Medicinal Plant Use for Biodiversity Conservation: From Tradition to Modern Application

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Methods:
study area / data collection

Results:
1) Nkundo medicinal plants/ ethnobotany
   - plant use
   - skin plants / examples
   - choice / availability / conservation / application

2) Interior vs. Kinshasa
   - Kinshasa medicinal plants
   - sustainability
   - choice / availability / conservation / application

Discussion:
From tradition to modern application
Potential vs. constraints
Taxonomy

> 6600 specimens
> 104 families
> 411 genera
> 880 species
Ethnobotany

- 549 vernacularly known taxa
- Interviews with men & women (N=54)
- 7 villages
- 1204 Questionnaires
- 69% of known plants used
Phytochemical Documentation

> 300 drug-samples in Kinshasa

> 60 TLCs

> 99 HPLC-MS screenings
NKUNDO plant use by gender (N=381 species)

- 29.1% women only
- 39.4% both
- 31.5% men only
NKUNDO plant use
(N=381 species)

COS Cosmetics
HYG Hygiene
OTH Other
MAG Magic
BF Firewood
CON Construction
NUT Nutrition
MED Medicinal
NKUNDO plant use
(N=381 species)
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NKUNDO medicinal plants:
areas of application (N=227 species)

- urinary
- poison/antidot
- respiratory
- eyes
- nervous
- divers
- STD
- ears
- cardio-vascular
- osteal-magic
- digestive
- infectious
- skin
- genital

% medicinal plants

- % medicinal plants
NKUNDO medicinal plants:
areas of application (N=227 species)

- urinary
- poison/antidote
- respiratory
- eyes
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- cardio-vascular
- osteal
- magic
- digestive
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- skin
- genital

% medicinal plants

0 5 10 15 20 25 30 35 40
Traumata
Parasites
Infections
Mycosis
Burns...
Skin problems treated by 70 plant species
(N=100 applications)

- Traumata: 25%
- Abscesses: 20%
- Scabies: 15%
- Onychia: 10%
- Burns: 7.5%
- Parasites: 5%
- Mycosis: 2.5%
- Allergies: 1%
- Ulcers: 0.5%
- Eczema: 0.5%
- Acne: 0.5%
Mammea africana (Clusiaceae)
Mammea africana (Clusiaceae)

Stembark
Decoction / Maceration
Powder

- Traumata
- Eczema
- Scabies
- Mycosis
- Burns
Mammea africana: TLC, HPLC-MS & UV chromatograms
Tetrapleura tetraptera (Mimosaceae)

Fruit

Pound & mixed with palm oil

Decoction

- Mycosis
- Allergies
Tetrapleura tetraptera: HPLC-MS & UV chromatograms

M+H⁺

M-H⁻

UV

SK01-007-18_UMd_AAMS2_2-E.6_01_4.d: BPC 100-1300 +All MS

SK01-007-18_UMd_AAMS2_2-E.6_01_4.d: BPC 100-1300 -All MS

SK01-007-18_UMd_AAMS2_2-E.6_01_4.d: UV Chromatogram, 278 nm
*Morinda morindoides* (Rubiaceae)
Morinda morindoides (Rubiaceae)

Leaves
Decoction
Bath

➤ Scabies
➤ Traumata
Morinda morindoides: HPLC-MS & UV chromatograms
Bacteriology / Toxicology
Availability of skin plants (N= 41 species )

Trees ◄► Shrubs, Lianas

# of species

stem density / ha

Trees

Shrubs, Lianas
Plant parts used for treatment of skin problems 
(N= 70 plant species)

- roots: 56%
- bark: 44%
- exudate
- leaves
- fruit
- flowers
- MD

% skin plant species
Availability of skin plants by plant part used
(N= 41 species )

stem density / ha

roots
bark
leaves
fruit
flowers
MD
Sustainability

unharvested  fresh cut  after 2 years
Cryptic Diversity

Alkaloid content in:

- leaves
- bark
- fruit

% species (N=60)

Absent | Present | Variable

0 | 20 | 40 | 60 | 80 | 100
Kinshasa’s Markets

- Availability & Price
- Provenance
- Traditional knowledge
- 17 markets
17 Markets of Kinshasa

- Kasavubu
- Limete
- N‘Djili
- Mont Ngafula
- Kasai
- N‘sele
- Maluku
- Kimbanseke

Congo River

- Banda-Lungwizi
- Central
- Limete
- N‘Djili Q6
- N‘Djili Q7
- Matete
- Matete Zone 6
- Lemba
- Lemba Mbanza Lemba
- Maba
- Mont Ngafula
- N‘Djili
- Ngana
- Ngafula
- N‘sele
- Maluku

Markets:
- Ngindi
- Kasavubu
- Limete
- Bumbu
- N‘Djili
- Matete
- Makala
- Lemba
- Mbanza Lemba
- Kinsenso
- N‘selle
- Selembao
- Banda Lungwizi
- Gombe

17 Markets of Kinshasa
Kinshasa‘s Markets

- Interviews with vendors (N=117)
- 73% women / 27% men
- Average age 40 years (SD: 12.94; range: 15-80)
- 44% trad. healers / 56% vendors only
- 4 DRC-Provinces & Angola
178 plant (ethno) species
132 species
Overlap with SNP: 35% (on species level)
% function of plant selling people / origin
(N=117)
% function of plant selling people / origin (N=117)

% plants / origin (N=132)
Habitat types according to provenance

- Kinshasa
- Bas-Congo
- Bandundu
- Equateur

Habitat types:
- Savannah
- Fallow
- Forest (sec)
- Forest (prim)
- Cultivated
KINSHASA medicinal plants:
areas of application (N=98 species)
KINSHASA medicinal plants:
areas of application (N=98 species)

- digestive
- genital
- osteal-articulate
- cardio-vascular
- infectious
- skin
- respiratory
- magic
- nervous
- ears
- urinary
- STD
- poison/antidote
- divers
- infectious
- cardio-vascular
- osteal-articulate
- genital
- digestive

% medicinal plants
Skin plant species

Interior (Nkundo-plants N=70)
- Trees: 43%
- Shrubs: 17%
- Lianas: 26%
- Herbs: 14%

Urban area (Kinshasa plants N=19)
- Trees: 26%
- Shrubs: 37%
- Lianas: 5%
- Herbs: 32%
Summary

Interior (Nkundo)

• 227 medicinal plant species (60%)
• 70 species used for skin problems
• Extracts: mostly lipophil, with antioxidants
• Species availability: 39% < 1 Ind/ha; 44% 1-10 Ind/ha
• Plant parts used: 56% use roots or bark; 44% leaves/fruit

Urban area (Kinshasa)

• 132 medicinal plant species
• 19 species used for skin problems
• Extracts: to be done
• Species availability:
• Plant parts used:

Quality: Great potential
Quantity: most species rare
Potential for sustainability: careful evaluation needed
From tradition to modern application

- Potential for CBD:
  - conserve biodiversity
  - sustainable use
  - local benefits

- Scale: local, national, global?

- Vision: controlled harvesting & cultivation
## Acknowledgements

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<th>Belgium (B)</th>
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|                                   | JP Habari
C Lubini
L Lukebakio
F Lukoki
D Musibono
K Taba | M Tamfum
S Karhemere | Direction Générale
N Bondjengo
G Kitengie | BMBF
DLR | SCHWABE | K Schötz |
|                                   |        |      |      | MPI EVAN    | ULB         | J Lejoly  |
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