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Practical Applications from the Study of Great Ape Self-Medication and Conservation Related Issues

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Investigation of self-meditative behavior in the African great apes is important for understanding how apes combat parasite infection and other pathogens that affect their health, reproduction and ultimate survival (1). To date, three general types of self-meditative behavior have been identified; bitter pith chewing, whole leaf swallowing and geophagy. These behaviors are hypothesized to assist in the control of parasite infection and related symptoms of gastrointestinal upset (2, 3, 4, 5).

The genus of nematode found to be most closely associated with self-medication in Mahale chimpanzees (3), *Oesophagostomum*, is known to infect a number of non-human primate species, occasionally humans, as well as pigs, sheep and cattle. While a number of broad spectrum anthelmintics are currently available for the treatment of this and other parasites, growing chemoresistance and the prohibitive costs of such drugs make their use impractical if not at times impossible in African nations. Recently, great interest has been taken in looking for new and alternative anthelmintic treatments using natural plant products derived from ethnomedicine to curb human suffering and economic loss (6, 7, 8). The study of self-medication in great apes too can be expected to aid in this effort. A multinational, multidisciplinary collaborative of scientists, The CHIMPP Group, (Pan Africa News, Vol. 1. No. 1) are involved in one such study.

Thus far the anthelmintic potential (e.g. anti-

schistosomal, anti-plasmodial, anti-leishmanial, anti-dysentery) of *Vernonia amygdalina* and a variety of other plants collected in Tanzania, Zaire, Cameroon, and elsewhere have been documented by in vitro analyses (9, 10, 11). Many of these plants are already recognized in traditional African ethnomedicine and are cultivated on the edges of gardens or collected from areas of secondary growth around village habitations. What we have begun to do is verify the wider pharmacological potential of some of these plants in the laboratory and consider the usefulness of methods employed by great apes in the control of nematode infection in humans and livestock living under similar conditions in the tropics.

One project now planned by the author is scheduled to start in the spring of 1998 and involves collaborations with the Department of Veterinary Sciences, Sokoine University of Agriculture, Tanzania, the Department of Zoology - Herbarium, University of Dar es Salaam (Morogoro, Dar es Salaam, Tanzania respectively) and The Danish Centre for Experimental Parasitology (Copenhagen, Denmark). A number of promising great ape medicinal plant species available in Tanzania and elsewhere in Africa will be collected and tested in Copenhagen. This will involve controlled in vivo and in vitro testing against *Oesophagostomum*, *Schistosoma* and tapeworm species. After this phase of the work is complete and published, details of the prescribe use of those plant species found most effective will be disseminated to local government and regional agricultural authorities. This information will also be made available to great ape sanctuaries (e.g. Jane Goodall Institute) and zoos throughout Africa where the appropriate species are readily available or can be grown and harvested in a sustainable fashion.

For conservation-education purposes, English, French and Swahili versions of research on self-medication in great apes have already been incorporated into the JGI's Roots and Shoots traveling chimpanzee museum program since 1994 and a joint Serengeti Wildlife Research Institute-Japan International Cooperation Agency-Tanzania National Parks public exhibit in 1995. Similar materials are planned to be used for community conservation and tourist education programs in collaboration with the Mahale Wildlife Conservation Society in Dar es Salaam and the Mahale Mountains and Gombe National Parks in western Tanzania.

This research has begun to provide detailed information of the medicinal plant flora included in great

ape diets (1). Such information should be considered in conservation policy planning of buffer zones around national parks and other protected great ape habitats threatened by human encroachment. Public education about and application of the scientific knowledge for livestock parasite control programs in areas where great ape species exist is a positive and unique approach to raising local awareness of the intrinsic value of these endangered primates and the necessity for protecting them and their natural habitats.

References

1. Huffman, MA, 1997.. Current evidence for self-medication in primates: A multidisciplinary perspective. *Yearbook of Physical Anthropology* 40: 1-30.
2. Huffman MA, Gotoh S, Izutsu D, Koshimizu K, and Kalunde MS, 1993. Further observations on the use of *Vernonia amygdalina* by a wild chimpanzee, its possible effect on parasite load, and its phytochemistry. *African Study Monographs* 14(4): 227-240.
3. Huffman MA, Page JE, Sukhdeo MVK, Gotoh, S, Kalunde MS, Chandrasiri, Towers GHN, 1996a. Leaf-swallowing by chimpanzees: A behavioral adaptation for the control of strongyle nematode infections. *Int. J. Primatol* 72(4): 475-503.
4. Mahaney WC, Hancock RGV, Aufreiter S, Huffman MA, 1996. Geochemistry and clay mineralogy of termite mound soil and the role of geophagy in chimpanzees of the Mahale Mountains, Tanzania. *Primates* 37:121-134.
5. Wrangham RW, 1995. Relationship of chimpanzee leaf-swallowing to a tapeworm infection. *American J. Primatology* 37: 297-303.
6. Kasonia K, and Ansay M, 1994. *Metissages en sante animale de Madagascar a Haiti*. Namur, Presses universitaires de Namur.
7. McCorkle CM, Mathias E, Schillhorn van Veen TW, 1996. *Ethnoveterinary research and development*. Intermediate Technology Publications, London.
8. Boegh HO, Andreassen J, Lemmich J, 1996. Anthelmintic usage of extracts of *Embelia schimperi* from Tanzania. *J. Ethnopharmacology* 50: 35-42.
9. Ohigashi H, Huffman MA, Izutsu D, Koshimizu K, Kawanaka M, Sugiyama H, Kirby GC, Warhurst DC, Allen D, Wright CW, Phillipson JD, Timmon-David P, Delnas F, Elias R, Balansard G, 1994. Toward the chemical ecology of medicinal plant-use in chimpanzees: The case of *Vernonia amygdalina* Del.. A plant used by wild chimpanzees possibly for parasite-related diseases. *J. Chemical Ecology* 20: 541-553.
10. Ohigashi H, 1995. Plants used medicinally by primates in the wild and their physiologically active constituents. Report to the Ministry of Science, Education and Culture for 1994 Grant-in-Aid for Scientific Research (no. 06303012).
11. Page JE, Huffman MA, Smith V and Towers GHN, 1997. Chemical basis for medicinal consumption of *Aspilula* leaves by chimpanzees: a re-analysis. *J. Chemical Ecology* 23(9): 2211-2225.