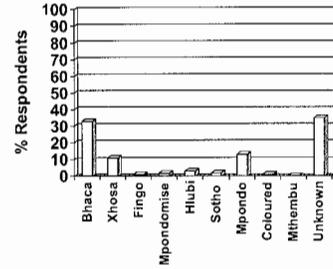
Very important	Important	Not important	Backwards	Don't know
9	14	9	17	32

**Addendum G Responses to the questions asked about plants used in the treatment of worms and zoonotic helminth diseases**

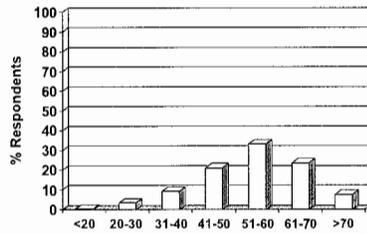
Question 7: Sex of respondent



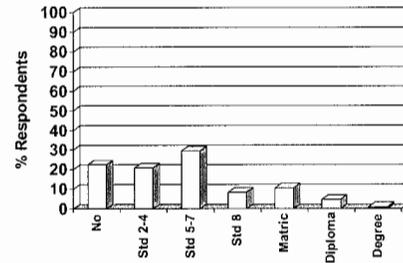
Question 8: Ethnic background



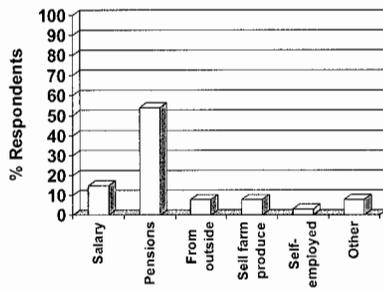
Question 9: Age of respondent (years)



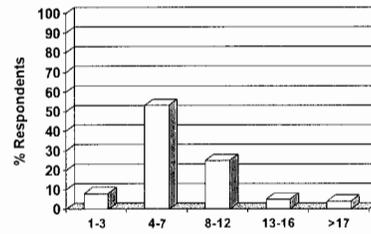
Question 10: Highest education level in household



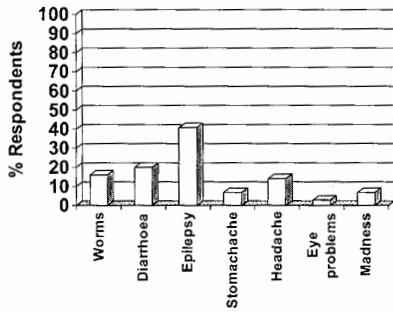
Question 11: Main income



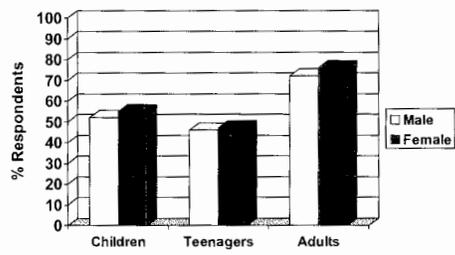
Question 12: Number of inhabitants



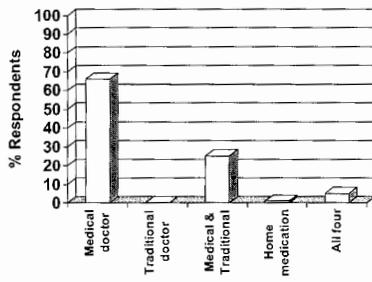
Question 20: Important human diseases



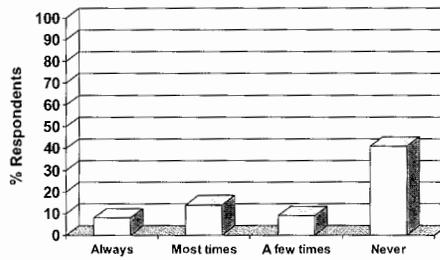
Question 21: Who do the diseases affect most?



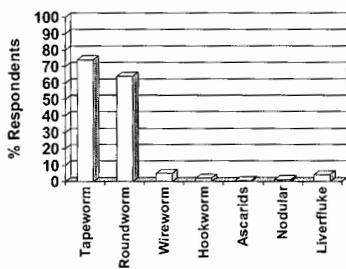
Question 22: Disease management



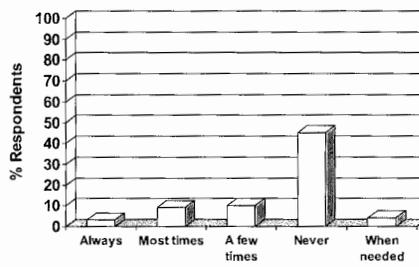
Question 23: How often are plants used as treatment?



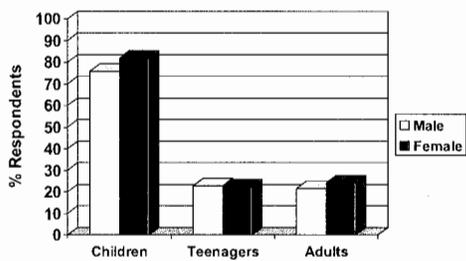
Question 25: Which worm types occur in your family?



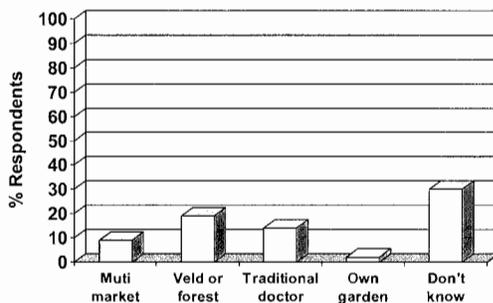
Question 26: How often are plants used as treatment for worms?



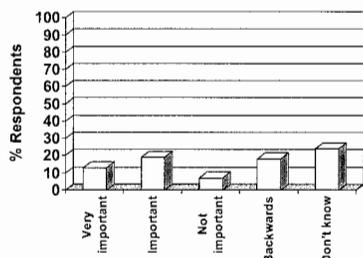
Question 28: Who is most affected by worms?



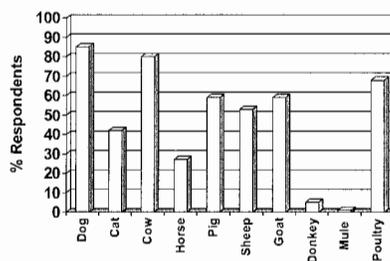
Question 29: Where do you get the plants from?



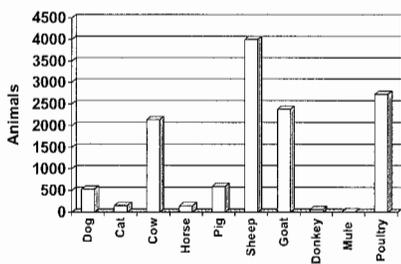
Question 30: What is the importance of traditional medicine in human treatment?



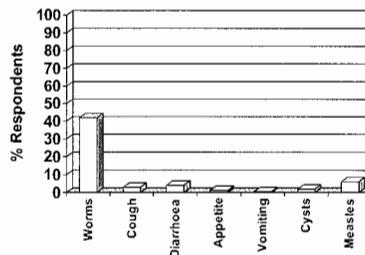
Question 31: Which animals do you have?



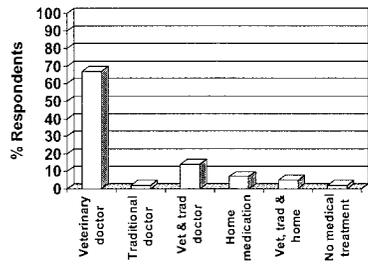
Question 31: Total number of animals



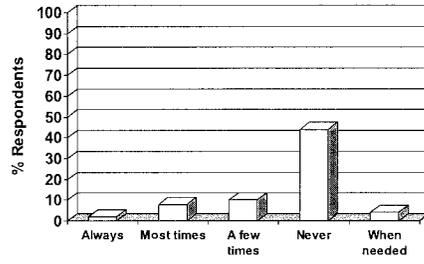
Question 32: Which diseases are important in your animals?



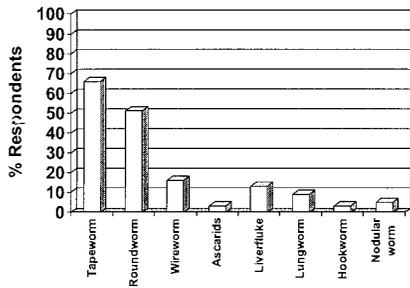
Question 33: How do you manage diseases in animals?



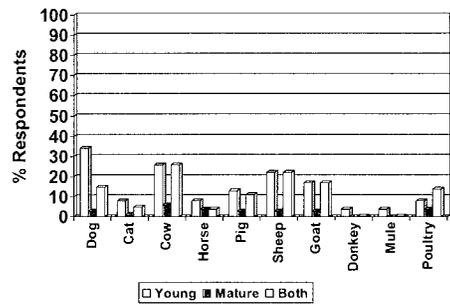
Question 35: How often are plants used to treat animals?



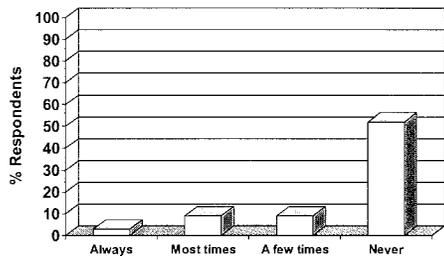
Question 36: Which worm types occur in your animals?



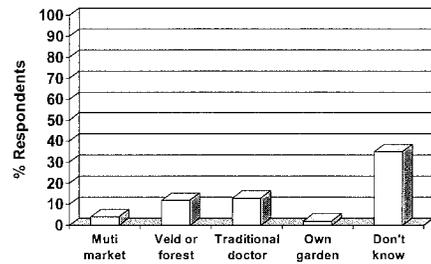
Question 37: Which animals and ages are most affected by worms?



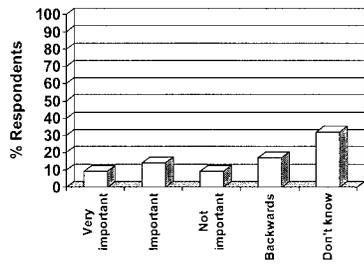
Question 38: How often are plants used as treatment for worms?



Question 40: Where do you get the plants from?



Question 41: What is the importance of traditional medicine in animal treatment?



**Addendum H African names given in interviews and questionnaires for plants used for anthelmintic properties**

Question number	Which plants	Plants for worms in humans	How?	Plants for worms in animals	How?
5	Mixture of herbs	Mixture of herbs	Purgative	*	*
6	*	Cape aloe	Mix with water		
7	*	Cape aloe	Mix with water		
9	*	Cape aloe	Mix with water and drink 2 spoons / day		
10	*	Cape aloe	Mix with water		
32	Mhlonyane	*	*		
41	Tsile	*	*		
52	Nukawi, Gobendlovu, Nyazangoma, Vimbukhalo, Tshinga, Medlutyani	*	Mixtures		
54	Itswele, Lasendle, Ixonya, Iphamba	Ixonya	Made as a paste	Intolwane, Isibalula	Made as a paste
55	Mgxam, Mthole, Labatheka, Phamba, Xonya	*	*		
56	Mgxam, Mthole, Mpepho, Bulawu	*	*		
58	*	Cape aloe	Mix with water	Isihlungu	Mix it with water
60	Uhlungwana, Isihluneiu	Macabhacat shana	By drinking the mixture	Ntolwana, Zwelicatshile	Mix them both, then you cook it
65	Mathunga for cramps & bachache, Thsuma and Mlahleni and Ndanluthi for BB, Ngubuza	Medical	*	Kentex	*
66	Mhlonyane for treatment of fever	Mfesi/Mhlo	Mixed with milk	n/a	n/a

Question number	Which plants	Plants for worms in humans	How?	Plants for worms in animals	How?
68	Magaqana, Intlungunyembe, Maklubalo (Helman herbs mentioned)	*	*	*	*
73	*	Mfesi/Mdlwa	*	Mfesi/Mdlwa	Dry roots, make powder mix with water and drench
75	Mfesi, Hlungunyemba, Hlunguhlungu, Ndewuluthi, Bohlololo	Mfesi	Powder form	*	*
76	*	Cape aloe	Mix with water	*	*
77	*	Cape aloe	Mix with water	*	*
78	*	Cape aloe	Mix with water	*	*
79	*	Cape aloe	Mix with water	*	*
82	*	Cape aloe	Mix with water then drink 2 tspns per day	*	*
83	Intsizi for Arthritis and Tsihwingu, Uggqontsi Idolo lenkonyane	For tapeworm: Cape Aloe	By mixing it in 1 liter of water	*	*
83		For roundworm: Ukrakreyo	By grinding it, putting it in cold water and then you drink	*	*
85	*	Ukrakreyo	Grind and mix with water then drink	*	*
94	Umbezo for epilepsy, Ntshungu for hypertension	Mfesi, Nyinge	Mix half a cup of milk with grated Mfesi, Chew a green leaf of Nyinge	*	*
95	*	Mfesi	Grate the bark and mix with half a cup of milk	*	*
96	*	Mfesi, Nyinge	Mix half a cup of milk with grated Mfesi, Chew a green	*	*

Question number	Which plants	Plants for worms in humans	How?	Plants for worms in animals	How?
			leaf of Nyinge		
103	Gumtree, Isiralarai, Impepho	Umthuma	Cook and drink	Intolwane	Cook and drink
104	Iqwili, Impepo, Umhlonyane, Impondovu, African Potato	*	*	*	*
105	*	Intshintsh, Intanga, Umfesi, Umagaqna	Intshintsh ground and mixed with milk; Intanga eaten raw for tapeworm and Roundworm	Ikhala	Mixed with hot water
107	Dambisa, Msolo	Gagashala	Cooked	Intlaba	Boiled
108	*	Intlaba	Mixed with water	Intlaba	Mixed with water
109	Umhlonyana, Ugobho	Umhlonyana	Cook and drink	Umhlonyana	Cook and drink
110	Gum tree, Umhlonyane, Intolwane	Umthuma	Cook and drink	Intolwane	Cook and drink
111	Umhlabelo, Iqwili, Impepho	Ingca	Eat	*	*
113	Impepho	Intolwane	Grind and cook	*	*
114	Traditional doctor	Ntololwana	Ground and cook	Ntololwana	Ground and cook
115	Ihmhlonyane	*	*	Intolwana	Cook
116	Umhlonyane, Iqwili, Impepo, Itshongwe, Gum tree, Umthuma	Intolwane, Umthuma	Boil it	*	*
117	Gum tree, Isiralara, Umhlonyane	Umthuma	Cook and drink	Umhlonyana	Cook and drink
118	Umhlonyane, Isihlungu	Umhlonyana	Cook and drink	Ntolwana	Cook and drink
119	Umhlonyani, Impepho	*	*	*	*
121	Umhlonyana, Ugobho	Umhlonyana	Cook and drink	Umhlonyana	Cook and drink
122	Umsenge,	*	*	*	*

Question number	Which plants	Plants for worms in humans	How?	Plants for worms in animals	How?
	Intelezi, Umhlonhani				
123	*	*	*	Intolwana	*
124	Umhlonyana, Isihlungu	Umhlonyana	Cook and drink	Ntolwana	Cook and drink
125	Umhlonyana, Isihlungu	Umthuma	Cook and drink	Ntolwana	Cook and drink
142	Aloe, African potato	Aloe	It is grinded into pieces and boiled in water for some minutes - drink when cold	*	*
143	*	Sulphur, Aloe, African potato	Sulphur- smear on for ringworm; African potato: grate into water and drink for roundworm; Aloe: Grate into drinking water for tapeworm	*	*
144	Sulphur, Aloe, African potato, Qwili	Sulphur, Aloe, African potato	Sulphur- smear on for ringworm; African potato: grate into water and drink for roundworm; Aloe: Grate into drinking water for tapeworm	African potato and aloe	Grate into water and drink
145	Phermanganate of Potash, African potato, Aloe	Aloe, Permanganate of Potash, Sulphur, African potato	Sulphur- smear and drink in water for ringworm; Permanganate: drink in water for roundworm; Aloe: Grate into drinking water for tapeworm	*	*

Question number	Which plants	Plants for worms in humans	How?	Plants for worms in animals	How?
146	African potato, Aloe, Sulphur	Sulphur, Aloe, African potato	Sulphur- smear and drink in water for ringworm; African potato: grate into water and drink for roundworm; Aloe: Grate into drinking water for tapeworm	*	*
147	African potato, Cape Aloe	Cape aloe	*	*	*
148	Cape aloe	*	*	*	*
149	African potato, Cape aloe	Cape aloe	Drink in water	*	*
150	African potato	*	*	*	*
151	African potato	*	*	*	*
153	*	Cape aloe	Mix with cold water	*	*
154	*	Cape aloe	Grind and boil in water	*	*
157	Mhlonyane, Cape aloe	*	*	*	*
185	*	*	*	Valbazen	*
202	Gum tree for fever	*	*	*	*
208	*	Aquatic plants	*	*	*
212	African potato, Aloe, Intolwane, Iqwili, Umhlonyane	Aloe	*	Intolwane	*
213	Iqwili, Umhlonyane, Intolwane, Aloe, African potato	Intolwane, Aloe	*	Intolwane, Aloe	*
214	African potato, Intolwane, African potato, Iqwili, Umhlonyane, Aloe	Aloe	*	Aloe	*
215	African potato, Aloe,	Aloe	*	Aloe	*

Question number	Which plants	Plants for worms in humans	How?	Plants for worms in animals	How?
	Umhlonyane, Iqwili, Intolwane				
216	African potato, Aloe, Umhlonyane, Iqwili, Intolwane	Aloe	*	Intolwane	*
217	African potato, Aloe, Umhlonyane, Iqwili, Intolwane	Intolwane, Aloe	*	Intolwane, Aloe	*
222	Umhlonyane, Iqwili, Intolwane, African potato, Ikhala (Aloe)	Aloe	*	Intolwane	*
224	Intolwane, Aloe, Iqwili, African potato	Aloe, Intolwane	*	Intolwane, Aloe	*
225	Intolwane, African potato, Iqwili, Umhlonyane, Aloe	Aloe, Intolwane	*	Intolwane, Aloe	*
226	Intolwane, African potato, Iqwili, Umhlonyane, Aloe	Aloe, Intolwane	*	Intolwane, Aloe	*
227	Intolwane, African potato, Iqwili, Umhlonyane, Ikhala (Aloe)	Aloe, Intolwane	*	Intolwane, Aloe	*

**Addendum I List of plants, plant parts, status of plant, trade, popularity of trade in market and distribution of plants used as anthelmintics in animals and humans in South Africa**

\*Note: All species are indigenous to South Africa unless stated that they are exotic or endemic.

Species	Family	Plant parts	Used or associated with.....				Trade				Trade popularity	Summary (Columns D-M)	Reference	Plant distribution	Notes	
			helminths	cestodes	nematodes	trematodes	Endemic*	Exotic	Durban	Gauteng						Mpumalanga
<i>Abrus precatorius</i>	Fabaceae-Faboideae		1	0	0	0	0	0	0	1	1	0	0	3	Pooley 1	
<i>Acacia nilotica</i>	Fabaceae-Mimosoideae		1	0	0	0	0	0	0	1	1	1	1	4	Pooley 1	
<i>Acokanthera oblongifolia</i>	Apocynaceae	Wood												3	Medicinal	
<i>Acokanthera oppositifolia</i>	Apocynaceae	Roots	0	1	0	0	0	0	0	1	1	1	0	4		
<i>Acokanthera venenata</i>	Apocynaceae	Roots	0	1	0	0	0	0	0	0	0	0	0	1		
<i>Aconkanthera schimperii</i>	Apocynaceae	Wood	1	0	0	0	0	0	0	0	0	0	0	1		
<i>Acorus calamus</i>	Araceae	Rhizome and Reeds	1	1	0	0	0	0	0	1	1	1	1	6		
<i>Alzella quanzensis</i>	Caesalpiniaceae	Roots	0	0	0	1	0	0	0	0	0	1	0	2	Pooley 2	
<i>Agrimonia bracteata</i>	Rosaceae	Leaves	1	1	0	0	0	0	0	1	0	0	0	3		
<i>Agrimonia eupatoria</i>	Rosaceae	Leaves	0	1	0	0	0	0	0	1	0	0	0	2		
<i>Allanthus altissima</i>	Simaroubaceae	Bark	0	1	0	0	0	0	0	0	0	0	0	1		
<i>Albizia anthelmintica</i>	Fabaceae-Mimosoideae	Bark	1	1	0	0	0	0	0	0	0	1	0	3		
<i>Albuca sp.</i>	Hyacinthaceae	Bulbs	1	0	0	0	0	0	0	1	1	1	1	5	Pooley 1	
<i>Aloe marlothii</i>	Asphodelaceae	Roots	1	0	1	0	0	0	0	1	0	0	0	3	Medicinal	
<i>Aloe tenuiflor</i>	Asphodelaceae	Roots	0	1	0	0	0	0	0	1	0	0	0	2	Pooley 1	
<i>Ananas comosus</i>	Bromeliaceae	Leaves	1	0	0	0	0	0	0	0	0	0	0	1		
<i>Andrachne ovalis</i>	Euphorbiaceae	Roots	1	0	0	0	0	0	0	0	1	1	1	6	Medicinal	
<i>Andropogon nardus</i>	Gramineae		1	0	0	0	0	0	0	0	0	0	0	1		
<i>Annona muricata</i>	Annonaceae	Bark, Leaves and Roots	1	0	0	0	0	0	0	0	0	0	0	1		
<i>Annona senegalensis</i>	Annonaceae		1	0	0	0	0	0	0	0	0	0	0	1		
<i>Annona senegalensis</i>	Annonaceae	Bark	1	0	0	0	0	0	0	0	0	0	0	1		
<i>Antidesma venosum</i>	Euphorbiaceae	Roots	0	0	1	0	0	0	0	0	0	0	0	1	Pooley 2	
<i>Apodytes dimidiata</i>	icacinaceae	Root bark	1	0	0	0	0	0	0	No	1	1	1	4	Pooley 2	
<i>Arctopus echinatus</i>	Apiaceae	Roots	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Artemisia afra</i>	Asteraceae	Roots and Rhizome	1	0	0	0	0	0	0	1	1	1	1	4	Medicinal	
<i>Asparagus virgatus</i>	Asparagaceae	Roots	1	0	0	0	0	0	0	0	0	0	0	1	Pooley 1	
<i>Aspidium athamanticum</i>	Dryopteridaceae		1	0	0	0	0	0	0	0	0	0	0	1		
<i>Asplenium adianthum-nigrum</i>	Aspleniaceae	Rhizome	1	0	0	0	0	0	0	0	0	0	0	1		
<i>Asplenium cuneatum</i>	Aspleniaceae	Rhizome	1	0	0	0	0	0	0	0	0	0	0	1		





<i>Hypoxis hemerocallidea</i>	Hypoxidaceae	Corm	1	0	0	0	0	0	0	0	1	1	1	1	4	8	Pooley 1
<i>Hypoxis</i> sp.	Hypoxidaceae	Corm	1	0	0	0	0	0	0	0	1	1	1	1	3	7	
<i>Indigofera yitindrica</i>	Fabaceae-Faboideae	Root bark	0	0	1	0	0	0	0	0	0	0	0	0	0	1	
<i>Indigofera frutescens</i>	Fabaceae-Faboideae	Root bark	1	0	1	0	0	0	0	0	0	0	0	0	0	2	
<i>Indigofera</i> sp.	Fabaceae-Faboideae	Whole plant	0	0	0	0	1	0	0	0	0	0	0	0	0	1	
<i>Indigofera tinctoria</i>	Fabaceae-Faboideae	Leaves	1	0	0	0	0	0	0	0	0	0	0	0	0	1	
<i>Jatropha curcas</i>	Euphorbiaceae	Seeds	1	1	1	0	0	0	0	0	1	0	0	0	0	4	
<i>Kalanchoe thyrsiflora</i>	Crassulaceae	Unspecified	1	0	0	0	0	0	0	0	1	0	0	0	0	2	Pooley 1
<i>Kigelia africana</i>	Bignoniaceae	Roots	0	1	0	0	0	0	0	0	1	1	0	0	0	4	Pooley 2
<i>Lagenaria siceraria</i>	Cucurbitaceae	Seeds	1	0	0	0	0	0	0	0	1	0	0	0	0	2	
<i>Lastrea athamantica</i>	Thelypteridaceae		1	0	0	0	0	0	0	0	0	0	0	0	0	1	
		Flowers,															
		Leaves and															
<i>Leonotis leonurus</i>	Lamiaceae	Roots	1	1	0	0	0	0	0	1	1	0	0	0	0	4	Pooley 1
<i>Leonotis nepetifolia</i>	Lamiaceae	Roots	1	0	0	0	0	0	0	0	0	0	0	0	0	1	Pooley 1
<i>Leucosidea sericea</i>	Rosaceae	Unspecified	1	0	0	0	0	0	0	0	0	1	0	0	0	2	Pooley 2
<i>Lichtensteinia interrupta</i>	Apiaceae	Roots	1	0	0	0	0	0	0	1	1	0	0	0	0	3	Pooley 1
<i>Lippia javanica</i>	Verbanaceae	Leaves	1	0	0	0	0	0	0	1	0	1	0	0	0	3	Pooley 1
<i>Maesa altifolia</i>	Myrsinaceae	Fruits	1	0	0	0	0	0	0	0	0	0	0	0	0	1	Pooley 1
		Fruits and															
<i>Maesa lanceolata</i>	Myrsinaceae	Seeds	1	1	0	0	0	0	0	1	1	1	0	0	0	5	Pooley 2
<i>Malva parviflora</i>	Malvaceae	Unspecified	0	1	0	0	0	0	0	0	0	0	0	0	0	2	
<i>Mangifera indica</i>	Anacardiaceae		1	0	0	0	0	0	1	0	0	0	0	0	0	2	Pooley 2
<i>Manihot esculenta</i>	Euphorbiaceae		1	0	0	0	0	0	0	0	0	0	0	0	0	1	
<i>Margaritaria discoidea</i> var. <i>discoidea</i>	Euphorbiaceae		1	0	0	0	0	0	0	0	0	0	0	0	0	1	Pooley 2
<i>Maytenus senegalensis</i>	Celastraceae	Roots	0	1	0	0	1	0	0	0	0	1	0	0	0	3	Pooley 2
		Leaves, Bark,															
		Roots and															
		Root bark															
<i>Melia azedarach</i>	Meliaceae	Root bark	1	0	1	0	0	0	1	0	0	1	0	0	0	4	Pooley 2
<i>Mentha longifolia</i>	Lamiaceae	Roots	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Pooley 1
<i>Micrococca mercurialis</i>	Euphorbiaceae	Roots	1	0	0	0	0	0	0	0	0	0	0	0	0	1	
<i>Mikania natalensis</i>	Asteraceae		1	0	0	0	0	0	0	0	0	0	0	0	0	1	Pooley 1
<i>Milletia grandis</i>	Fabaceae-Faboideae	Seeds	1	0	1	0	0	0	0	1	0	0	0	0	0	3	Pooley 2
<i>Momordica balsamina</i>	Cucurbitaceae		1	0	0	0	0	0	0	0	0	0	0	0	0	2	Pooley 1
<i>Momordica charantia</i>	Cucurbitaceae		1	0	0	0	0	0	0	0	0	0	0	0	0	1	
		Leaves and															
		stems															
<i>Momordica foetida</i>	Cucurbitaceae		1	0	0	0	0	0	0	1	0	0	1	0	0	3	Pooley 1
<i>Monadenium lugardiae</i>	Euphorbiaceae		1	0	0	0	0	0	0	0	0	0	0	0	0	1	Pooley 1
<i>Mondia whitei</i>	Perillocaceae	Roots	0	0	0	0	1	0	0	1	1	0	1	0	1	4	Pooley 1
<i>Myrsine africana</i>	Myrsinaceae	Fruits	1	0	0	0	0	0	0	0	0	0	0	0	0	2	Pooley 2
<i>Newtonia hildebrandtii</i>	Fabaceae-Mimosoideae		1	0	0	0	0	0	0	1	0	0	0	0	0	2	Pooley 2
<i>Ocimum canum</i>	Lamiaceae		1	0	0	0	0	0	0	0	0	0	0	0	0	1	Pooley 1
		Leaves and															
		stems															
<i>Olea europaea</i> subsp. <i>africana</i>	Oleaceae		1	0	0	0	0	0	0	0	0	0	1	0	0	2	Pooley 2
<i>Oncosiphon suffruticosum</i>	Asteraceae		1	0	0	0	0	0	0	0	0	0	0	0	0	1	
<i>Opuntia vulgaris</i>	Cactaceae	Leaves	1	0	0	0	0	0	1	0	0	0	0	0	0	2	Invasive alien.
<i>Ornithogalum dubium</i>	Hyacinthaceae		1	0	0	0	0	0	0	0	0	0	0	0	0	1	
<i>Othorna natalensis</i>	Asteraceae	Roots	1	1	0	0	0	0	0	1	0	0	1	0	0	4	Pooley 1
<i>Oxalis pescaprae</i>	Oxalidaceae	Bulbs	1	1	0	0	0	0	0	0	0	1	0	0	0	3	





**Note to Addendum I Identification of plant species with highest probability of producing anthelmintic drugs**

Information on whether the plant is traded, where it is traded and market popularity in Durban was obtained from existing records and references listed. The ecologists and botanists consulted also employed recent personal experience of frequency of encountering species at markets and in loads confiscated from illegal gatherers and traders.

It is noted that the traditional medicine trade is dynamic and there could well be species which are currently traded in the various markets but which are not recorded in the records in this report as being traded and *vice versa*. Detailed market assessments would be required to update this information.

Popularity in markets should not be the only appropriate criterion on which to judge species with the greatest likelihood of producing anthelmintic drugs as they may not be popular in markets for that reason. These species may be popular in the market for other reasons (e.g. *Hypoxis hemerocallidea* is popular for treatment of HIV related ailments). However, based on market popularity, plant part used and a broad opinion on rarity, the table below lists 13 priority species for possible anthelmintic drug yield. These species are all important and are not listed in any particular order. Based on the information gathered for this report, none of the listed species are endemic to South Africa or any of its provinces. While some species are widely exploited for traditional medicine, only the *Dioscorea* species are currently documented conservation priorities.

When prioritizing plant species, some emphasis should be placed on the plant part used. For example, a species from which leaves, fruit or seeds are harvested is more likely to yield quicker returns and produce a sustainable offtake than a species which has its bark, roots or whole plant harvested. It should be given a higher rating as a result. Similarly, the life form of the plant is important (e.g. a bulbous species is likely to be slow growing and more vulnerable to over-exploitation than a species which is faster growing). An example of a slow growing species would be any of the trees from which bark is harvested, while an example of a faster growing species would be *Artemisia affra*.

Species priorities based on market popularity (\*for Durban market), part used and rarity status

Species	Popularity Score*	Part Used	Rarity Status
<i>Dioscorea sylvatica</i>	4	Root	Rare
<i>Dioscorea dregeana</i>	3	root	Rare
<i>Rapanea melanophloeos</i>	4	Bark	Declining
<i>Hypoxis hemerocallidea</i>	4	Root	Declining
<i>Synaptolepis kirkii</i>	4	Root	Declining
<i>Cassine transvaalensis</i>	3	Bark	Declining
<i>Hypoxis</i> sp	3	Root	Declining
<i>Hypoxis colchifolia</i>	3	Root	Declining
<i>Andrachne ovalis</i>	2	Root	Common
<i>Tulbaghia alliacea</i>	2	Bulb	Common
<i>Tulbaghia capacea</i>	2	Bulb	Common
<i>Tulbaghia violacea</i>	2	Bulb	Common
<i>Artemisia affra</i>	1	Leaves	Common

**Addendum J Inventory of plants used for the treatment of helminths in animals and humans in South Africa**

1)	Common names of plants used for the treatment of helminths
2)	Plants used against cestode parasites
3)	Plants used against nematode parasites
4)	Plants used against trematode parasites
5)	Plants used for treatment of epilepsy

**1) Common names of plants used for the treatment of helminths**

Name ID	ID	Species	Family	Language	Name
3	2	<i>Pteridium aquilinum</i>	Dennstaedtiaceae	12	Adelaarsvaring
4	2	<i>Pteridium aquilinum</i>	Dennstaedtiaceae	13	Bracken fern
5	2	<i>Pteridium aquilinum</i>	Dennstaedtiaceae	13	Eagle fern
6	2	<i>Pteridium aquilinum</i>	Dennstaedtiaceae	10	Umbewe, umhlashoshana
7	3	<i>Acokanthera oppositifolia</i>	Apocynaceae	12	Gewone gifboom, boesmangif
8	3	<i>Acokanthera oppositifolia</i>	Apocynaceae	13	Common poison-bush, bushman's poison bush
9	3	<i>Acokanthera oppositifolia</i>	Apocynaceae	10	Uhlunguyembe, inhlungunyembe, ubhlungu-benyoka, umhlagaliso, umkhwangu
10	3	<i>Acokanthera oppositifolia</i>	Apocynaceae	11	Nthunguyembe
11	4	<i>Acorus clamus</i>	Araceae	10	Ikalamuzi
12	4	<i>Acorus clamus</i>	Araceae	12	Makkalmoes
13	4	<i>Acorus clamus</i>	Araceae	13	Sweet-flag
14	5	<i>Albizia adianthifolia</i>	Fabaceae-Mimosoideae	12	Platkroon
15	5	<i>Albizia adianthifolia</i>	Mimosoideae	13	Flat-crown
16	6	<i>Aloe ferox</i>	Aloeceae	12	Bitteraalwyn, Kaapse aalwyn
17	6	<i>Aloe ferox</i>	Aloeceae	13	Bitter aloe
18	6	<i>Aloe ferox</i>	Aloeceae	11	Umhlaba
19	6	<i>Aloe ferox</i>	Aloeceae	10	Umhlaba
20	6	<i>Aloe ferox</i>	Aloeceae	1	Umhlaba
21	7	<i>Arctopus echinatus</i>	Apiaceae	12	Kaapse platdoring, sieketroos
22	8	<i>Artemisia afra</i>	Asteraceae	13	African wormwood; wildworm wood
23	8	<i>Artemisia afra</i>	Asteraceae	12	Als, alsem, wildeals
24	9	<i>Aster bakeranus</i>	Asteraceae	10	Udlutshana
25	9	<i>Aster bakeranus</i>	Asteraceae	1	Phoa
26	9	<i>Aster bakeranus</i>	Asteraceae	11	Unozixekana
27	10	<i>Balanites maughamii</i>	Balanitaceae	13	Torchwood
28	10	<i>Balanites maughamii</i>	Balanitaceae	12	Fakkelhout, groending
29	10	<i>Balanites maughamii</i>	Balanitaceae	10	Umgobandlovu
30	10	<i>Balanites maughamii</i>	Balanitaceae	4	Umnulu
31	11	<i>Ballota africana</i>	Lamiaceae	12	Kattekruid, katterkruie
32	12	<i>Cannabis sativa</i>	Cannabaceae	12	Dagga
33	12	<i>Cannabis sativa</i>	Cannabaceae	1	Matokwane
34	12	<i>Cannabis sativa</i>	Cannabaceae	13	Marijuana
35	12	<i>Cannabis sativa</i>	Cannabaceae	10	Nsangu
36	12	<i>Cannabis sativa</i>	Cannabaceae	11	Umya
37	13	<i>Capparis tomentosa</i>	Capparidaceae	12	Wollrige kapperbos
38	13	<i>Capparis tomentosa</i>	Capparidaceae	13	Woolly caper-bush
39	13	<i>Capparis tomentosa</i>	Capparidaceae	10	Iqwaningi, Umabusane
40	13	<i>Capparis tomentosa</i>	Capparidaceae	7	Gwambadzi, Mubadali
41	14	<i>Cotyledon orbiculata</i>	Crassulaceae	12	Plakkie, kouterie
42	14	<i>Cotyledon orbiculata</i>	Crassulaceae	2	Kouterie
79	25	<i>Rumex lanceolatus</i>	Polygonaceae	11	Idololenkonyane, dolonyana
80	25	<i>Rumex lanceolatus</i>	Polygonaceae	10	Idololenkonyane, dolonyana
81	25	<i>Rumex lanceolatus</i>	Polygonaceae	1	Kxamane
82	26	<i>Ruta graveolens</i>	Rutaceae	12	Wynruit, binnewortel
83	26	<i>Ruta graveolens</i>	Rutaceae	13	Rue, herb of grace
84	27	<i>Sanseveria hyacinthoides</i>	Dracaenaceae	12	Aambeiwortel, skoonma-se-tong*
85	27	<i>Sanseveria hyacinthoides</i>	Dracaenaceae	13	Piles root, mother-in-law's tongue*
86	27	<i>Sanseveria hyacinthoides</i>	Dracaenaceae	11	Isikholokotho
87	27	<i>Sanseveria hyacinthoides</i>	Dracaenaceae	10	Isikholokotho

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88	27	<i>Sanseveria hyacinthoides</i>	Dracaenaceae	2	Kai, ghaiwortel
89	28	<i>Sclerocarya birrea</i>	Anacardiaceae	12	Maroela
90	28	<i>Sclerocarya birrea</i>	Anacardiaceae	13	Marula
91	28	<i>Sclerocarya birrea</i>	Anacardiaceae	10	Unganu
92	28	<i>Sclerocarya birrea</i>	Anacardiaceae	6	Morula
93	29	<i>Synaptolepis kirkii</i>	Thymelaeaceae	10	Uvuma-omhlope
94	30	<i>Valeriana capensis</i>	Valerianaceae	12	Wiidebalderjan
95	30	<i>Valeriana capensis</i>	Valerianaceae	13	Cape valerian
96	31	<i>Warburgia salutaris</i>	Canellaceae	12	Peperbasboom
97	31	<i>Warburgia salutaris</i>	Canellaceae	13	Pepper-bark tree
98	31	<i>Warburgia salutaris</i>	Canellaceae	10	Isibhaha
99	31	<i>Warburgia salutaris</i>	Canellaceae	7	Mulanga, manaka
100	31	<i>Warburgia salutaris</i>	Canellaceae	8	Shibaha
101	32	<i>Zanthoxylum capense</i>	Rutaceae	13	All knobwood
102	32	<i>Zanthoxylum capense</i>	Rutaceae	10	Umlungumabele
103	32	<i>Zanthoxylum capense</i>	Rutaceae	11	Umlungumabele
104	32	<i>Zanthoxylum capense</i>	Rutaceae	1	Monokwane
105	34	<i>Abrus precatorius L. subsp. africanus</i>	Fabaceae-Faboideae	13	Crab's eyes, jequirity bean, lucky bean climber, minnie-minnies
106	34	<i>Abrus precatorius L. subsp. africanus</i>	Fabaceae-Faboideae	10	Umkhokha, umkoka
107	35	<i>Acacia sieberiana</i>	Fabaceae-Mimosoideae	12	Papierbasdoring
108	35	<i>Acacia sieberiana</i>	Fabaceae-Mimosoideae	13	Natal camel thorn, paper bark acacia
109	35	<i>Acacia sieberiana</i>	Fabaceae-Mimosoideae	10	Umkhamba, umkhambati, umkhaya
110	36	<i>Acokanthera oblongifolia</i>	Apocynaceae	14	Duingifboom
111	36	<i>Acokanthera oblongifolia</i>	Apocynaceae	12	Gifboom
112	36	<i>Acokanthera oblongifolia</i>	Apocynaceae	15	Bushman's
113	36	<i>Acokanthera oblongifolia</i>	Apocynaceae	13	Poison bush, dune poison bush, wintersweet
114	36	<i>Acokanthera oblongifolia</i>	Apocynaceae	10	Inhlungunyembe, ubuhlungu-benjoka, umhlagashiso
115	37	<i>Acokanthera oppositifolia</i>	Apocynaceae	12	Gewone gifboom
116	37	<i>Acokanthera oppositifolia</i>	Apocynaceae	13	Bushman's arrow poison, Hottentot's poison bush, kaffir poison bush, poison bush/tree
117	37	<i>Acokanthera oppositifolia</i>	Apocynaceae	10	Inhlungunyembe, ubuhlungu-benyoka, umhlagaliso, umkhwangu
118	38	<i>Acorus calamus</i>	Araceae	12	Makkalmus
119	38	<i>Acorus calamus</i>	Araceae	13	Sweet calomel, sweet flag, sweet sedge
120	38	<i>Acorus calamus</i>	Araceae	10	Ikalamuzi, ikhalamusi, indawolucwatha
121	39	<i>Azelia quanzensis</i>	Caesalpinioideae	12	Peulmahonie
122	39	<i>Azelia quanzensis</i>	Caesalpinioideae	13	Lucky bean, pod mahogany
124	39	<i>Azelia quanzensis</i>	Fabaceae-Caesalpinioideae	10	Inkehli (seeds), Umdlavusa, umhlakuva, umhlavusi, umshamfuthi
125	40	<i>Albizia adianthifolia</i>	Fabaceae-Mimosoideae	12	Platkroon
126	40	<i>Albizia adianthifolia</i>	Fabaceae-Mimosoideae	13	Flat crown
127	40	<i>Albizia adianthifolia</i>	Fabaceae-Mimosoideae	10	Igowane, umbhelebhele, umgadankawu, umgadenkawu, umhlandlothi, ummalahanga, umnebelele, usolo
128	41	<i>Albizia adianthifolia</i>	Fabaceae-Mimosoideae	12	Platkroon
129	41	<i>Albizia adianthifolia</i>	Fabaceae-Mimosoideae	13	Flat crown
130	41	<i>Albizia adianthifolia</i>	Fabaceae-Mimosoideae	10	Igowane, umbhelebhele, umgadankawu, umgadenkawu, umhlandlothi, ummalahanga, umnebelele, usolo
131	42	<i>Albizia anthelmintica</i>	Fabaceae-Mimosoideae	12	Wurmbasvaldoring
132	42	<i>Albizia anthelmintica</i>	Fabaceae-Mimosoideae	13	Worm cure albizia
133	42	<i>Albizia anthelmintica</i>	Mimosoideae	10	Ummalahanga
134	43	<i>Allophylus africanus Beauv. Var. africanus</i>	Sapindaceae	12	Swartbastertaibos ( <i>A. africanus var. africanus</i> )

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361	4	<i>Acorus calamus</i>	Araceae	13	Sweet flag
135	43	<i>Var. africanus</i>	Sapindaceae	12	Bastertaaibos, rooibessieboom ( <i>A. decipiens</i> )
136	43	<i>Allophylus africanus</i> Beauv. <i>Var. africanus</i>	Sapindaceae	13	Black false currant, false currant, red berry tree
137	43	<i>Allophylus africanus</i> Beauv. <i>Var. africanus</i>	Sapindaceae	10	Umhlozana ( <i>A. africanus</i> var. <i>africanus</i> ), umaquanda, umhlohlela, umncandathambo ( <i>A. decipiens</i> )
138	44	<i>Andrachne ovalis</i>	Euphorbiaceae	12	Basterbliksembos
139	44	<i>Andrachne ovalis</i>	Euphorbiaceae	13	False lightning bush
140	44	<i>Andrachne ovalis</i>	Euphorbiaceae	10	Umawupole, umbesa, umbesa, umbhezo, umboza, umembeze
141	45	<i>Annona senegalensis</i> Pens. <i>Subsp. Senegalensis</i>	Annonaceae	12	Wildesuikerappel
142	45	<i>Annona senegalensis</i> Pens. <i>Subsp. Senegalensis</i>	Annonaceae	13	Wild custard apple
143	45	<i>Annona senegalensis</i> Pens. <i>Subsp. Senegalensis</i>	Annonaceae	10	Isiphofu, umhlalajube, umphofu, umthofa
144	46	<i>Apodytes dimidiata</i>	Icacinaceae	12	Witpeer
145	46	<i>Apodytes dimidiata</i>	Icacinaceae	13	White pear
146	46	<i>Apodytes dimidiata</i>	Icacinaceae	10	Umdakana, umdakane
147	47	<i>Artemisia afra</i>	Asteraceae	12	Wilde-als
148	47	<i>Artemisia afra</i>	Asteraceae	13	Wormwood
149	47	<i>Artemisia afra</i>	Asteraceae	10	Umhlonnyane, umhlonnyane omncane
150	48	<i>Aster bakeranus</i>	Asteraceae	10	Idlutshane, udhlatshana, udlutshana, uhloshana, umaqhunsula, umhludwana
151	49	<i>Athrixia phyllicoides</i>	Asteraceae	12	Boesmanstee
152	49	<i>Athrixia phyllicoides</i>	Asteraceae	13	Bushman's tea
153	49	<i>Athrixia phyllicoides</i>	Asteraceae	10	Icholocholo, itsshelo, umtshanela
154	51	<i>Barringtonia racemosa</i>	Lecythidaceae	12	Poeierkwasboom
155	51	<i>Barringtonia racemosa</i>	Lecythidaceae	13	Brackwater mangrove, guava, horse chestnut, powder-puff tree
156	51	<i>Barringtonia racemosa</i>	Lecythidaceae	10	Iboqo, iliboqo, umluluka (Zulu)
157	52	<i>Belamcanda chinensis</i>	Iridaceae	10	Indawoluthi emnyama
158	53	<i>Bidens pilosa</i>	Asteraceae	12	Knapsekerel, wewenaar
159	53	<i>Bidens pilosa</i>	Asteraceae	13	Black jack
160	53	<i>Bidens pilosa</i>	Asteraceae	10	Amalenjane, uqadolo
161	54	<i>Brachylaena discolor</i>	Asteraceae	12	Bosvaalbos, kreukelboom, kusvaalbos, vaalbos
162	54	<i>Brachylaena discolor</i>	Asteraceae	13	Coastal/Natal silverleaf/silver oak
163	54	<i>Brachylaena discolor</i>	Asteraceae	10	Iphala, iphahla, isiduli, isiphaluga, umduli, imphaphla
164	55	<i>Bridelia cathartica</i>	Euphorbiaceae	12	Bloublaarsoetbessie
165	55	<i>Bridelia cathartica</i>	Euphorbiaceae	13	Blue sweetberry, knobby bridelia
166	55	<i>Bridelia cathartica</i>	Euphorbiaceae	10	Umnangasi, umngwangazi, umthundangazi, umzilanyoni (Zulu)
167	57	<i>Bridelia micrantha</i>	Euphorbiaceae	12	Bruinstinkhout, mitserie, mitzeerie, mzerie
168	57	<i>Bridelia micrantha</i>	Euphorbiaceae	13	Coastal goldenleaf
169	57	<i>Bridelia micrantha</i>	Euphorbiaceae	10	Incini, isihlalamangewibi, isihlalamangwibi, umhlahle, umhlaimagwababa, umhlalimakwaba, umhlamagwababa, umshonge
170	59	<i>Cardiospermum halicacabum</i>	Sapindaceae	12	Blaasklimop, opblaasboontjie
171	59	<i>Cardiospermum halicacabum</i>	Sapindaceae	13	Balloon vine
172	59	<i>Cardiospermum halicacabum</i>	Sapindaceae	10	Ikhambhi leziduli, uzipho (Zulu)
173	60	<i>Cassine aethiopica</i>	Celastraceae	12	Kaboehout, koeboebessie, lepelboom
174	60	<i>Cassine aethiopica</i>	Celastraceae	13	Cape cherry, kooboo-berry, spoonwood
175	60	<i>Cassine aethiopica</i>	Celastraceae	10	Inqayi, umgunguluzampunzi, umnqayi (obumvu) (Zulu)
176	61	<i>Celosia trigyna</i>	Amaranthaceae	10	Uvelabahleke
177	62	<i>Cheilanthes hirta</i>	Adiantaceae	12	Parsley fern
178	62	<i>Cheilanthes hirta</i>	Adiantaceae	10	Inkomakoma, inkomankoma (Zulu)
179	63	<i>Chenopodium album</i>	Chenopodiaceae	12	Hondepisbossie, misbredie, seepbossie, varkbossie
180	63	<i>Chenopodium album</i>	Chenopodiaceae	13	Fat hen
181	63	<i>Chenopodium album</i>	Chenopodiaceae	10	Imbilicane, isijabane

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182	64	<i>Chenopodium ambrosioides</i>	Chenopodiaceae	12	Galsiektebos, handepis, sinkingsbos, stinkblaar, vloioibossie
183	64	<i>Chenopodium ambrosioides</i>	Chenopodiaceae	10	Insukumbili, puniyi (?uphuny)
184	65	<i>Cissampelos mucronata</i>	Menispermaceae	12	Davidtjies (wortel)
185	65	<i>Cissampelos mucronata</i>	Menispermaceae	13	Ivy vine
186	65	<i>Cissampelos mucronata</i>	Menispermaceae	10	Umbombo, ?umthombo
187	66	<i>Clausena anisata</i>	Rutaceae	12	Basternieshout, perdeboom, perdepis(boom/bos)
188	66	<i>Clausena anisata</i>	Rutaceae	13	Horsewood
189	66	<i>Clausena anisata</i>	Rutaceae	10	Isifudu, isifuthu, umnukambhiba, amnukelambiba, umsanka
190	67	<i>Clematis brachiata</i>	Ranunculaceae	12	Roosmaryn
191	67	<i>Clematis brachiata</i>	Ranunculaceae	13	Old man's beard, travellers' joy
192	67	<i>Clematis brachiata</i>	Ranunculaceae	10	Ihlonzo leziduli, inhlabahlanzi, inhlongo, umdlonzo, umdlozo (Zulu)
193	68	<i>Cleome monophylla</i>	Capparidaceae	12	Rusperbossie
194	68	<i>Cleome monophylla</i>	Capparidaceae	10	Isiwisa esiluhlaza
195	69	<i>Clerodendrum glabrum</i>	Verbenaceae	12	Bitterblaar, bontelhout, harpuijsblaar, huilboom, stinkboom
196	69	<i>Clerodendrum glabrum</i>	Verbenaceae	13	Tinderwood, verbena tree, white cat's whiskers
197	69	<i>Clerodendrum glabrum</i>	Verbenaceae	10	Ifamu, umnukalembeba, umnukambiba, umqangazane, umqaqongo, umqoqonga, umqwaqwane, uphehlacwathi
198	70	<i>Clerodendrum hirsutum</i>	Verbenaceae	10	Umathanjana, umathanjane, usikisiki
199	71	<i>Colocasia antiquorum</i>	Araceae	12	Amadoembie, olifantsoor
200	71	<i>Colocasia antiquorum</i>	Araceae	13	Elephant's ear
201	71	<i>Colocasia antiquorum</i>	Araceae	10	Idumbe (lomfula), idumbi
202	72	<i>Combretum molle</i>	Combretaceae	12	Basterrooibos, hardekool, rooibos
203	72	<i>Combretum molle</i>	Combretaceae	13	Velvet bush willow
204	72	<i>Combretum molle</i>	Combretaceae	10	Umbondo, umbondwe (-omhlophe)
205	73	<i>Cymbopogon marginatus</i>	Poaceae/Graminaea	12	Buffelsrooigras, kuskusgras, motwortel, rooigras
206	73	<i>Cymbopogon marginatus</i>	Poaceae/Gramineae	13	Lemon grass, tambootie grass
207	73	<i>Cymbopogon marginatus</i>	Poaceae/Gramineae	10	Isicunge, isiqunga
208	75	<i>Dichrostachys cinerea</i>	Fabaceae-Mimosoideae	12	Sekelbos
209	75	<i>Dichrostachys cinerea</i>	Mimosoideae	13	Sickle bush
210	75	<i>Dichrostachys cinerea</i>	Fabaceae-Mimosoideae	10	Ugagane, ugegane, umthezane, umzilazembe, usegwane
211	76	<i>Dicoma anomala</i>	Asteraceae	12	Gryshout, kalwerbossie, maagbitterwortel, wurmbossie
212	76	<i>Dicoma anomala</i>	Asteraceae	10	Isihlabamakhondlwane, umuna
213	77	<i>Dioscorea sylvatica</i>	Dioscoreaceae	10	Ingwevu, ufudu
214	78	<i>Dryopteris athamantica</i>	Dryopteridaceae	10	Inkomankoma, inkomankomane
215	79	<i>Ekebergia capensis Sparrm.</i>	Meliaceae	12	Es(boom), essenhout, rooiess(en)hout
216	79	<i>Ekebergia capensis Sparrm.</i>	Meliaceae	13	Cape ash, dog plum
217	79	<i>Ekebergia capensis Sparrm.</i>	Meliaceae	10	Isimanaye, umathunzi wentaba, umathunzini, umathunzini-wezintaba, umgwenyana wezinja, umnyamathi, umthoma, usimanaye, uvungu
218	80	<i>Eleutherine bulbosa</i>	Iridaceae	10	Ababomvu, abanqonqosi
219	81	<i>Embelia ruminata</i>	Myrsinaceae	10	Ibhini, ibinini, inbhini, moyushisa
220	82	<i>Emex australis</i>	Polygonaceae	12	Breëblaardubbeltjie, dubbeltjie, duiweljedoring, tongblaar
221	82	<i>Emex australis</i>	Polygonaceae	13	Cape spinach, devil's thorn
222	82	<i>Emex australis</i>	Polygonaceae	10	Inkuzama, inkunzana, inkuzane
223	83	<i>Ethulia conyzoides</i>	Asteraceae	13	Carter's curse, todd's folly
224	83	<i>Ethulia conyzoides</i>	Asteraceae	10	Umsokosoko
225	84	<i>Euclea divinorum</i>	Ebenaceae	12	Towerghwarrie
226	84	<i>Euclea divinorum</i>	Ebenaceae	13	Magic guarri
227	84	<i>Euclea divinorum</i>	Ebenaceae	10	Ichitamuzi, idungamuzi, ubophanyamazana, umhlangula, umncafuzana, umshekisane
228	85	<i>Euclea natalensis</i>	Ebenaceae	12	Bergghwarrie, natalghwarrie, swarbasboom
229	85	<i>Euclea natalensis</i>	Ebenaceae	13	Large-leaved guarri, natal ebony, natal guarri
230	85	<i>Euclea natalensis</i>	Ebenaceae	10	Ichitamuzi, idungamuzi, inkunzana, inkunzi emnyama, isinzimane, umhlallanyamazane, umshekisane, ilizimane, umzumane
231	86	<i>Eulophia spp.</i>	Orchidaceae	10	Amabelejongosi, imabeleyongosi, imfe yamasele empofu, umabelejongosi, umahayiza, undwendweni

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232	87	<i>Felicia erigeroides</i>	Asteraceae	13	Michaelmas daisy
233	87	<i>Felicia erigeroides</i>	Asteraceae	10	Isithelelo, ixhaphozi (usually for ranunculus species)
234	90	<i>Gerbera piloselloides</i>	Asteraceae	12	Swartteebossie
235	90	<i>Gerbera piloselloides</i>	Asteraceae	10	Indlebeyempithi, uhlango olimpofu, umoya-wezwe
236	91	<i>Helinus integrifolius</i>	Rhamnaceae	12	Seepbos
237	91	<i>Helinus integrifolius</i>	Rhamnaceae	13	Soap plant
238	91	<i>Helinus integrifolius</i>	Rhamnaceae	10	Hubhubhu, ubububu
239	92	<i>Heteromorpha trifoliata</i>	Apiaceae	12	Kraaibos, stinkbos, wildepieterselie
240	92	<i>Heteromorpha trifoliata</i>	Apiaceae	10	Umbangandlala
241	93	<i>Hydnora africana</i>	Hydnoraceae	12	Bobbejaankos, jakkalskos
242	93	<i>Hydnora africana</i>	Hydnoraceae	13	Kannip, kawimp
243	93	<i>Hydnora africana</i>	Hydnoraceae	10	Kuns !nau; umafumbuka
244	94	<i>Hypoxis colchicifolia</i>	Hypoxidaceae	10	Igudu, ilabatheka, ilabatheka-elimnyama, ingcobo
245	95	<i>Hypoxis sp.</i>	Hypoxidaceae	10	Inkomfe enkula
246	96	<i>Indigofera frutescens</i>	Fabaceae-Faboideae	12	Rivierverbos
247	96	<i>Indigofera frutescens</i>	Fabaceae-Faboideae	13	River indigo
248	96	<i>Indigofera frutescens</i>	Fabaceae-Faboideae	10	Umnukambiba
249	97	<i>Jatropha curcas</i>	Euphorbiaceae	13	Purgin nut tree
250	97	<i>Jatropha curcas</i>	Euphorbiaceae	10	Inhlakuvag
251	98	<i>Kalanchoe crenata</i>	Crassulaceae	10	Ibohlole elimpofu, ikhambi-ncolosi, umahogwe
252	99	<i>Kigelia africana</i>	Bignoniaceae	12	Kalabasboom, komkommerboom, worsboom
253	99	<i>Kigelia africana</i>	Bignoniaceae	13	Sausage tree
254	99	<i>Kigelia africana</i>	Bignoniaceae	10	Ibele-ndhlovu, umbele-wendlovu, umbongothi, umfongothi, umvongothi, umvunguta, umzingula
255	101	<i>Leonotis leonurus</i>	Lamiaceae	12	Duiwelstabak, koppiesdagga, rooidagga, wildedagga
256	101	<i>Leonotis leonurus</i>	Lamiaceae	13	Cape hemp, lion's ear, minaret flower, wild dagga
257	101	<i>Leonotis leonurus</i>	Lamiaceae	10	Imunyamunya, imunyane(-omncane)
258	102	<i>Leucosidea sericea</i>	Rosaceae	12	Broshout, dwadwa, geelhout, ouhout, varingboom
259	102	<i>Leucosidea sericea</i>	Rosaceae	13	Oldwood
260	102	<i>Leucosidea sericea</i>	Rosaceae	10	Umchichi, umtshitshi (Zulu)
261	103	<i>Lonchocarpus capassa</i>	Fabaceae-Faboideae	12	Appelblaar, olifantsoor, raasboom, stamperhout
262	103	<i>Lonchocarpus capassa</i>	Fabaceae-Faboideae	13	Apple leaf, lance tree, panda tree, rain tree
263	103	<i>Lonchocarpus capassa</i>	Fabaceae-Faboideae	10	Isihomohomo, umbandu, umphanda
43	14	<i>Cotyledon orbiculata</i>	Crassulaceae	13	Pig's ear*
44	15	<i>Dioscorea dregeana</i>	Dioscoreaceae	12	Wildejam
45	15	<i>Dioscorea dregeana</i>	Dioscoreaceae	13	Wild yam
46	15	<i>Dioscorea dregeana</i>	Dioscoreaceae	10	Isidakwa
47	16	<i>Ekebergia capensis</i>	Meliaceae	12	Essenhout
48	16	<i>Ekebergia capensis</i>	Meliaceae	13	Cape ash
49	16	<i>Ekebergia capensis</i>	Meliaceae	10	Umunyamathi
50	16	<i>Ekebergia capensis</i>	Meliaceae	6	Mmidibidibi
51	17	<i>Embelia ruminata</i>	Myrsinaceae	10	Ibhini
52	18	<i>Heteromorpha arborescens</i>	Apiaceae	12	Wildepietersielie
53	18	<i>Heteromorpha arborescens</i>	Apiaceae	13	Parsley tree
54	18	<i>Heteromorpha arborescens</i>	Apiaceae	11	Umbangandlala
55	18	<i>Heteromorpha arborescens</i>	Apiaceae	10	Umbangandlala
56	18	<i>Heteromorpha arborescens</i>	Apiaceae	1	Mkatlala
57	19	<i>Leonotis leonurus</i>	Lamiaceae	12	Wilde dagga
58	19	<i>Leonotis leonurus</i>	Lamiaceae	13	Wild dagga, lions' ear*
59	19	<i>Leonotis leonurus</i>	Lamiaceae	10	Umunyane
60	19	<i>Leonotis leonurus</i>	Lamiaceae	1	Lebake
61	19	<i>Leonotis leonurus</i>	Lamiaceae	11	Umfincafincane
62	19	<i>Leonotis leonurus</i>	Lamiaceae	3	Umhlahlampetu
63	20	<i>Leucosidea sericea</i>	Rosaceae	12	Ouhout
64	20	<i>Leucosidea sericea</i>	Rosaceae	13	Oldwood
65	20	<i>Leucosidea sericea</i>	Rosaceae	11	Isidwadwa
66	21	<i>Pellaea calomelanos</i>	Adiantaceae	13	Hard fern
67	21	<i>Pellaea calomelanos</i>	Adiantaceae	10	Inkomankomo
68	22	<i>Psidium guajava</i>	Myrtaceae	12	Koejawel
69	22	<i>Psidium guajava</i>	Myrtaceae	13	Guava
70	22	<i>Psidium guajava</i>	Myrtaceae	10	Ugwava
71	23	<i>Punica granatum</i>	Punicaceae	12	Granaat
72	23	<i>Punica granatum</i>	Punicaceae	13	Pomegranate

Name ID	ID	Species	Family	Language	Name
73	24	<i>Rauvolfia caffra</i>	Apocynaceae	12	Kinaboom
74	24	<i>Rauvolfia caffra</i>	Apocynaceae	13	Quinine tree
75	24	<i>Rauvolfia caffra</i>	Apocynaceae	10	Umhlambamanzi
76	24	<i>Rauvolfia caffra</i>	Apocynaceae	11	Umhlambamase
77	25	<i>Rumex lanceolatus</i>	Polygonaceae	12	Tongblaar
78	25	<i>Rumex lanceolatus</i>	Polygonaceae	13	Common dock
362	849	<i>Acokanthera oppositifolia</i>	Apocynaceae	13	Common bush poison
363	850	<i>Acorus calamus</i>	Araceae	13	Sweet flag
364	850	<i>Acorus calamus</i>	Araceae	10	Ikalamuzi
365	850	<i>Acorus calamus</i>	Araceae	12	Kalmoes
366	852	<i>Artemisia afra</i>	Asreaceae	10	Umhlonyane
367	852	<i>Artemisia afra</i>	Asreaceae	12	Wildeals, als, alsem
368	852	<i>Artemisia afra</i>	Asreaceae	13	Wild wormwood
369	853	<i>Aster bakeranus</i>	Asteraceae	10	Undlutshana
370	854	<i>Callilepis laureola</i>	Asteraceae	10	Impila
371	855	<i>Carica papaya</i>	Caricaceae	13	Pawpaw
372	856	<i>Curcubita pepo</i>	Curcubitaceae	13	Pumpkin
373	857	<i>Dichhrostachys cinerea</i>	Mimosoideae	13	Sickle bush
374	857	<i>Dichhrostachys cinerea</i>	Mimosoideae	12	Sekelbos
375	858	<i>Dicoma anomala</i>	Asteraceae	12	Maagwortel, maagbitterwortel, kalwerwortel
376	858	<i>Dicoma anomala</i>	Asteraceae	1	Mohlatsetse
377	858	<i>Dicoma anomala</i>	Asteraceae	10	Isihlabamakhondlwa
378	859	<i>Gymnospora senegalensis</i>	Celastraceae	13	Red spike thorn
379	860	<i>Heteromorpha aborescens</i>	Apiaceae	10	Umbangandlala
380	860	<i>Heteromorpha aborescens</i>	Apiaceae	11	Umbangandlala
381	860	<i>Heteromorpha aborescens</i>	Apiaceae	1	Mkatlala
382	860	<i>Heteromorpha aborescens</i>	Apiaceae	12	Wildpieterselie
383	861	<i>Hypoxis hemerocallidea</i>	Hypoxidaceae	10	Imkomfe
384	861	<i>Hypoxis hemerocallidea</i>	Hypoxidaceae	13	African potato
385	862	<i>Mentha longifolia</i>	Lamiaceae	13	Wild mint
386	862	<i>Mentha longifolia</i>	Lamiaceae	12	Ballerja, kruisment
387	862	<i>Mentha longifolia</i>	Lamiaceae	10	Ufuthane lomhalange
388	862	<i>Mentha longifolia</i>	Lamiaceae	1	Koena-ya-thaba
389	862	<i>Mentha longifolia</i>	Lamiaceae	11	Inixina
390	863	<i>Mondia whitei</i>	Periplocaceae	10	Umondi
391	864	<i>Punica granatum</i>	Punicaceae	13	Pomegranate
392	865	<i>Sansevieria aethiopica</i>	Dracaenaceae	13	Bowstring hemp, piles root
393	865	<i>Sansevieria aethiopica</i>	Dracaenaceae	2	Ghaiwortel
394	865	<i>Sansevieria aethiopica</i>	Dracaenaceae	8	Xikwenga
395	865	<i>Sansevieria aethiopica</i>	Dracaenaceae	12	Aambeiwortel
396	865	<i>Sansevieria aethiopica</i>	Dracaenaceae	11	Isikhokotho
397	866	<i>Sansevieria hyacinthoides</i>	Dracaenaceae	13	Piles root
398	868	<i>Turraea nilotica</i>	Meliaceae		
399	869	<i>Viscum capense</i>	Viscaceae	13	Cape mistletoe
400	869	<i>Viscum capense</i>	Viscaceae	12	Lidjies tee
401	39	<i>Albuca sp. (Zulu name; Incelo)</i>	Hyacinthaceae	10	Incelo
402	104	<i>Pellaea sp.</i>	Adiantaceae	10	Inkomankona
264	104	<i>Maesa lanceolata</i>	Myrsinaceae	12	Basterassegaai, bruinsapblaar
265	104	<i>Maesa lanceolata</i>	Myrsinaceae	13	False assegai
266	104	<i>Maesa lanceolata</i>	Myrsinaceae	10	Isidenda, isithende, ubhoqobhoqo, ugupu, uhlamvubele, umagupu, umaququ, umphonga, phonga, uphophopho (Zulu)
267	105	<i>Maytenus heterophylla</i>	Celastraceae	12	Gewone pendoring, gifdoring, lemoending, pendoring
268	105	<i>Maytenus heterophylla</i>	Celastraceae	13	Common spike-thorn
269	105	<i>Maytenus heterophylla</i>	Celastraceae	10	Inggwangane, inggwangane yehlanze, isibhubu, isibulu, isihlangu, umkhokhozo, umquqo, usala, usolo
270	106	<i>Maytenus senegalensis</i>	Celastraceae	12	Rooipendoring
271	106	<i>Maytenus senegalensis</i>	Celastraceae	13	Red spike-thorn
272	106	<i>Maytenus senegalensis</i>	Celastraceae	10	Ubuhlangwe, isihlangu, isihlangwane
273	107	<i>Melia azedarach</i>	Meliaceae	12	Kaapse sering, makboom, bessieboom
274	107	<i>Melia azedarach</i>	Meliaceae	13	China berry tree, persian lilac, sering, syringa, umbrella tree
275	107	<i>Melia azedarach</i>	Meliaceae	10	Umsilinga

Name ID	ID	Species	Family	Language	Name
276	108	<i>Monadenium lugardiae</i>	Euphorbiaceae	10	Umhlebe, umhuwa
277	109	<i>Mondia whitei</i>	Periplocaceae	10	Umondi
278	110	<i>Othonna natalensis</i>	Asteraceae	10	Incama, incamu
279	111	<i>Pelargonium sidoides</i>	Geraniaceae	12	Kalwerbossie
280	112	<i>Phytolacca dodecandra</i>	Phytolaccaceae	10	Ingubivumile, umahedeni
281	113	<i>Plantago major</i>	Plantaginaceae	12	Ribrass
282	113	<i>Plantago major</i>	Plantaginaceae	13	Plaintain
283	113	<i>Plantago major</i>	Plantaginaceae	10	Indlebe kathekwane
284	114	<i>Polystichum sp.</i>	Aspidiaceae	10	Ukhomokhomo
285	115	<i>Portulaca quadrifida</i>	Portulacaceae	13	Wild purslane
286	115	<i>Portulaca quadrifida</i>	Portulacaceae	10	Amalenjan
287	115	<i>Portulaca quadrifida</i>	Portulacaceae	12	Katbosdoring
288	115	<i>Portulaca quadrifida</i>	Portulacaceae	10	Ibutha, iphinganhloya
289	116	<i>Protasparagus virgatus</i>	Dracaenaceae	12	Adelaarsvaring
290	116	<i>Protasparagus virgatus</i>	Dracaenaceae	13	Bracken fern, eagle fern
291	116	<i>Protasparagus virgatus</i>	Dracaenaceae	10	Umbewe, umhlashoshana
292	117	<i>Pteridium aquilinum</i>	Dennstaedtiaceae	12	Kiaat
293	117	<i>Pteridium aquilinum</i>	Dennstaedtiaceae	13	Bloodwood, wild teak
294	117	<i>Pteridium aquilinum</i>	Dennstaedtiaceae	10	Umbilo, umvangazi
295	118	<i>Pterocarpus angolensis</i>	Fabaceae-Faboideae	10	Umathangane, umathanjana
296	119	<i>Raphionacme sp.</i>	Periplocaceae	12	Bobbejaantou, droog-my-keel, gewone bosdruif
297	119	<i>Raphionacme sp.</i>	Periplocaceae	13	Monkey rope, wild.common forest grape
298	119	<i>Raphionacme sp.</i>	Periplocaceae	10	Isinwazi, umthwazi, unungwane (Zulu)
299	120	<i>Rhoicissus tomentosa</i>	Vitaceae	12	Bobbejaantou, droog-my-keel, gewone bosdruif
300	120	<i>Rhoicissus tomentosa</i>	Vitaceae	13	Monkey rope, wild.common forest grape
301	120	<i>Rhoicissus tomentosa</i>	Vitaceae	10	Isinwazi, umthwazi, unungwane (Zulu)
302	121	<i>Rhus gueinzii</i>	Anacardiaceae	12	Doringkaree
303	121	<i>Rhus gueinzii</i>	Anacardiaceae	13	Thorny karree
304	121	<i>Rhus gueinzii</i>	Anacardiaceae	10	Inhlokoshiyane, umphondo
305	122	<i>Rumex lanceolatus</i>	Polygonaceae	12	Tongblaar
306	122	<i>Rumex lanceolatus</i>	Polygonaceae	13	Common dock, smaller dock
307	122	<i>Rumex lanceolatus</i>	Polygonaceae	10	Idolo lenkonyane (Zulu)
308	123	<i>Sansevieria hyacinthoides</i>	Dracaenaceae	12	Aambeiwortel, ghaiwortel
309	123	<i>Sansevieria hyacinthoides</i>	Dracaenaceae	13	Mother-in-law's tongue, pile root
310	123	<i>Sansevieria hyacinthoides</i>	Dracaenaceae	10	Isikhokotho, isikwendle, isitokotoko (Zulu)
311	124	<i>Satyrium bracteatum</i>	Orchidaceae	10	Ubani lwenkangala
312	125	<i>Sclerocarya birrea</i>	Anacardiaceae	12	Maroela
313	125	<i>Sclerocarya birrea</i>	Anacardiaceae	13	Marula, cider tree
314	125	<i>Sclerocarya birrea</i>	Anacardiaceae	10	Unganu
315	126	<i>Senna occidentalis</i>	Caesalpinioideae	13	Coffee senna, stinkweed
316	126	<i>Senna occidentalis</i>	Caesalpinioideae	10	Isinyembane, umnwanda-nyoka
317	127	<i>Solanum acanthoideum</i>	Solanaceae	12	Bitterappel, doringappel
318	127	<i>Solanum acanthoideum</i>	Solanaceae	13	Bitter apple, prickly apple
319	128	<i>Solanum nigrum</i>	Solanaceae	12	Gaalbessie, inkbessie, nagskaalbossie, nagskade
320	128	<i>Solanum nigrum</i>	Solanaceae	13	Black / common / garden / woody nightshade, inkberry
346	138	<i>Urginea macrocentra</i>	Hyacinthaceae	12	Bergtulp, Natalslangkop, slangkop
347	138	<i>Urginea macrocentra</i>	Hyacinthaceae	10	Injobo, isiklenama, ufobo (Zulu)
348	140	<i>Uvaria lucida</i>	Annonaceae	12	Groottrospeer
349	140	<i>Uvaria lucida</i>	Annonaceae	13	Large cluster-pear
350	140	<i>Uvaria lucida</i>	Annonaceae	10	Umavumba, umazwenda-omnyama (Zulu)
351	141	<i>Vernonia neocorymbosa</i>	Asteraceae	10	Uhlungu-lungu, umhlunguhlungu, umhlunguhlungu omhlophe, umzane-wehlati
352	142	<i>Ximenia americana</i>	Olacaceae	12	Blousuurpruim
353	142	<i>Ximenia americana</i>	Olacaceae	13	Blue sourplum
354	143	<i>americana</i>	Olacaceae	10	Umkhlotshwana, umthunduluka-omncane
355	144	<i>Ximenia caffra</i>	Olacaceae	12	Grootsuurpruim, kafferpruim, wildepruim
356	144	<i>Ximenia caffra</i>	Olacaceae	13	Kaffir plum, sour plum
357	144	<i>Ximenia caffra</i>	Olacaceae	10	Amathunduluka, umgwenya, umthunduluka
358	145	<i>Zanthoxylum capense</i>	Rutaceae	12	Kardamon, leinperdepram, kop(pies)doring
359	145	<i>Zanthoxylum capense</i>	Rutaceae	13	Adelaide spice tree, cardamom, small knobwood

Name ID	ID	Species	Family	Language	Name
360	145	<i>Zanthoxylum capense</i>	Rutaceae	10	Amabelentombi, amabelezintshingezi, isimungumabele, isinungwane, umlungumabele, umnungamabele, umnungwane omncane
321	128	<i>Solanum nigrum</i>	Solanaceae	10	Isihlalakuhle, udoye, ugqumgqumu, ugwabha, umaguqa, umsobo (-omncane, -sobo) (Zulu)
322	129	<i>Stephania abyssinica</i>	Menispermaceae	10	Umbombo, unthambana, umthambane, umthombo
323	130	<i>Strychnos henningsii</i>	Loganiaceae		Hardepeer(hout)
324	130	<i>Strychnos henningsii</i>	Loganiaceae	12	Rooibitterbessie
325	130	<i>Strychnos henningsii</i>	Loganiaceae	13	Coffee bean strychnos, coffee hard pear, natal teak
326	130	<i>Strychnos henningsii</i>	Loganiaceae	10	Umanana, umdunye, umnono, umqalothi, umqaloti (Zulu)
327	131	<i>Tephrosia macropoda</i>	Fabaceae-Faboideae	12	Visboontjie
328	131	<i>Tephrosia macropoda</i>	Fabaceae-Faboideae	13	Fish/poison bean
329	131	<i>Tephrosia macropoda</i>	Fabaceae-Faboideae	10	Iloxane, ilozane, umuthi wezifuba
330	132	<i>Tephrosia purpurea</i>	Fabaceae-Faboideae	13	Ash vetch
331	132	<i>Tephrosia purpurea</i>	Fabaceae-Faboideae	10	Ilozane
332	133	<i>Tephrosia vogelii</i>	Fabaceae-Faboideae	13	Fish/poison bean
333	133	<i>Tephrosia vogelii</i>	Fabaceae-Faboideae	10	Ilozane
334	134	<i>Terminalia phanerophlebia</i>	Combretaceae	12	Lebombotrosblaar/bastergeelhout ( <i>T. phanerophlebia</i> ); bloubos, bosvaal, sandvolbos, silwerboom, vaalboom ( <i>T. sericea</i> ),
335	134	<i>Terminalia phanerophlebia</i>	Combretaceae	13	Lebombo cluster-leaf/terminalia ( <i>T. phanerophlebia</i> ), assegai wood, silver cluster-leaf ( <i>T. sericea</i> )
336	134	<i>Terminalia phanerophlebia</i>	Combretaceae	10	Amangwe, / umangwe (-amhlophe, - ampofu, - ansundu, -ompofu), umkhono (t. phaerophlebia); amangwe (-amhlophe, -amnyama) ( <i>T. sericea</i> )
337	135	<i>Trema orientalis</i>	Ulmaceae	12	Hophout
338	135	<i>Trema orientalis</i>	Ulmaceae	13	Pigeonwood
339	135	<i>Trema orientalis</i>	Ulmaceae	10	Ifamu, iphubane, isikhwelamfene, ubathini, umbhangabhanga, umbokhangabokhanga, umcebekhazana, umdindwa, umsekeseke, umvangazi
340	136	<i>Trichilia emetica</i>	Meliaceae	12	Basteresse(n)hout
341	136	<i>Trichilia emetica</i>	Meliaceae	13	Cape/natal mahogany, red ash, thunder tree
342	136	<i>Trichilia emetica</i>	Meliaceae	10	Ixolo, umathunzini, umkhuhla, umkhuhlu, umkhuhlwa (Zulu)
343	137	<i>Tulbaghia violacea</i>	Alliaceae	12	Wildeknofflok
344	137	<i>Tulbaghia violacea</i>	Alliaceae	13	Wild garlic
345	137	<i>Tulbaghia violacea</i>	Alliaceae	10	Isihaqa

2) Plants used against cestode parasites

ID	Source	Species	Family	Plant parts	Part of plant used	Medical uses	Plant part used	Biological activity	Chemicals	References
3	1	<i>Acockanthera oppositifolia</i>	Apocynaceae	L & R	Dried leaves (or roots).	Headaches . Other ailments for which the plant has been used include toothache, colds, anthrax and tapeworm. <i>Acockanthera</i> species are best known as sources of extremely toxic arrow poisons (Forbes, 1986; Neuwinger, 1994).			The plant is extremely toxic since it contains several heart glycosides (Neuwinger, 1994) of which acovenoside A is the major compound, with smaller amounts of acolognifloroside K and several other minor constituents.	Pujol, 1990; Hutchings and van Staden, 1994; Watt and Breyer-Brandwijk, 1962; Forbes, 1986; Neuwinger, 1994; Neuwinger, 1994; De Villiers, 1962.
4	1	<i>Acorus calamus</i>	Araceae	Rh	All parts of the plant have a strong, pungent smell, but only the rhizomes are generally used.	The plant has possibly been used since biblical times, but it is not certain if the "Calamus" of the Bible actually refers to this plant. There are numerous traditional uses all over the world, mainly as a digestive and carminative, but sometimes as an emetic, anti-spasmodic, stimulant and anthelmintic.			The essential oil contains numerous monoterpenoids (e.g. camphene, p-cymene, linalool) and sesquiterpenoids (e.g. acorenone). Toxicity is ascribed to $\beta$ -asarone, a phenylpropanoid (Lander, 1990; Bruneton, 1995). They contain an essential oil (Bruneton, 1995) in concentrations of 2 to 9%.	Grieve, 1967; Lander, 1990; Bruneton, 1995.
5	1	<i>Albizia anthelmintica</i>	Fabaceae-Mimosoidae	B	Powdered bark. F.11	<i>A. anthelmintica</i> is a well known African anthelmintic and the powdered bark has been used in South Africa to treat tapeworm infestations.			The presence of histamine and other imidazole derivatives in the bark of <i>Albizia</i> species may have some effect when the bark is used as headache snuff and perhaps also for hyposensitisation effects when applied to the skin.	Teichler, 1971; Hutchings et al., 1994; Pujol, 1990; Hutchings, 1994; Dictionary of Natural Products, 1996.
17	1	<i>Embellia ruminata</i>	Myrsinaceae	B, L & R	The roots are usually used, but sometimes also the bark, leaves or fruit.	The plant is a traditional remedy against tapeworm (Cawston, 1933; Watt and Breyer-Brandwijk, 1962; Pujol, 1990) and is also used as a general tonic. Several other African species of <i>Embellia</i> are used for the same purposes (Iwu, 1993). Ammonium embelate is used as an anthelmintic against cestodes (Merck, 1989).			The active ingredient is embelin, a benzquinone which has been isolated from several <i>Embellia</i> species (Dictionary of Natural Products, 1996). The diammonium salt of embelin (ammonium embelate) is used commercially as a vermifuge (Merck, 1989).	Cawston, 1933; Watt and Breyer-Brandwijk, 1962; Pujol, 1990; Merck, 1989; Iwu, 1993; Dictionary of Natural Products, 1996.
23	1	<i>Punica granatum</i>	Punicaceae	RB	The fruit rind is used as antidiarrhoeal; the root and stem bark as vermifuge.	The dried fruit rind (Afrikaans: "granaatskilie") is an early Cape remedy for diarrhoea and stomach ache (Dykman, 1891; Cillii, 1992). Its use in antidiarrhoeal decoctions has also been recorded in the Eastern Cape (Hutchings, 1989). The root bark (occasionally with stem bark and leaves included) is a well-known and widely used treatment for tapeworm (Watt and Breyer-Brandwijk, 1962; Iwu, 1993).			Punicalin and punicalagin are the two main galloquinone of the fruit rind (Dictionary of Natural Products, 1996; Tanaka et al., 1986; Hutchings, 1989; Merck, 1989; Iwu, 1993; Cillii, 1992; Dictionary of Natural Products, 1996).	Dykman, 1891; Watt and Breyer-Brandwijk, 1962; Martindale, 1977; Tanaka et al., 1986; Hutchings, 1989; Merck, 1989; Iwu, 1993; Cillii, 1992; Dictionary of Natural Products, 1996.
25	1	<i>Rumex lanceolatus</i>	Polygonaceae	L & R	The roots are mainly used, sometimes the leaves.	The plant is a traditional remedy for internal parasites (tapeworm and roundworm) (Watt and Breyer-Brandwijk, 1962; Rood, 1994; Pujol, 1990; Hutchings, 1996). The whole plant is also said to be widely used for vascular diseases and internal bleeding (Pujol, 1990). Externally, it is applied to abscesses, boils and tumours (Watt and Breyer-Brandwijk, 1962; Pujol, 1990; Hutchings, 1996).			Members of this family are well known for the presence of anthraquinones (Dictionary of Natural Products, 1996).	Watt and Breyer-Brandwijk, 1962; Rood, 1994; Pujol, 1990; Hutchings, 1996; Dictionary of Natural Products, 1996.
36	2	<i>Acockanthera oppositifolia</i>	Apocynaceae	R	Root decoctions are taken for tapeworm (Watt and Breyer-Brandwijk, 1962).	Roots are used for tapeworm by the Xhosa (Watt and Breyer-Brandwijk, 1962). Other African usage includes use of the wood as an anthelmintic (Watt and Breyer-Brandwijk, 1962). Leaf infusions are administered for fits in Transkei but reputed to be very poisonous if too strong (BCR 570 UFH).			Plants contain oxalic acid. The active principle producing severe gastrointestinal irritation and digitalis-like action is a rhamnose glycoside venenatin.	Watt and Breyer-Brandwijk, 1962.
37	2	<i>Agrimonia bracteata</i>	Rosaceae	L	Pounded leaves are taken in a little cold water for tapeworm sometimes in addition of three leaves of <i>Maesa lanceolata</i> (Byant, 1966; Gerstner, 1941). F.14	Taken as vermifuge by Xhosa and Sotho (Watt 1962). Leaves boiled with anthrax infected meat.			Condensed tannins, polysaccharides coumarins, terpenoids and flavanoids.	Watt and Breyer-Brandwijk, 1962; Byant, 1966; Gerstner, 1941.

ID	Source	Species	Family	Plant parts	Part of plant used	Medical uses	Plant part used	Biological activity	Chemicals	References
38		2 <i>Albizia anthelmintica</i>	Fabaceae-Mimosoideae	B	Bark is used as an anthelmintic (pers. comm. to A.B.C.).	In many parts of eastern and southern Africa, bark is used as an anthelmintic for humans and animals (Watt and Breyer-Brandwijk, 1962; Kokwaro, 1976; Hedberg and Staugard, 1989).	No toxic effects were observed in clinical tests of the bark as an anthelmintic in humans (Watt and Breyer-Brandwijk, 1962). Good results from the bark have been reported in 25 patients treated for tapeworm at a mission hospital. The powdered bark was found to be more effective as an anthelmintic than decoctions. Sheep are reported to eat the bark when infested with worms, although experimental administration produced poor results.	A triterpenoid saponin known as museninin is found in rootbark, stembark and seeds (Tschesche and Forstman, 1957). Rootbark also contains deglucosaminin and echinocystic acid is found in the bark (Tschesche et al., 1966; Tschesche and Kämmerer, 1969).	Tschesche and Forstman, 1957; Watt and Breyer-Brandwijk, 1962; Tschesche et al., 1966; Tschesche and Kämmerer, 1969; Kokwaro, 1976; Hedberg and Staugard, 1989; Jalal, 1987; Ibrahim, 1992; Samuelsson et al., 1992b.	
42		2 <i>Aloe tenuior</i>	Asphodelaceae	L & R	Leaves and roots used for tapeworm infestation and purgatives by Xhosa and Fingo (Batten and Bokelmann, 1966).	Purgative, sprinkling charm and protective bathing charms.				Batten and Bokelmann, 1966.
55		2 <i>Calliepis laurolea</i>	Asteraceae	R	Boiled roots are taken for tapeworms (Watt, 1962).	Root paste used to kill maggots in cattle as purgative. In enemas, as charms, cough remedy.	Boiling of root.	Toxic and causes hypoglycaemia.	Glucosides.	Watt and Breyer-Brandwijk, 1961.
59		2 <i>Chellanthes hirta</i>	Adiantaceae	Used	Used as a tapeworm anthelmintic (Watt and Breyer-Brandwijk, 1962).					Watt and Breyer-Brandwijk, 1962.
62		2 <i>Clausena anisata</i>	Rutaceae	L & R	Roots are used in a tapeworm remedy (Bryant, 1966). Leaves are an ingredient in infusions taken in doses of a cupful as parasitocides and purgatives.	Leaves are used in southern Africa for various children's complaints, fevers and as anthelmintics (Watt and Breyer-Brandwijk, 1962). Pounded roots are used for malaria in East Africa (Kokwaro, 1976). Crushed leaves are applied to wounds infested with maggots in Zimbabwe (Gelfand et al., 1985).		The glandular leaves are strong smelling, particularly when crushed. Many terpenoid hydrocarbons, sesquiterpenoids and fatty acids have been isolated from pericarps, roots and leaves (Resch et al., 1985).	Watt and Breyer-Brandwijk, 1962; Bryant, 1966; Kokwaro, 1976; Gelfand et al., 1985; Resch et al., 1985.	

ID	Source	Species	Family	Plant parts	Part of plant used	Medical uses	Plant part used	Biological activity	Chemicals	References
64	2	<i>Cherodendrum glabrum</i>	Verbenaceae	L	Leaves are ingredients in infusions taken in doses of a cupful for intestinal parasites known as ikhambi. The infusions are made from leaves pounded with roots of <i>Cymbopogon marginatus</i> (Steud. Siao ex Burtt Davy, a Hypoxis species, the shrub umkhwangu was entabeni (probably <i>Erythrophileum lasianthum</i> Corbishley or <i>Margaritaria discoidea</i> (Baill.) Webster) and leaves of <i>Zanthoxylum capense</i> (Thunb.) Harv., <i>Brachylaena discolor</i> (DC.) Ekebergia capensis Sparrm., <i>Chlausena anisata</i> (Willd.) Hook. f. ex Benth. and the injiza bush. Leaves are also used for roundworms and threadworms (Watt and Breyer-Brandwijk, 1962).	The Sotho and Swazi use leaf decoctions, topically applied, to prevent the development of parasites in animal wounds (Watt and Breyer-Brandwijk, 1962). Leave infusions, with bark scraping and milk, are used as anthelmintics for calves, dogs and donkeys by the Tswana (Roberts, 1990).	Flowers and leaves have an unpleasant odour and unspecified parts are reported by the Lobedu to be repellent to beetles (Watt and Breyer-Brandwijk, 1962).		Watt and Breyer-Brandwijk, 1962; Roberts, 1990.	
71	2	<i>Cyrtanthus breviflorus</i>	Amaryllidaceae	Bb	Bulbs are used for roundworm and tapeworm (Gerstner, 1939).	Bulb infusions taken as love charms emetics.				Gerstner, 1939.
75	2	<i>Dryopteris athamantica</i>	Dryopteridaceae	Usd	Used as a general anthelmintic and administered in 3 dram doses against tapeworm (Gerstner, 1939).	Rhizome decoctions are used for retained placenta in cows by the Sotho (Jacot Guillarmod, 1971).	Administered as 3 dram doses against tapeworm.	Overdoses may be fatal (Gerstner, 1939).		Gerstner, 1939.
78	2	<i>Embellia ruminata</i>	Myrsinaceae	Fr, L, & R	Leaves, ripe berries and roots are taken as anthelmintics against tapeworm (Bryant, 1966).				Contains a toxalbumin and embellic acid (Watt and Breyer-Brandwijk, 1962).	Watt and Breyer-Brandwijk, 1962; Bryant, 1966.
84	2	<i>Gerbera ambigua</i>	Asteraceae	L	Pounded leaf infusions used for tapeworms and stomach ache while root infusions are sipped hot for coughs (Bryant, 1966; Hulme, 1954).	Also used for heart pain.			Sesquiterpenoids.	Bryant, 1966; Hulme, 1954.
85	2	<i>Gerbera piloselloides</i>	Asteraceae	L	Strained leaf infusions are taken for tapeworm (Hulme, 1954).				Roots contain 3-geranyl-4-hydroxy-5-coumarincarboxaldehyde, three acetophenones and two chromenes (Bohlmann and Grenz, 1975).	Hulme, 1954; Bohlmann and Grenz, 1975.
91	2	<i>Jatropha curcas</i>	Euphorbiaceae	S		In tropical Africa, seeds are used as anthelmintics and for skin ailments (Watt and Breyer-Brandwijk, 1962). In Madagascar leaves and roots are used for malaria (Jenkins, 1967; Rasoaivo et al., 1992). Roots and leaf infusions are used for convulsions and fits (Adesina, 1982).			The seeds contain 50% of a fixed oil, pinhoen oil, and a mucilage composed of xylose, galactose, rhamnose and galacturonic acid and the toxalbumin, curcin (Bézanger-Beauquesne, 1956; Mourgue et al., 1961a; b).	Bézanger-Beauquesne, 1956; Mourgue et al., 1961a; b; Watt and Breyer-Brandwijk, 1962; Stirpe et al., 1976; Adekunmi and Marquis, 1980; Adesina, 1982; Jenkins, 1967; Rasoaivo et al., 1992.
93	2	<i>Kigelia africana</i>	Bignoniaceae	R		Roots are used for tapeworm.			The roots have yielded dihydroisocoumarins, lapachol and sterols and the presence of iridoid glycosides has been reported (Govindachari et al., 1971; Alamelu and Bhuwan, 1974).	Govindachari et al., 1971; Alamelu and Bhuwan, 1974.

ID	Source	Species	Family	Plant parts	Part of plant used	Medical uses	Plant part used	Biological activity	Chemicals	References
94		2 <i>Leonotis leonurus</i>	Lamiaceae	F & L	Pounded roots and leaves are added to drinking water to prevent gallsickness in cattle (Hulme, 1954). Leaves and flowers are used for tapeworm and infusions of leaves, with those of <i>Clitita hirsuta</i> E. Mey. Ex Sond., are used for gallsickness in animals.			Although plants are reputed to induce intoxication and delirium, other reports indicate that no such effects were produced when 10 g of dried leaves were taken and that an alcoholic extract had no toxic or narcotic effect (Bryant, 1966; Watt and Breyer-Brandwijk, 1962). A nauseous vapour was given off when the dried herb was smoked and plants are reported to have a peculiar scent and a nauseous taste. Negative feeding tests have been produced in sheep and pigs.	Compounds known from leaves include a reddish oil with a high boiling point, two phenolic compounds and 19.8% resin (Watt and Breyer-Brandwijk, 1962).	Hulme, 1954; Watt and Breyer-Brandwijk, 1962; Bryant, 1966.
100		2 <i>Maytenus senegalensis</i>	Celastraceae	L & R		In Zimbabwe, roots and leaves are used for epilepsy (Gelfand et al., 1985). Roots are used for schistosomiasis. In India, paste made from powdered bark is used against <i>Pediculus capitis</i> (Watt and Breyer-Brandwijk, 1962).			Bark is thought to contain tannin (Watt and Breyer-Brandwijk, 1962).	Watt and Breyer-Brandwijk, 1962; Gelfand et al., 1985.
103		2 <i>Othonna natalensis</i>	Asteraceae	R	Cold water root infusions are taken for tapeworm and as vermifuges for children, sheep and calves (Bryant, 1966; Gerstner, 1938; 1941).	Roots are used as a vermifuge for calves by the Sotho (Watt and Breyer-Brandwijk, 1962).				Gerstner, 1938; 1941; Watt and Breyer-Brandwijk, 1962; Bryant, 1966.
104		2 <i>Pellaea sp.</i>	Adiantaceae	R	Roots used as anthelmintic.F33					Per commun ABC.
111		2 <i>Raphionacme sp.</i>	Periplocaceae	RB	Pounded rootbark of a plant known as umathiana and reported to be a <i>Raphionacme</i> species is mixed with water to treat worm infestation (Valley Trust healers, pers. comm., plant not seen by A.H.).					Valley Trust healers, pers. comm., plant not seen by A.H.
115		2 <i>Rumex lanceolatus</i>	Polygonaceae	L & R	Cold root infusions are used for tapeworm (Watt and Breyer-Brandwijk, 1962).	Sweet milk leaf decoctions are taken for tapeworm by the Xhosa (Watt and Breyer-Brandwijk, 1962).		Mild purgative properties are reported (Watt and Breyer-Brandwijk, 1962).	Chrysophanic acid, emodin and a small amount of volatile oil has been isolated (Watt and Breyer-Brandwijk, 1962). The rhizome yields 6.7% tanning material.	Watt and Breyer-Brandwijk, 1962.
122		2 <i>Stychnos henningsii</i>	Loganiaceae	Uzd	Unspecified parts are used for tapeworm (Bryant, 1966).				Many alkaloids have been isolated.	Bryant, 1966.
126		2 <i>Urignea macrocentra</i>	Hyacinthaceae	Bb	Bulbs are used for roundworm and tapeworm (Gerstner, 1939).	Reported to be dangerous, poisonous plants (Gerstner, 1939). All parts of the plants are toxic and lethal to cattle, goats, sheep, rabbits and guinea-pigs (Watt and Breyer-Brandwijk, 1962). The flowering stems are more toxic than the leaves (Kellerman et al., 1988).				Gerstner, 1939; Watt and Breyer-Brandwijk, 1962; Kellerman et al., 1988.

ID	Source	Species	Family	Plant parts	Part of plant used	Medical uses	Plant part used	Biological activity	Chemicals	References
849	11	<i>Acokanthera oppositifolia</i>	Apocynaceae	R	Powdered root administered orally or as snuff for pain and snake bite and root decoctions are taken for anthrax and tapeworm.	Powdered root administered orally or as snuff for pain and snake bite and root decoctions are taken for anthrax and tapeworm.				
851	11	<i>Albizia anthelmintica</i>	Fabaceae-Mimosoideae	B		Bark commonly used as an effective anthelmintic for tapeworm and other worms in humans and stock animals, and the root and stem bark are used to treat fever, venereal disease and rheumatism.				
854	11	<i>Cailliepis laureola</i>	Asteraceae	R	Preparations of root used as purgatives, tonic, for tapeworm infertility, snakebite, cough.	Preparations of root used as purgatives, tonic, for tapeworm infertility, snakebite, cough.				
856	11	<i>Curcubita pepo</i>	Curcubitaceae	S	Root infusion taken for rheumatism and ground seed eaten for tapeworm.	Root infusion taken for rheumatism and ground seed eaten for tapeworm.				
864	11	<i>Punica granatum</i>	Punicaceae	RB	Dried fruit rind used for diarrhoea and stomach, while root bark used as tapeworm remedy.	Dried fruit rind used for diarrhoea and stomach, while root bark used as tapeworm remedy.				
919	3	<i>Acokanthera oppositifolia</i>	Apocynaceae	Roots	Used for snakebite (leaf and root). Powder from a plant reported to be this one is used for urinary tract infections. Root decoctions are taken for anthrax and tapeworm. Plants are used to destroy marauding dogs and hyaenas. Leaf decoctions are taken for stomach ache, spider bite, blood poisoning and septic sores. Used as charms. Leaf infusions are used for fits. Used for toothache, syphilis and an anthelmintic. The dried leaves or roots are used to treat headaches or as a treatment for snakebite. Weak leaf infusions are taken for abdominal pain. Other ailments for which the plant has been used include toothache, colds, anthrax and tapeworm. <i>Acokanthera</i> sp are best known as sources of extremely toxic arrow poisons.					
920	3	<i>Acokanthera venenata</i>	Apocynaceae	Roots	A root decoction is taken by both Zulu and Xhosa for anthrax and tapeworm. The wood is an African anthelmintic. Used by Xhosa as anthelmintic.					
922	3	<i>Agrimonia eupatoria</i>	Rosaceae	Leaves	1) Zulu use finely powdered leaf used for tapeworm in man and animal by Zulus. 2) Xhosa and Southern Sotho use plant as vermifuge.					
923	3	<i>Allianthus altissima</i>	Simaroubaceae	Bark	1) Tree used as taeniafuge 2) Bark for tapeworm 3) Slightly positive against malaria.					
925	3	<i>Aloe tenuior</i>	Asphodelaceae	Unspecified	1) Fingo and Xhosa tapeworm remedy.					

ID	Source	Species	Family	Plant parts	Part of plant used	Medical uses	Plant part used	Biological activity	Chemicals	References
934	3	<i>Aster filifolius</i>	Asteraceae	Unspecified	1) Infusion with camphor used to treat tapeworm by Xhosa and Kwena.	An infusion of <i>Aster filifolius</i> Vent. is taken with camphor as a tapeworm remedy by the Xhosa and the Kwena. Dyer and Steyn report that the plant has been suspected of producing mortality in sheep and is poisonous on test in the rabbit. Feeding tests by Steyn confirm this. The chief symptoms are weakness, acceleration of the pulse, tympanites, irregular respiratory rhythm and sometimes salivation. Post mortem, there is found cyanosis, subendocardial haemorrhages, congestion of various organs, fluid in the serous sacs and oedema of the lungs. Catarhal gastro-enteritis is also observed. Story, on the other hand, says that the plant is poisonous in some areas and regarded as a useful fodder in others. Another negative toxicity finding is from van der Walt et al. The plant under the name <i>Aster filifolius</i> Auct. non Vent. has, however, produced toxic effects in a test on a rabbit, performed as a result of a report of the loss of 200 sheep from eating the plant. The effects are suggestive of a severe irritant action with haemorrhage.				
942	3	<i>Cheilanthes hirta</i>	Adiantaceae	Roots	1) Zulu use powdered root as anthelmintic for tapeworms.					
945	3	<i>Clerodendrum glabrum</i>	Lamiaceae	Leaves	1) Zulu use leaf for tapeworm and roundworm 2) Lobedu use infusion of root bark for worms in donkey.					
946	3	<i>Colocynthis citrullus</i>	Cucurbitaceae	Seeds	1) Fixed oil, extracts hull and kernel paralyse the tapeworms and roundworms of cat.					
948	3	<i>Cucurbita maxima</i>	Cucurbitaceae	Seeds	1) Tropical Africa seed is roundworm remedy in cotyledon 2) Fresh seed used as taenicide.					
949	3	<i>Cucurbita pepo</i>	Cucurbitaceae	Seeds	The seed is vermifugal at doses of 10-50 g or 100-200g. Chemical investigation failed to show taenicial. Seed oil reputed to have taenicial activity.	Seeds for tapeworm.				
954	3	<i>Dryopteris athamantica</i>	Dryopteridaceae	Unspecified	1) Infusion and electuary, excellent anthelmintic for tapeworm by Xhosa and Southern Sotho 2) A zulu anthelmintic 3) tapeworm remedy in South Africa 4) Xhosa and Sotho vermifuge.					
957	3	<i>Embellia kraussii</i>	Myrsinaceae	Fruits, leaves and roots	Zulu use fruit and leaf as anthelmintic for <i>Taenia</i> .					
960	3	<i>Gisekia pharnacoides</i>	Ficoideae	Unspecified	1) South Africa - plant used as a taenicide.					

ID	Source	Species	Family	Plant parts	Part of plant used	Medical uses	Plant part used	Biological activity	Chemicals	References
969	3	<i>Maesa lanceolata</i>	Myrsinaceae	Fruits and seeds	1) Zulu and Xhosa use seed as anthelmintic 2) Powdered fruit in water used as anthelmintic in man and animal 3) Xhosa use as taenifuge.	Powdered whole fruit or seeds are used as anthelmintics. Infusions from decorticated roots are taken as emetics for biliousness. The plant is used as a febrifuge and for sore throats and abdominal cramps. Warmed leaves are rubbed on wounds and sprains while roots are used for jaundice. Bark is used to make a stimulating beverage. Leaves are used for initiation wounds and for infertility. Leaves and stems are used for stinging rashes and leaves as a vermifuge. Roots are used for biennorrhagia and unidentified part are used for wounds and chicken pox. Is reported to be toxic.				
970	3	<i>Malva parviflora</i>	Malvaceae	Unspecified	Southern Sotho decoction as remedy for tapeworm, profuse menstruation and lotion.					
975	3	<i>Oxalis pescaprae</i>	Oxalidaceae	Bulbs	1) Raw bulb used as anthelmintic 2) Plant used as taenifuge in South Africa.					
976	3	<i>Oxalis smifhiana</i>	Oxalidaceae	Roots	1) Xhosa and others use the dried powdered root as a tapeworm remedy.					
981	3	<i>Phytolacca americana</i>	Phytolaccaceae	Unspecified	The plants is considered emetic, purgative, anisphyllitic and taenifuge.					
984	3	<i>Prunus persica</i>	Rosaceae	Flowers and Leaves	1) Eastern Province flower is purgative and anthelmintic 2) Mauritius young leaf used as vermifuge 3) North Africa fruit used for roundworm and leaf regarded as dangerous taenifuge.					
990	3	<i>Rumex lanceolatus</i>	Polygonaceae	Rhizome	Xhosa, milk decoction of rhizome as tapeworm remedy. Rhizome chewed for same purpose. Zulu rhizome cold infusion used for same purpose. Rhizome milk decoction also used for roundworms.	Anthelmintic.				
991	3	<i>Rumex nepalensis</i>	Polygonaceae	Leaves	Leaf decoction used for bilharziasis 2) Nguni and Sotho, several <i>Rumex</i> sp. Used as root decoction for tapeworm remedy.					

3) Plants used against nematode parasites													
ID	Source	Species	Family	Plant parts	Part of plant used	Medical uses	Plant part used	Biological activity	Chemicals	References	Dosing preparation	Parasite	Abbreviation
25	1	<i>Rumex lanceolatus</i>	Polygonaceae	L & R	The roots are mainly used, sometimes the leaves.	The plant is a traditional remedy for internal parasites (tapeworm and roundworm) (Watt and Breyer-Brandwijk, 1962; Food, 1994; Pujol, 1990; Hutchings, 1996). The whole plant is also said to be widely used for vascular diseases and internal bleeding (Pujol, 1990). Externally, it is applied to abscesses, boils and tumours (Watt and Breyer-Brandwijk, 1962; Pujol, 1990; Hutchings, 1996).			Members of this family are well known for the presence of anthraquinones (Dictionary of Natural Products, 1996). <i>Rumex</i> roots contain glycosides of chrysophanol, such as chrysophanein, while <i>Rumex</i> species have various glycosides of rhein.	Watt and Breyer-Brandwijk, 1962; Food, 1994; Pujol, 1990; Hutchings, 1996; Dictionary of Natural Products, 1996.		6	
40	2	<i>Aloe marlothii</i>	Asphodelaceae	L & R	Leaves and roots administered as decoctions against roundworms (Watt, 1962).	Chewed roots used as enema, shoot widely used in South Africa for stomach ailments.		Produces emesis if taken in large quantities.	Anthraquinones.	Watt and Breyer-Brandwijk, 1962.	1		4   L & R
45	2	<i>Anilidesma venosum</i>	Euphorbiaceae	R	Roots used for hookworm and washes to ease body pain (Palgrave, 1981).	Abdominal disorders, enemas, infertility, menorrhagia.			Alkaloids.	Watt and Breyer-Brandwijk, 1962; Palgrave, 1981.	12		4 R
54	2	<i>Brodiaea ferruginea</i>	Euphorbiaceae	L & B		Extracts from stem bark and leaves possess neuromuscular activity (Onoruwwe et al., 1994). Such activities may account for anthelmintic use of the extracts against roundworms.				Onoruwwe et al., 1994.	12		4 L & B
62	2	<i>Clauseria anisata</i>	Rutaceae	L & R	Roots are used in a tapeworm remedy (Bryant, 1966). Leaves are an ingredient in infusions taken in doses of a cupful as parasitocides and purgatives.	Leaves are used in southern Africa for various children's complaints, fevers and as anthelmintics (Watt and Breyer-Brandwijk, 1962). Pounded roots are used for malaria in East Africa (Kokwaro, 1976). Crushed leaves are applied to wounds infested with maggots in Zimbabwe (Gelland et al., 1985).			The glandular leaves are strong smelling, particularly when crushed. Many terpenoid hydrocarbons, sesquiterpenoids and fatty acids have been isolated from pericarps, roots and leaves (Resch et al., 1985).	Watt and Breyer-Brandwijk, 1962; Bryant, 1966; Kokwaro, 1976; Gelland et al., 1985; Resch et al., 1985.	2		6 L & R
64	2	<i>Clerodendrum glabrum</i>	Verbenaceae	L	Leaves are ingredients in infusions taken in doses of a cupful for intestinal parasites known as ikhambi. The infusions are made from leaves pounded with roots of <i>Cymbopogon marginatus</i> (Steud.). Stapf ex Burt Davy, a Hypoxis species, the shrub umkhwangu was entabent (probably <i>Erythrophloeum lasianthum</i> Corbishley or <i>Margaritana discolor</i> (Baill.) Webster] and leaves of <i>Zanthoxylum capense</i> (Thunb.) Harv., <i>Brachylaena discolor</i> (dc., Ekebergia capensis Sparrm., <i>Okeusia anisata</i> (Willd.) Hook. f. ex Benth. and the injuza bush. Leaves are also used for roundworms and threadworms (Watt and Breyer-Brandwijk, 1962).	The Sotho and Swazi use leaf decoctions, topically applied, to prevent the development of parasites in animal wounds (Watt and Breyer-Brandwijk, 1962). Leave infusions, with bark scraping and milk, are used as anthelmintics for calves, dogs and donkeys by the Tswana (Roberts, 1990).		Flowers and leaves have an unpleasant odour and unspecified parts are reported by the Lobodu to be repellent to bees (Watt and Breyer-Brandwijk, 1962).		Watt and Breyer-Brandwijk, 1962; Roberts, 1990.	2		6 L
67	2	<i>Combretum molle</i>	Combretaceae	L & R		In Ghana, leaves are used as anthelmintics (Irvine, 1961). Root decoctions are used for hookworm in East Africa.			Mollic acid glycosides from the leaves could be used as a molluscicide (Lawton et al., 1991).	Irvine, 1961; Lawton et al., 1991.	1		5 L
71	2	<i>Cyrtanthus breviflorus</i>	Amaryllidaceae	Bb	Bulbs are used for roundworm and tapeworm (Gerstner, 1939).	Bulb infusions taken as low charms emetics.				Gerstner, 1939.	2		6 Bb
79	2	<i>Emex australis</i>	Polygonaceae	L		Leaf decoctions are used for threadworm in horses.		Reported to have purgative and diuretic properties (Watt and Breyer-Brandwijk, 1962).	The leaf is said to contain anthraquinones (Watt and Breyer-Brandwijk, 1962).	Watt and Breyer-Brandwijk, 1962.	1		4 L
80	2	<i>Ethulia conyzoides</i>	Asteraceae	Usd	Unspecified parts are used for intestinal parasites. (Bryant, 1966; Doke and Vilakazi, 1972).	Unspecified parts are used in tropical Africa and Madagascar as counter irritants and for roundworm and ophthalmia (Watt and Breyer-Brandwijk, 1962). Whole plants are used in Madagascar for asthma and haemoptysis and unspecified parts are used for scabies (Jenkins, 1987).			Ethuliacoumarin A, from the aerial parts of <i>E. conyzoides</i> var. <i>gracilis</i> exhibited significant anthelmintic activity against <i>Ascaris lumbricoidea</i> and was shown to be responsible for the anthelmintic activity of the original alcohol extract.	Watt and Breyer-Brandwijk, 1962; Bryant, 1966; Doke and Vilakazi, 1972; Mahmood et al., 1983; Jenkins, 1987.		5 Usd	

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90	2	<i>Indigofera frutescens</i>	Fabaceae	Faboidaeae	RB	Rootbark decoctions are used as anthelmintics for humans and animals, especially for roundworm (Watt and Breyer-Brandwijk, 1962).				Watt and Breyer-Brandwijk, 1962.	1	5 RB
91	2	<i>Jatropha curcas</i>	Euphorbiaceae	S		In tropical Africa, seeds are used as anthelmintics and for skin ailments (Watt and Breyer-Brandwijk, 1962). In Madagascar leaves and roots are used for malaria. (Jenkins, 1987; Rasoaivo et al., 1992). Roots and leaf infusions are used for convulsions and fits (Adesina, 1982).			The seeds contain 50% of a fixed oil, pinhoen oil, and a mucilage composed of xylose, galactose, rhamnose and galacturonic acid and the toxtalbumin, curcin (Bézanger-Beauquesne, 1956; Mourgue et al., 1961a; b).	Bézanger-Beauquesne, 1956; Mourgue et al., 1961a; b; Watt and Breyer-Brandwijk, 1962; Stirpe et al., 1976; Adesina and Marquis, 1980; Adesina, 1982; Jenkins, 1987; Rasoaivo et al., 1992.	2	6 S
118	2	<i>Senna occidentalis</i>	Fabaceae-Caesalpinioideae	Fr & L		Leaf and fruit decoctions are used as anthelmintics for roundworm by the Swazi (Watt and Breyer-Brandwijk, 1962). A French missionary, working in a part of Africa specified as Zambesia, claimed that root decoctions be used as anthelmintics.		(Kokwaro, 1976). In Madagascar roots, leaves and fruit are used as diuretics and for malaria. (Jenkins, 1987). In central Nigeria, leaves are used for Guinea worm (Bhat et al., 1990).	Weak antimalarial activity has been observed (Gasquet et al., 1993).	Watt and Breyer-Brandwijk, 1962; Kokwaro, 1976; Jenkins, 1987; Gasquet et al., 1993; Bhat et al., 1990.	1	4 Fr & L
121	2	<i>Stephania abyssinica</i>	Menispermaceae	R		Leaves are also reported to be used as purgatives while roots are used for roundworm in tropical Africa.		This is one of ten species from China in which parkilling and tranquilizing effects are known (Zhao, 1986).	A large number of alkaloids have been isolated from the plant. These include melaphanine, oxxylophine, and various hasubanonine alkaloids including demethylhasubanonine derivatives aknadine, aknadinine, aknadicine.	De Waal et al., 1966; Moza, 1967; Moza and Basu, 1967; Kupchan and Sulfriss, 1970a; Kupchan et al., 1970b; White et al., 1972; Kupchan et al., 1973; Van Wyk, 1975; Zhao, 1986.		4 R
126	2	<i>Urginea macrocarpa</i>	Hyacinthaceae	Bb		Bulbs are used for roundworm and tapeworm (Gerstner, 1939).				Gerstner, 1939; Watt and Breyer-Brandwijk, 1962; Kellerman et al., 1988.		6 Bb
924	3	<i>Aloe marlothii</i>	Asphodelaceae	Leaves		The Kgalla boil the chopped-up leaf of <i>Aloe marlothii</i> in water with sugar and administer the product for tapeworm infestation. The Zulu administer a decoction of the leaf and root of an aloe, which is probably this species, by mouth or as an enema in the treatment of roundworm. A Zulu woman rubs the leaf pulp over the breasts in order to hasten weaning. In general the Southern African drinks a decoction of the shoots for stomach troubles. This is said to produce emesis if the quantity taken is large.					1	4 L

ID	Source	Species	Family	Plant parts	Part of plant used	Medical uses	Plant part used	Biological activity	Chemicals	References	Dosing preparation	Parasite	Abbreviation
940	3	<i>Brachylaena discolor</i>	Asteraceae	Leaves	An infusion of the leaf of <i>Brachylaena discolor</i> is used in diabetes and renal conditions by both the European and the African. It is said to act as a tonic. The early Dutch settlers made alkali for soap-making from the ashes of the plant (H374). According to Bryant (B50), the leaf is an ingredient in a Zulu remedy for intestinal parasites, especially "beetles". The leaf is also a roundworm remedy (G19). The timber, which is yellowish-brown (S31), has been used in wagon-building and is said to be excellent as boat timbers (Fourcade quoted by Sim (S83)). very durable as fencing posts (S31) and very good as a pick handle (S31) (pg 207).						12	4 L	
943	2	<i>Clausena anisata</i>	Rutaceae	Leaves and Roots	1) Bantu use leaf as anthelmintic 2) Zulu leaf parasiticide and root anthelmintic.						12		5 L & R
945	3	<i>Clerodendrum glabrum</i>	Lamiaceae	Leaves	1) Zulu use leaf for tapeworm and bark for worms in donkey.						1		6 L
946	3	<i>Colocynthis citrullus</i>	Cucurbitaceae	Seeds	1) Fixed oil, extracts hull and kernel paralyse the tapeworms and roundworms or cat.								6 S
948	3	<i>Cucurbita maxima</i>	Cucurbitaceae	Seeds	1) Tropical Africa seed is roundworm remedy in cotyledon 2) Fresh seed used as taenicide.						12		6 S
951	3	<i>Daucus carota</i>	Asteraceae	Unspecified	1) Afrikaans remedy for threadworms 2) T grated carrots in morning 3) Root anthelmintic.						12		5 Usd
958	3	<i>Fagara capensis</i>	Rutaceae	Leaves and Bark	1) Leaf infusion used by Zulu and European for intestinal parasites 2) Decoction of plant as an African ascariocide 3) Bark used by European for epilepsy 4) Zulu uses as parasiticide.						2		12 L & B
959	3	<i>Ficus exasperata</i>	Moraceae	Flowers and Leaves	Tropical Africa use leaf as anthelmintic 2) Tropical Africa use flower as ascariocide.						12		5 Fl & L

ID	Source	Species	Family	Plant parts	Part of plant used	Medical uses	Plant part used	Biological activity	Chemicals	References	Dosing preparation	Parasite	Abbreviation
962	3	<i>Heteromompha arborescens</i>	Apiaceae	Leaves and Roots	Southern Sotho, leaf preparations to children with intestinal worms 2) Xhosa use decoction of decorticated root for shortness of breath, cough, scrotula and threadworms in horses.	<i>Heteromompha trilobata</i> . Leaves are used in a scrotula remedy and infusions are administered in colic, scrotula and as a vermifuge for horses. Leaf decoctions are administered for mental and nervous diseases and for intestinal worms in children while root or bark decoctions are used for infants with depressed frontanelles. Smoke is inhaled for headaches. Used in protective charms. Warm infusions, with the addition of salt, are administered 3 times a day to patients suffering from mental disturbances. The roots are used for shortness of breath, coughs, dysentery, colic and stomach and kidney cleansers and for headaches. Root infusions are taken for weakness by men. Root and seed decoctions are taken for heart palpitations and difficult breathing. In Zimbabwe roots are used for headaches, asthma, coughs, pain in the chest and back, fever and infertility. Unspecified parts are used for itches, ringworm.					1	4 L & R	
963	3	<i>Indigofera cylindrica</i>	Fabaceae-Faboideae	Root bark	1) Zulu use a decoction of the root bark as an anthelmintic in man and animal, especially roundworm.						1	4 Rb	
971	3	<i>Melia azedarach</i>	Meliaceae	Roots and Root bark	1) Marcutius uses strong decoction of root bark as anthelmintic and must be fresh 2) China, Tanganyika and China also used as anthelmintic 3) Across the southern USA, the drupe and bark used as vermifuge 4) Furti bark and root are used as anthelmintic 5) In West and Southern Africa bark is used as an asciticide and antiparasitic.						1	5 R & RB	
972	3	<i>Milletia grandis</i>	Fabaceae-Faboideae	Seeds	Bean used as vermifuge particularly for roundworms by using 1 or 2 beans.						12	4 S	
984	3	<i>Prunus persica</i>	Rosaceae	Flowers and Leaves	1) Eastern Province flower is purgative and anthelmintic 2) Marulius young leaf used as vermifuge 3) North Africa fruit used for roundworm and leaf regarded as dangerous taenituge.						12	14 Fl & L	
990	3	<i>Rumex lanceolatus</i>	Polygonaceae	Rhizome	Xhosa, Milk decoction of rhizome as tapeworm remedy, Rhizome chewed for same purpose. Zulu rhizome cold infusion used for same purpose. Rhizome milk decoction also used for roundworms.						1	6 Rh	
993	3	<i>Senna absus</i>	Fabaceae-Caesalpinioideae	Seeds	1) In Africa seed is anthelmintic for roundworm.						12	4 S	
995	3	<i>Solanum acanthoides</i>	Solanaceae	Fruits	1) In Natal juice of fruit applied to sandworms.						11	4 Fr	

ID	Source	Species	Family	Plant parts	Part of plant used	Medical uses	Plant part used	Biological activity	Chemicals	References	Dosing preparation	Parasite Abbreviation
996	3	<i>Stephania abyssinica</i>	Menispermaceae	Roots	Tropical Africa. Roots are used for roundworm and menorrhagia.	Decoctions of powdered roots mixed with <i>Momordica foetida</i> are taken for boils (as a blood purifier). Roots of <i>S. abyssinica</i> var. <i>lomentella</i> are used in enemas administered to children. Unspecified parts are used in sprinkling charms. Leaf infusions are used as purges for children and juice of the stem in milk is taken as an emetic for chest pain. Roots are used for roundworm and menorrhagia; Decoctions of powdered roots mixed with <i>Momordica foetida</i> are taken for boils (as a blood purifier). Roots of <i>S. abyssinica</i> var. <i>lomentella</i> are used in enemas for children and unspecified parts are used as charms. Leaf infusions are used as purges for children while roots are used for roundworm and menorrhagia. It is used in China as a tranquiliser and painkiller.					12	4 R
1005	3	<i>Vangueria apiculata</i>	Rubiaceae	Unspecified	Ha anthelmintic for roundworm.						12	4 Usd

4) Plants used against trematode parasites									
ID	Source	Species	Family	Plant parts	Medical uses	Dosing preparation	Chemicals	References	Parasite
10	1	<i>Balanites maughanii</i>	Balanitaceae	R	The roots are a popular ingredient of ritual emetics (Watt and Breyer-Brandwijk, 1962; Ngwenya, 1994) and the bark is reported to be applied in the form of cutaneous implantations to strengthen the body. The fruits are lethal to freshwater snails and other organisms and have been recommended for the eradication of bilharzia (Watt and Breyer-Brandwijk, 1962). Kitchen spoons for stirring and dishing up are made with the wood (Kirstenbosch National Botanical Garden, 2004).		<i>Balanites</i> species contain numerous steroidal glycosides derived from diosgenin and structurally related saponinins (Dictionary of Natural Products, 1996). An example is cryptogenin.	Watt and Breyer-Brandwijk, 1962; Ngwenya, 1994; Dictionary of Natural Products, 1996; Kirstenbosch National Botanical Garden, 2004.	2
36	2	<i>Azela quanzensis</i>	Fabaceae- Caesapiinioideae	R	Root infusions are blown through the bladder and taken for the treatment of schistosomiasis in unspecified parts of Africa (Palgrave, 1981).	2	2 A lipoxanthin yellow, oil soluble dye is found in the outer cell layers of the seed (Watt and Breyer-Brandwijk, 1962).	Watt and Breyer-Brandwijk, 1962; Palgrave, 1981.	2
50	2	<i>Berkheya speciosa</i>	Asteraceae	R	Abdominal disorders, enemas, sore eyes	2		Watt and Breyer-Brandwijk, 1962.	2
61	2	<i>Cissampelos mucronata</i>	Menispermaceae	R	Roots are used for schistosomiasis and malaria.	12		Watt and Breyer-Brandwijk, 1962; Gelfand et al., 1985.	2
81	2	<i>Euclea natalensis</i>	Ebenaceae	B	Fresh root decoctions are used as emetics for anthelmintics in East Africa (Kokwaro, 1976).	1	1 Two pentacyclic terpenoids, lupcol and betulin, have been isolated (Lopes and Paul, 1973). Four naphthaquinone, diosindigo A, 7-methylglucon, narmegakinone and diospyrone were isolated from a root macerate (van der Vijver, 1975).	Lopes and Paul, 1973; van der Vijver, 1975; Kokwaro, 1976; Cunningham, 1988.	8
100	2	<i>Maytenus senegalensis</i>	Celastraceae	L & R	In Zimbabwe, roots and leaves are used for epilepsy (Gelfand et al., 1985). Roots are used for schistosomiasis in India, paste made from powdered bark is used against <i>Pedicularis capitis</i> (Watt and Breyer-Brandwijk, 1962).	2		Watt and Breyer-Brandwijk, 1962; Gelfand et al., 1985.	9
114	2	<i>Rhus guinzili</i>	Anacardiaceae	R	Decorticated root infusions are used for schistosomiasis by the Sotho (Watt and Breyer-Brandwijk, 1962).	2		Watt and Breyer-Brandwijk, 1962.	2
128	2	<i>Ximenia caffra</i>	Oleaceae	L & R	In Tanzania leaf decoctions are taken for ancylostomiasis. Roots are used for bilharziasis.			Leaf extracts produced significant anti-tumor activity in mice (Claesson and Samuelsson, 1989).	8
863	11	<i>Mondia whitei</i>	Periplocaceae	R	Root infusion used in Zimbabwe for constipation, anorexia, bilharzia and as aphrodisiac.	2			2
937	3	<i>Berkheya speciosa</i>	Asteraceae	Roots		2			2
964	3	<i>Indigofera sp</i>	Fabaceae-Faboideae	Whole plant		1			2
989	3	<i>Rhus guinzili</i>	Anacardiaceae	Roots		2			2
991	3	<i>Rumex nepalensis</i>	Polygonaceae	Leaves		1			2
1007	3	<i>Vernonia amygdalina</i>	Asteraceae	Unspecified		2			9
									2

ID	Plants used for treatment of epilepsy	Family	Plant parts	Part of plant used	Medical uses	Plant part used	Biological activity	Chemicals	References	Dosing preparation	Parasit e	Abbreviatio n
7	1. <i>Arctopus echinatus</i>	Apiaceae	R	Roots are used (or the white resinous gum which oozes from it).	"Sieketroos" was a popular early Cape remedy for numerous diseases and the use of the plant probably had its origin in the Kholi culture. The vernacular name is derived from the medicinal value of the tuberous rootstock, which brings comfort (Afrikaans: "roos") to the sick (Afrikaans: "sieke"). Decoctions, infusions or tinctures of the root have been used to treat venereal diseases (Watt and Breyer-Brandwijk, 1962). The medicine is said to be diuretic, demulcent and purgative, and is widely used to treat bladder ailments and skin irritations (Watt and Breyer-Brandwijk, 1962). Other traditional uses include the treatment of epilepsy (Watt, 1967).			The resinous gum in the roots is chemically very similar to the resin from <i>Alseidea thizomes</i> . The same mixture of diterpenoids (kaurene derivatives) has been found, such as ent-16-kauren-19-olc acid and other kaurenolic acids.	Forbes, 1986; Pappé, 1957; Smith, 1966; Watt and Breyer-Brandwijk, 1962; Watt, 1967; De Castro et al., in preparation.			
15	1. <i>Dioscorea dieganii</i>	Dioscoreaceae	Tb	The large, fleshy tubers are used.	The tuber is used in different ways for different purposes (Watt and Breyer-Brandwijk, 1962; Rood, 1994). It may be followed out and the water which is heated in it is used as a lotion for cuts and sores (Watt and Breyer-Brandwijk, 1962). The plant is also a Zulu remedy for hysteria, convulsions and epilepsy (Watt and Breyer-Brandwijk, 1962; Pujol, 1990; Watt, 1967). The Zulu name "isibakwa" means "the drunkard", referring to the reported effects that it may have (Watt and Breyer-Brandwijk, 1962). It is also used typically for scabies. None of the South African, Indian and Chinese names there are several Central American, Indian and Chinese species of importance in the extraction of steroidal saponins which are hydrolysed to diosgenin. The compound is used as a starting material in steroid hormone semi-synthesis, to produce cortisone and contraceptives (Brunelton, 1993).			The activity of <i>Dioscorea</i> species have been ascribed to the action of various steroidal saponins (diosgenin is a well-known aglycone) and also to dioscorin and other alkaloids derived from nicotinic acid (Brunelton, 1995; Merck, 1989).	Watt and Breyer-Brandwijk, 1962; Watt, 1967; Pujol, 1990; Brunelton, 1995; Merck, 1989; Dictionary of Natural Products, 1996.	2	11	Tb
19	1. <i>Leonotis leonurus</i>	Lamiaceae	L & R	The leaves and stems are mainly used, sometimes also the roots.	Numerous traditional uses have been recorded (Folbbs, 1988; Smith, 1966; Watt and Breyer-Brandwijk, 1962; Hutchings, 1996; Rood, 1994; Watt, 1967). There is some doubt about early reports (Forbes, 1986; Smith, 1966) of the plant being smoked as a substitute for datura, because it is only mildly narcotic (Watt and Breyer-Brandwijk, 1962). However, it has been smoked for the relief of epilepsy (Watt, 1967). The leaves or roots are widely used as a remedy for snakebite (Watt and Breyer-Brandwijk, 1962; Hutchings, 1996) and also to treat other bites and stings. Externally, decoctions have been applied to treat boils, eczema, skin diseases, itching and muscular cramps (Watt and Breyer-Brandwijk, 1962; Rood, 1994). Internally decoctions are used for coughs, colds and influenza, and also for bronchitis, high blood pressure and headaches (Watt and Breyer-Brandwijk, 1962; Hutchings, 1996; Rood, 1994). Leaf infusion have been used for asthma and viral hepatitis. Relief for aches and pains (Kirstenbosch National Botanical Garden, 2004).			In addition to volatile oil, <i>Leonotis</i> species contain several unusual diterpenoids (dibene type lactones). A typical example is manarubin, which has been isolated from <i>L. leonurus</i> (Dictionary of Natural Products, 1996).	Forbes, 1986; Smith, 1966; Watt and Breyer-Brandwijk, 1962; Hutchings, 1996; Rood, 1994; Wagner et al., 1977; Merck, 1989; Brunelton, 1995; Dictionary of Natural Products, 1996; Kirstenbosch National Botanical Garden, 2004.			L & R
25	1. <i>Ruta graveolens</i>	Rutaceae	L	The leaves and twigs are harvested.	Leaf infusions are taken for fever (Watt and Breyer-Brandwijk, 1962; Rood, 1994) and also for convulsions and fits in children, and for epilepsy and hysteria (Watt, 1967). Alcoholic tinctures have been popular for respiratory problems and heart diseases (Watt and Breyer-Brandwijk, 1962; Rood, 1994). Bruised leaves are used as a treatment against toothache and sarache (Watt and Breyer-Brandwijk, 1962; Rood, 1994; Watt, 1967), while decoctions have been used to ease childbirth (Watt and Breyer-Brandwijk, 1962; Watt, 1967). The plant is traditionally used in Europe for a wide range of ailments ranging from hysteria to rheumatism (Grévea, 1967).			A large number of chemical compounds are known from <i>R. graveolens</i> (Dictionary of Natural Products, 1996). Of interest in the identification of the drug are the coumarins (for example, rutaretin, the aglycone of rutin), furanocoumarins (Wagner and Bladt, 1996).	Watt and Breyer-Brandwijk, 1962; Grévea, 1967; Watt, 1967; Rood, 1994; Wagner et al., 1977; Dictionary of Natural Products, 1996.	2	11	L
26	1. <i>Synaploplepis kirkii</i>	Thymelaeaceae	Tb	The tuberous root is cut into chunks for sale (Mandiers et al., 1995). The chunks are remarkably pure white in colour ("omhlope" – white) and easy to identify. They have the appearance of pieces of plaster of Paris, with brown fibres embedded in them.	The main use of the plant is as an emetic (Mandiers et al., 1995; Watt and Breyer-Brandwijk, 1962; Hutchings, 1996). It is also used to treat epilepsy and constipation (Hutchings, 1996).			An unusual diterpenoid ester known as <i>Synaploplepis</i> factor K1, has been reported from a <i>Synaploplepis</i> species (Dictionary of Natural Products, 1996; Zayed et al., 1977; Natural Products, 1996).		12		

ID	Source	Species	Family	Plant parts	Part of plant used	Medical uses	Plant part used	Biological activity	Chemicals	References	Dosing preparation	Parasit e	Abbreviatio n
30	1	<i>Valeriana capensis</i>	Valerianaceae	Rh	The rhizomes, which are long thin creeping underground stems, together with the fleshy roots, are dug up and used.	The plant is an early Cape remedy for nervous disorder, hysteria and epilepsy (Watt and Breyer-Brandwijk, 1962; Smith, 1966; Watt, 1967). Some other uses have also been recorded (Watt and Breyer-Brandwijk, 1962; Smith, 1966). In the Cape, for example, it is mixed with <i>Balota africana</i> and <i>Stachys thunbergii</i> (both "katlekrake" in Afrikaans) in a medicine to treat asthma, bronchitis, heart trouble, hysteria and insomnia (Watt and Breyer-Brandwijk, 1962). Early records (Forbes, 1986) show that this traditional medicine was widely used, mainly for flatulent colic (Forbes, 1986), stomach ache and fever (Watt and Breyer-Brandwijk, 1962; Hutchings, 1996) and also for toothache and as a mouthwash (Watt and Breyer-Brandwijk, 1962; Hutchings, 1996; Pujol, 1990). It is an old remedy for epilepsy (Watt, 1967) and numerous other ailments (Watt and Breyer-Brandwijk, 1962; Hutchings, 1996). Smoke from burnt roots is inhaled for epilepsy.		Valeriana species contain a wide range of sesquiterpenoids and iridoids, the latter usually referred to as the valepotriates (Dictionary of Natural Products, 1996; Brunelton, 1995).	Valeriana species contain a wide range of sesquiterpenoids and iridoids, the latter usually referred to as the valepotriates (Dictionary of Natural Products, 1996; Brunelton, 1995).	12	11	n	
32	1	<i>Zanthoxylum capense</i>	Rutaceae	Ud	Root, bark, leaves and fruit are used.				No detailed study of <i>Z. capense</i> seems to have been made and the plant is chemically poorly known (Dictionary of Natural Products, 1996).	Watt and Breyer-Brandwijk, 1962; Watt, 1967; Hutchings, 1996; Forbes, 1986; Pujol, 1990; Dictionary of Natural Products, 1996.	12	11	Ucd
53	2	<i>Bridelia cathartica</i>	Euphorbiaceae	R	Tubers are used for renal complaints, sterility, cattle diseases and epilepsies.					Pujol, 1990.	5	11	r
113	2	<i>Rhoicissus tridentata</i>	Vitaceae	Tb							12	11	Tb
857	11	<i>Dichrostriachys cinerea</i>	Fabaceae-Mimosoidae	R	Used for diarrhoea, toothache, earache and applied directly to bite. Extracts of leaves and barks used to treat wounds, to heal wounds. In Zimbabwe, root infusions used for abdominal pain, cough and pneumonia.						2	11	r
859	11	<i>Gymnosporz senegalensis</i>	Celastraceae	R	In Zimbabwe, root powder or infusion used for cough, bronchitis, pneumonia, tuberculosis. Plant also used for sore throat, headache, earache, fever, measles, abdominal measles, abdominal pain, venereal diseases and epilepsies.						14	11	r
862	11	<i>Merrithia longifolia</i>	Lamiaceae	R	Used for respiratory ailments, headaches, fever, indigestion and urinary tract infections. Dry root taken as infusion for epilepsy.				Volatile oils.		2	11	r
868	11	<i>Turraea nitidica</i>	Meliaceae	R	Zimbabwe, root powder used for abdominal pain, venereal diseases, constipation, menstrual cramps, epilepsy diarrhoea and pneumonia.						2	11	r
869	11	<i>Viscum capense</i>	Viscaceae	St	Leafless stem taken as a herbal tea and tonic. Taken as decoction to treat epilepsy.						1	11	St
939	3	<i>Boscia albitrunca</i>	Capparidaceae	Fruits	1) Unripe fruit used as epilepsy remedy.							11	Fr
958	3	<i>Fagara capensis</i>	Rutaceae	Leaves and Bark	1) Leaf infusion used by Zulu and European for intestinal parasites 2) Decoction of plant as an African ascariocide 3) Bark used by European for epilepsy 4) Zulu uses as parasiticicide.						2	12	L & B
965	3	<i>Indigofera tinctoria</i>	Fabaceae	Leaves	1) Leaf used as anthelmintic 2) Juice of leaf for epilepsy.						11	11	L
968	3	<i>Rhoicissus tridentata</i>	Vitaceae	Unspecified	Lobody, plant is used as epilepsy remedy and fruit edible.						12	11	Ucd
1004	3	<i>Valeriana capensis</i>	Valerianaceae	Roots	The root is used in epilepsy, hysteria and other conditions of the nervous system. It is used in the treatment of typhoid fever, to expel intestinal worms and as a diaphoretic. The root is used externally and internally as an irritant. Internally it is supposed to stimulate the alimentary tract, the bronchial mucosa, the kidney and the circulation, the latter reflexly from irrigation of the gastric mucous membrane. The leaf is burned in the hut of a sick person to drive away illness. The rootstock is said to contain a volatile oil which has been identified as an antispasmodic (p. 1046).						12	13	R

ID	Source	Species	Family	Plant parts	Part of plant used	Medical uses	Plant part used	Biological activity	Chemicals	References	Dosing preparation	Parasit e	Abbreviatio n
1006	3	<i>Verbena officinalis</i>	Verbenaceae	Unspecified	1) Plant used as anthelmintic.						12	13	Usd
1008	3	<i>Vernonia corymbosa</i>	Asteraceae	Roots	1) Lobedu use decoction of root with mealie meal to treat "white worm" in intestinal tract 2) Lobedu use sweetened decoction of root for anthelmintic in donkey 3) Swati use macerated leaf for epilepsy.						1	13	R

# Grant Activity Completion Report

1. Name of Organisation	Krecek and Krecek Target Management Activities CC
2. Grant Activity	Completion Report for Grant "Potential use of indigenous plants for zoonotic helminth diseases in South Africa" (01301003-G GA38)
<p>3. Briefly describe the grant objectives achievements and impact as a result of the grant activities implemented during the grant period.</p> <p>The overall objective of this grant was to increase market-driven employment opportunities and to promote growth of historically disadvantaged (or resource-poor) small, medium, and micro-enterprise (SMMEs) and agribusinesses in the Eastern Cape. A previous USAID funded and community based study on the application of diagnostic biotechnology on porcine cysticercosis showed that ninety-two percent of small scale resource-poor pig owners are unemployed African women. The current grant was designed to generate new opportunities to help reduce poverty and inequality and increase profitability of historically disadvantaged agribusinesses and SMMEs. This was done by helping emerging farmers and entrepreneurs to access new markets through the identification of indigenous plants used for the treatment of zoonotic helminth disease. Establishing business linkages was used because it is an effective tool for developing agribusiness and SMMEs. Linkages between resource-poor farmers and businesses with larger established entities were another aim of this grant and included identification of potential markets, transfer of information, technologies and skills and access to finance. Identification and a better understanding of the indigenous plants used by farmers for the treatment of zoonotic helminth diseases in South Africa expands the number of "tools in the toolbox" to be used for managing these diseases. This improves the quality of life for the people and their animals in rural communities in the Eastern Cape and other emerging farming areas throughout South Africa, the value of animals in production and the marketplace, reduces the risk of human disease and creates a potential commercial use of plants for emerging agriculture and commercialization.</p> <p>The proposed and achieved outcomes with impact indicators for this grant were:</p> <ol style="list-style-type: none"> <li>1) Proposed: list a minimum of 50 indigenous plants being used in the treatment of helminth diseases for livestock, including zoonotic helminths in South Africa. Achieved: 231 plants were identified.</li> <li>2) Proposed: identify a minimum of 30 plants with potential anthelmintic efficacy and availability. Achieved: 226 plants were identified.</li> <li>3) Proposed: determine which plans are potentially profitable. Achieved: at least 13 of 226 were identified for their market popularity, part used and rarity status. Additional market assessments are needed to update this list as more are estimated to have market and trade popularity leading to their potential profitability.</li> <li>4) Proposed: identify a minimum of 5 biotechnological entities with interest in this market niche of plants and in the development of the commercial potential. Achieved: 41 stakeholders were identified and have communicated an interest in this market niche of plants and the commercial potential.</li> <li>5) Proposed: link emerging farmers with biotechnological firms and institutions through established linkages. Achieved: many of the 41 stakeholders are actively working with emerging farmers and have communicated an interest in this market niche of plants and the commercial potential.</li> <li>6) Proposed: identify opportunities in the chain from production, processing and marketing of wild and domestic plants to the development, future commercialization of these ethnoveterinary plants for emerging livestock producers and their communities. Achieved: throughout the grant regular networking, communications and linkages were established to identify and facilitate the opportunities.</li> </ol>	
4. Briefly discuss the implementation process, including lessons learned and recommendations.	

## Grant Activity Completion Report

The implementation process was:

**1) Programme set-up: Layout research workplan, contact key stakeholders and identify key staff. Set up needed infrastructure.** Milestones were: 1. Workplan. 2. Identification of stakeholders and key staffing and personnel. 3. Report of needed infrastructure and/or plans to acquire.

**2) Compile Focused Inventory of Plants for Zoonotic Helminth Diseases: Identify plants used to treat worm diseases, especially cestodes, nematodes and trematodes that are zoonotic.** Interview stakeholders in resource-poor communities for information and to engage participation in study. Identify gaps in current knowledge on existence, cultivation/gathering and use of plants. Milestones were: 4. Inventory of plants used to treat worms. 5. Record of meetings with stakeholders.

**3) Survey to gather more knowledge on plants and usage:** Design questionnaire; test; revise questionnaire; conduct fieldwork in Eastern Cape; analyze questionnaire results. Validate findings with emerging livestock producers, botanists and veterinary staff. Internal evaluation of progress and results to date (IERTD). Milestones were: 6. Report of survey including description of methodology, results, sample questionnaires, numbers surveyed, etc. 7. Report of Internal Evaluation and results to date (IERTD).

**4) Identification of biotech entities interested in products with anthelmintic properties and efficacy against zoonotic helminths.** Prepare final report and circulate to stakeholders. Arrange linkages with emerging farmers and interested biotech entities. Milestone was: 8. Final report: including results of study and of linkages with biotech entities.

**5) Technology transfer material** on the pork tapeworm and how this zoonotic helminth is being transmitted and can be prevented: Milestone was: 9. Proof of printing and distribution of posters.

**One of the most important lessons learned and recommendations** beyond the achieved outcomes in this grant relates to the probability of the use of these plants for producing anthelmintic drugs. Though not an initial objective of the current study, the grant resources were utilized to carry out this very preliminary screening effort. Information on whether the plants were traded, where they were traded and market popularity was compiled. This was a first in prioritizing the promising and potentially most profitable plants. Though limited this effort highlighted the need for future detailed market assessments to fully examine the promise of these plants, and ultimately the opportunities for emerging farmers. Information on whether the plant is traded, where it is traded and market popularity was obtained from existing records and references listed. The ecologists and botanists consulted also employed recent personal experience of frequency encountering species at markets and in loads confiscated from illegal gatherers and traders. It was noted that the traditional medicine trade is dynamic and there could well be species which are currently traded in the various markets but which are not recorded in the records in this report as being traded and *vice versa*. Detailed market assessments would be required to update this information.

Popularity in markets should not be the only appropriate criterion on which to judge species with the greatest likelihood of producing anthelmintic drugs, as they may not be popular in markets for that reason. These species may be popular in the market for other reasons (e.g. *Hypoxis hemerocallidea* is popular for treatment of HIV related ailments). However, based on market popularity, plant part used and a broad opinion on rarity, a list of 13 priority species for possible anthelmintic drug yield was identified. None of the listed species are endemic to South Africa or any of its provinces. While some of these 13 species are widely exploited for traditional medicine, only the *Dioscorea* species are currently documented conservation priorities.

The grant team's overall recommendation is that detailed market assessments be undertaken. As future resources become available this promising area of indigenous plants for zoonotic helminth diseases in South Africa should be developed further.

5. Public Dissemination: GMAC requires that all grant activity deliverable(s) of the grant activity (e.g., a report or survey) must be made available to the general public. Briefly discuss how the grants activities and results were made accessible to interested parties.

## Grant Activity Completion Report

More than 41 stakeholders included a range of biotechnological entities with an interest in this market niche of plants and in the development of the commercial potential of these plants as well as small scale resource-poor farmers. All stakeholders were informed of the results of the deliverables throughout the study. Some methods used to make this information accessible were:

1) networking and dissemination of the findings and promotion of the results at local, national and international level. Meetings with stakeholders were held locally, nationally and internationally. Locally and nationally information was made available at the provincial level to be taken back to the farmers through animal health technicians and agricultural extension officers. In addition, formal presentations of grant results were made at ten conferences and meetings in four countries. Several presentations were designed as visually attractive posters with information. This poster design was used to engage the audience, and lead them to additional information available on the website below or through contact following the meeting.

2) results were posted on the following web site ([www.africabio.com/index.shtml](http://www.africabio.com/index.shtml)) and stakeholders were directed to this information.

3) posters as part of the technology transfer material on the pork tapeworm and how this zoonotic helminth is being transmitted were produced and distributed to all stakeholders. Animal health technicians and extension officers agreed to take the posters to the farmers in the field. Additional information about the project was included with these posters.

Signature of  
Grantee



Date



## ***GMAC Grantee Annual Narrative Report***

**Grantee** RC Krecek  
**Agreement No.** 10301003-G GA38

**Report for the period:**  **October 1, 2004 through September 30, 2005**

Please complete a one-two page narrative summary of your main accomplishments between October 1, 2004 – September 30, 2005. To prevent you from re-inventing the wheel, it is recommended that you work through the two narrative reports that you are required to submit to Mega-Tech for the specified reporting period and capture essential accomplishments related to your milestones.

### **Grant Activity Title: Potential use of indigenous plants for zoonotic helminth diseases in South Africa**

**Background:** The pork tapeworm, *Taenia solium*, is one of the zoonotic worm parasitic diseases increasingly recognized as a public health and agricultural challenge worldwide, in the Sub-Saharan subregion and in South Africa. This disease is considered one of the neglected diseases of neglected populations by the World Health Organization. It was identified as a potentially eradicable disease, yet it is now an emerging disease of eastern and southern Africa, and endemic in several provinces of South Africa including the Eastern Cape Province. This zoonotic helminth results in the disease neurocysticercosis, a major cause of epilepsy and often death in humans. Currently, the highest levels of juvenile neurocysticercosis reported in the world occur in this province.

A study was conducted with 224 pig owners in the Eastern Cape. They were interviewed about the practices they use for the management of porcine cysticercosis and 15% indicated that they use indigenous plants and traditional remedies to treat this disease (Krecek et al., 2004; Krecek et al., unpublished results, 2004). The World Health Organization estimates 80% of the populations of developing countries rely on traditional medicine, mostly plant drugs, for their primary health care needs.

**Strategic objective:** This grant aimed to identify indigenous plants, which are currently used for the treatment of zoonotic helminth diseases and to assess their potential to successfully treat these diseases in livestock and humans. This has led to the identification of opportunities for emerging farmers and entrepreneurs to grow and market these plants. There is a demand from these owners however, for further information and relevant skills training to aid with prevention and control of animal and human diseases as well as to improve animal production. Therefore, identification of these plants, compilation of information about their availability and determination of the highest probability of producing anthelmintic drugs were aims of this grant. Milestone 8 identified biotechnological entities interested in plants with anthelmintic properties and efficacy against zoonotic helminths and a final report circulated to stakeholders. Linkages with emerging farmers and interested biotechnological entities were made. Milestone 9 was the printing and distribution of an information poster that was developed.

**Proposed and achieved outcomes with impact indicators for this grant:**

- a) Proposed: list a minimum of 50 indigenous plants being used in the treatment of helminth diseases for livestock, including zoonotic helminths in South Africa. Achieved: 231 plants were identified.
- b) Proposed: identify a minimum of 30 plants with potential anthelmintic efficacy and availability. Achieved: 226 plants were identified.
- c) Proposed: determine which plants are potentially profitable. Achieved: at least 13 of 226 were identified for their market popularity, parts used and rarity status. Additional market assessments are needed to update this list as more are estimated to have market and trade popularity leading to their potential profitability.
- d) Proposed: identify a minimum of 5 biotechnological entities with interest in this market niche of plants and in the development of the commercial potential. Achieved: 41 stakeholders were identified and have communicated an interest in this market niche of plants and the commercial potential.
- e) Proposed: link emerging farmers with biotechnological firms and institutions through established linkages. Achieved: many of the 41 stakeholders are actively working with emerging farmers and have communicated an interest in this market niche of plants and the commercial potential.
- f) Proposed: identify opportunities in the chain from production, processing and marketing of wild and domestic plants to the development, future commercialization of these ethnoveterinary plants for emerging livestock producers and their communities. Achieved: throughout the grant there was regular networking, communications and linkages to identify the opportunities.

**Overall statement of grant impact:** This project proposed to generate new opportunities to help reduce poverty and inequality and to increase profitability of historically disadvantaged agribusinesses and SMMEs. This was achieved by helping emerging farmers and entrepreneurs to access new markets through the identification of indigenous plants used for the treatment of zoonotic cestode diseases. The list of plants highlighted in this study enables emerging farmers together with biotechnological industries to consider which plants are available in specific regions. Though not an initial objective of the current study, information such as whether the plants were traded, where they were traded and market popularity were compiled. This screening effort was a first in prioritizing the most promising and potentially most profitable plants.

Women are the owners of free-range pigs, the domestic livestock animal species in the pork tapeworm life cycle which infects pigs and humans. "Safe pork" increases livestock production and also reduces the public health hazard to communities dependent on the raising of this animal. The husbandry, management and animal health needs of these pigs are the responsibility of these owners, who are largely women. The staff in the daily operation of the grant was also mostly women (e.g. animal health support, administration, bookkeeping, statistical support etc.)

Relationships of mutual benefit were developed with more than 40 biotechnological entities who have an interest in this market niche of plants and in the development of the commercial potential of these plants. This was achieved through networking, dissemination of the findings and promotion of the results at national and international meetings in 10 presentations in four countries.

In my capacity as the grantee agent, I hereby certify that to the best of my knowledge, the above information is accurate.

Authorised Signature: RC Krecek  \_\_\_\_\_  
 Date: 3 October, 2005