Dirasat, Pure Sciences, Volume **34**, No. **1**, 2007

Verification of Folk Medicinal Plants in Southern Jordan

Saleh A. Al-Qura'n* *

ABSTRACT

Three hundred and fifteen medicinal species that belong to 88 families were investigated in the area of the study. One hundred and ten medicinal species (34.92%) were mentioned by less than three informants, and therefore excluded from further consideration. One hundred and fourty one medicinal species (44.76%) were mentioned by three or more informants, but less than 15, so they were considred as unpopular kinds of medicinal plants. Only sixty four species (20.31%) were mentioned by 15 or more informants (half or more of the maximum number of the informants which is 30), and therefore considered as popular medicinal plants. Fourty five species (14.28.%) have Rank Order Priority (ROP) values that equal 50 or more which represnted the highest rank of medicinal popularity among the species investigated. One hundred and sixty eight species (53.33%) have medicinal uses similar to those in the neighboring countries, while the remaining one hundred and fourty seven species (46.66%) haven't such similar common uses. The studied area was dominated mainly by Saharo-arabian element; although the Mediterranean, Irano-turanian and Nubo-sudanian elements were also present. This studied area showed a high level of species diversity; which required ecological awareness to protect and preserve the wild endemic species from further threats.

Keywords: Medicinal Plants, Therapeutic Effects, Fidelity Level (FL), Relative Popular Level (RPL), Rank Order Priority (ROP).

1. INTRODUCTION

The Southern part of Jordan is located between longitudes of 35ºE and 38ºE and between latitudes of 31^0 30' N and 34^0 N, Forming about 60% of the total Jordanian territories. Most of the area comprises deserts especially in south eastern part in Ma'an, Jafer and Bayir. This area of study is dominated mainly by Saharo-arabian element which has annual precipitation that is not exceeding 100 mm; this is in addition to Mediterranean (which dominated the Southern heights with annual precipitation of about 400 mm), Irano-turanian and Nubo-sindian along the strip from Tafilah to Aqaba region. The Western regions that have high altitudes more than 1000m above sea level in Shoubek, Karak and Sharah series, which have high annual precipitation, were dominated by certain kinds of vegetation similar to those found in Northern heights, whereas *Aretmisia* vegetation is characterizing Irano-turnain element which is extended between Petra to Tafileh (Al-Eisawi,1982; Bender, 1974; Boulos, 1977; Boulos and Al-Eisawi, 1977; Boulos and Lehham, 1977; Karim and Al-Quran, 1988; Zohary, 1973; Zohary and Feinbrun-Dothan, 1986).

It is obvious that plants have been used for medication early in history, and the history of herbal medicine is very old and popular worldwide. Those who practice these methods of medication were called herbalists. The medicinal plants remained widely used in many areas of the world especially southern parts of Jordan even after the recent flourishing of the chemistry of plants (Phytochemistry). Greek and Egyptians were the most famous nations in this field, who distributed this knowledge through ancient trade ways; a matter that influenced the development of the medicinal potentiality of the plants (Adailkan and Gauthaman, 2001; Stickel et al., 2000).

The therapeutic effects of medicinal plants of Jordan and neighboring countries were investigated during the recent years. Most of these plants were wild of

* Department of Biology, Faculty of Science, Mu'tah University, Karak, Jordan. Received on 16/8/2004 and Accepted for Publication on 28/8/2006.

mediterranean and saharo-arabian elements. They are considered the major natural resource of folk medication for local rural inhabitants and experienced cattle owners during the grazing movements and forage requirements (Karim and Al-Qura'n, 1986; Khayyat and Mursi, 1981).

Many botanists and pharmacologists all over the world investigated the medicinal plants species, especially the ones used in traditions and folklore, to extract the active constituents. The proper scientific means and techniques of extractions and identifications were used to determine the therapeutic effects and dosages of these plants (Eddouks et al., 2002; Harborne, 1997; Heinrich, 2000; Heinrich, 2002; Joud et al., 2001).

The use of plants in medicine promoted the chemical analysis of medicinal plants for the active chemical constituents to be extracted, identified, and later synthesized (Krebs, 2001; Prance, 2001; Rates, 2001; Stickel et al., 2000).

There are many botanical resources to depend upon in order to compare the ethnobotany in southern Jordan and neighboring countries, especially Palestine and Iraq. This kind of comparison may be helpful to know the degree of similarity between them, which consequently gives the evidence of new records of therapeutic effects not recorded previously.

This study aims to verify the phytomedicinal wealth present in the investigated area, depending on some verifying steps, to differentiate among the different levels of popularity since the investigated area is distinguished of a high level of species diversity. The inhabitants have intimate relationship with the earth and its natural resources as source of their food and medication. The majority of the people in the area are Bedouins and rural, oriented and well-experienced in this field of science, which therefore increases their responsibilities in protecting these species from the factors of threatening and endangering. Consequently, this kind of cultural heritage may be reinforced and layed down in the track of scientific measures (Rates, 2001; Stickel et al., 2000).

2. MATERIALS AND METHODS

During the period of February 2001-October 2002, field work investigation was done to formulate the ethnobotanical information and their medicinal verification in the area of study. Interviews with 80 informants were conducted; 50 men and 30 women from different parts of the area, whose age ranged from 40-70 years. Most of the interviewees (60 persons) were more than 60 years old who belong to families that have a strong linkage with folk medicine, and that's because they were beduoins and rural inhabitants whose experience in this field was extensive. Most of the people were either native born or had been living in the area for more than 30 years, they were mainly either local healers, herbalists, shepherds, experienced adults or old patients.

During the first phase, preliminary data were collected from the informants through field work. Experienced people were asked to inform where the medicinal species were located and what were the major therapeutic effects. Structured interviews were then conducted to collect more specific information, which was used to detect the traditional methods of preparation and remedation for each species quoted.

The taxonomic identity of medicinal taxa mentioned by interviewees was confirmed precisely by several methods; either by comparison with the already identified specimens preserved in the herbaria of Jordan universities and Ministry of Agriculture, or by showing and presenting the fresh plant specimens or dried samples to the interviewees for precise recognition. Questions addressed to the informants focused mainly on the use of the plant, ways of preparation, medicinal plant parts and dosages required.

Each species which was not recognized by the interviewees was photographed before collection. Flora Palaestina (Zohary and Feinbrun-Dothan, 1986) in its four volumes, and the herbaria of research centers in Jordanian universities and Ministry of Agricultre were used for the identification of the specimens collected. Thirteen geographical sites were investigated; they were: (1)Mujib valley, (2)Araba valley, (3)Rum valley, (4)Aqaba region, (5)Karak, (6)Shoubek, (7)Maa'n, (8)Afra, (9)Tafileh, (10)Petra, (11)Jafer, (12)Bayir and (13) Burbaitah.

The pharmacological terms used in this study were taken from different pharmacological resources and specialized dictionaries (Karim and Al-Qura'n, 1986; Khayyat and Mursi, 1981; Prance, 2001; Stickel et al., 2000) which dealt mainly with the terms in the field of pharmacognosy that relates medicinal and pharmaceutical materials of the plants.

The therapeutic effects of the medicinal species were accepted if mentioned by at least 3 informants native to

the area of survey and (or) those who have been living in the area for at least 30 years, while those mentioned by less than 3 informants were not accepted, and excluded from further consideration.

Three verifying parameters were used to reach this goal; Fidelity Level (FL), Relative Popularity Level (RPL), and Rank Order Priority (ROP), similar to that calculated by Friedman et al. (1986).

FL was calculated typically by: $(I_p/I_u)x100$, where I_p is the number of informants who informed the specific therapeutic effect of the plant, while I_u is the number of informants who informed any therapeutic effect of the plant .Then RPL(calculated as a percentage of $I_u/30$)was given a score of 1 if mentioned by at least half the number of informants (15 or more since the highest number of informants of any therapeutic effect is 30), and in this case it was considered "popular", while it was given less than 1 if mentioned by more than 3 but less than 15, and in this case it was considered "non-popular", while the value of less than 3 informants is excluded. ROP was calculated typically as: FL x RPL, ROP value represents the high popularity of the medicinal plants.

3. RESULTS

315 native medicinal species were mentioned by 80 informants interviewed in this study. 111 species of them (35.23%) were mentioned by less than 3 informants, and therefore were excluded from further consideration, while 142 species (45.07%) were mentioned by 3 informants or more but less than 15, and therefore considered as non-popular medicinal plants, and 62 species (19.68%) were considered as popular medicinal plants since they were mentioned by 15 or more informants (Table 1).

Many of the medicinal species have no similarity in their medicinal uses and therapeutic effects with those recorded in the neighboring countries, especially Iraq and Palestine. These plants included 151 species (47.33%), which were considered as newly recorded medicinal uses and therapeutic effects. 168 species (52.67%) were recorded to have similarities in this aspect with the neighboring countries.

The medicinal species recorded belonged to 88 families, 161 species were well-known either wild, cultivated or purchased in the market, 154 species were investigated and photographed in the field.

45 species (14.28%) have ROP values of 50 or more; which represented the highest rank of medicinal popularity among the species investigated (Table 1).

4. DISCUSSION

The medicinal plants recorded in this study can be classified, according to their medicinal uses and therapeutic effects, into many different categories depending on the internal or external uses.

The highly ranked medicinal plants with ROP values of 50 or more were represented by only 45 species (14.28%), and can be categorized into the following categories as in Table 2.

5. CONCLUSIONS

It is obvious from the above data, that the Southern part of Jordan has exhibited highly diversified medicinal species (203 species that belong to 88 families), which were cofirmed by three or more informants. This diversity refers to the fact that it has at least four main phytogeographical elements which include the lowest point in their altitude under sea level in Dead sea area (-400 m) and the highest point in Sharah series (1440m).

This high diversity is, in part, due to the type of people inhabited this area for a long time ago, most of them were beduoins and rural inhabitants who have a broad experience in folk medicine as local healers, herbalists, shephards, and well-experienced persons.

This plant wealth requires that researchers should pay attention to this natural resource to be protected from threatening and endangering factors, especially for the rare and endemic species.

This ethnobotanical survey of folk medicine in the Southern part of Jordan is considered a clear evidence for the intimate interconnected integration between the local people and earth natural resources, which supports the return to the earth and discovering the cultural and traditional symbolism for this manifestation in the form of sustainable development.

This study opens the doors widely to the scientific approach in order to determine the validity of folk medicine and improve the pharmaceutical industries based on natural resources. This challenge needs further investigations to recognize the active constituents found in each species.

It is obvious that the number of medicinal plants verified by calculating FL, RPL, and finally ROP as three

main popularity levels in the Southern part of Jordan is relatively high, and this conclusion is contrary to that found by the study of Friedman et al. (1986) among Bedouins in the Negev desert. Friedman found that only eight medicinal species had ROP values above 50 (12.7%), while in this study 45 medicinal species (14.17%) were found to have ROP values above 50 (26.4%), and this is because the kind of people in the Southern part of Jordan still have higher linkage with folk medicine and natural resources.

Table (2): List of the Verified Highly Ranked Medicinal Plants Categorized into 9 Groups with ROP Values of 50 or More.

Group	Plant Species	ROP	Medicinal Uses
1	*Achillea santolina* L. *Achillea tomentosa* L. *Adiantum capillus - veneris* L. *Aloe vera* L. *Ammi visnaga* (L.)Lam. *Foeniculum vulgare* (L.)Mill. *Glaucium corniculatum* (L.)Curt. *Leontice leontopetalum* L. *Rosmarinus officinalis* L. *Ruta chalepensis* L. *Salvia triloba* L. *Withania somnifera* (L.)Dunel.	69 68 67 63 50 53 58 69 74 56 64 70	Expectorant, Astringent, Muscular relaxant of uterus and arteries, Carminative, Antispasmodic, Antiepileptic, For impotency, and Antitussive:
2	*Aaronsohnia factorovskyi* Warb. Et Eig. *Lavandula officinalis* L. *Matricaria chamomilla* L. *Polygonum persicaria* L. *Populus alba* L. *Sarcopoterium spinosa* (L.)Spach	71 63 63 60 65 71	Anilithic, for intestinal colic, For gastric disturbances, Antidysentric, and renal calculi
3	*Aesculus hippocastanum* L. *Anchusa italica* Retz. *Anchusa strigosa* Lab. *Citrullus colocynthis* (L.) Sch. *Hyoscyamus albus* L. *Hyoscyamus aureus* L. *Laurus nobilis* L. *Salix alba* L. *Salix babylonica* L. *Salix fragilis* L.	63 78 68 69 63 58 53 54 54 55	Narcotic, Antipyretic, Anirheumatic, Diaphoretic, Cathartic, Hypnotic and Antiarthritic
4	*Allium sativum* L. *Artemisia herba - alba* L. *Clematis recta* L. *Echinochloa crusgalli*(L)P.Beauv. *Plantago major* L. *Salvia officinalis*	53 67 53 73 61 57	Skin diseases, Antiscabious, Antiseptic, For pleurisy, Antisyphilitic, and For eye diseases
5	*Coriandrum sativum* L. *Digitalis purpurea* L.	53 58	Aphrodisiac, Diuretic and Cardiac tonic:
6	*Helianthus tuberosus* L.	60	Hypoglycemic and Antidiabetic:
7	*Ephedra transitoria* Riedl. *Eucalyptus bicolor* (A.) Cunn. *Inula viscosa* (L.) Ait.	67 62 67	Asthma, Bronchodilator, Anti-inflammatory for upper respiratory tract, Lactagogue, and For lung disorder:
8	*Cucurbita maxima Duch.*	53	Anthelmintic
9	*Allium.cepa* L. *Artemisia arborescens* L. *Ecballium elaterium* (L.)A.Rich. *Glycyrrhiza glabra* L.	60 67 59 58	Emmenagogue, Stomachic, For fluid retention, jaundice, Spleen disorder, and Peptic ulcers:

REFERENCES

Adailkan, P.G. and Gauthaman, K. 2001. History of Herbal Medicines with an Insight on the Pharmacological Properties of *Tribulus Terrestris. The Aging Male,* 4:163-169.

Al-Eisawi, D. 1982. *List of Jordan Vascular Plants*. The Jordan University Press, Amman, 22-39.

Bender, F. 1974. *Geology of Jordan*. Berlin, Stuttgart.

Boulos, L. 1977. On the Flora of El-Jafer- Bayir Desert. *Candollea*, 32: 99-110.

Boulos, L. and El-Eisawi, D. 1977. On the Flora of Ras en Naqab. *Candollea*, 32: 81-98.

Boulos, L. and Lehham, J. 1977. On the Desert Flora North East of Aqaba. *Candollea*, 32: 99-110.

Eddouks, M., Maghrani, M., Lemhadri, A., Quahidi, M.L. and Joud, H. 2002. Ethnopharm-Acological Survey of Medicinal Plants Used for the Treatement of Diabetes Mellitus, Hypertension and Cardiac Diseases in the South-Eastern Region of Morocco (Tafilalet). *Journal of Ethnopharmacology*, 82: 97-103.

Friedman, J., Yaniv, Z., Dafni, A. and Palevitch, D. 1986. A Preliminary Classification of the Healing Potential of Medicinal Plants, Based on a Rational Analysis of an Ethnopharmacological Field Survey among Bedouins in the Negev Desert. *Journal of Ethnopharmacology*, 16: 275-278.

Harborn, J. B. 1997. African Ethnobotany-Poisons and Drugs. *Photochemistry*, 45: 1095-1096.

Heinrich, M. 2000. Plant Resources of South-East Asia, No.12 (1). Medicinal and Poisonous Plants 1. *Photochemistry*, 53: 619-620.

Heinrich, M. 2002. Plant Resources of South-East Asia 12 (2): Medicinal and Poisonous Plants. *Journal of Ethnopharmacology*, 81: 139-140.

Joud, H., Haloui, M., Rhiouani, H., Ehilaly, J. and Eddouks M. 2001. Ethnobotanical Survey of Medicinal Plants Used for the Treatment of Diabetes, Cardiac Diseases in the North Center Region of Morocco (Fez-Boulemane). *Journal of Ethnopharmacology*, 77: 175-182.

Karim, F. and Al-Qura'n, S. 1986. *Medicinal Plants of Jordan*. Yarmouk University Press, Irbid, Jordan, 11-30.

Karim, F. and Al-Qura'n S. 1988. *Wild Flowers of Jordan*. Yarmouk University Press, Irbid, Jordan.

Khayyat, A. A. and Mursi, M. 1981. *Pharmacology and Veterinary Toxicology in Iraq*, 1st Ed, Ministry of Higher Education Press, Baghdad, 14-33.

Krebs, H. C. 2001.Toxic Plants: Dangerous to Humans and Animals. *Toxicon*, 39: 429-429.

Prance, G. T. 2001. A Dictionary of Natural Products: Terms in the filed of Phamacognosy Relating to Medicinal and Pharmaceutical Materials and the Plants, Animals, and Minerals from Whom are Derived. *Biodiversity and Conservation*, 10: 301-302.

Rates, S. M. K. 2001. Plants as Source of Drugs. *Toxicon*, 39: 603-613.

Stickel, F., Egerer, G. and Seitz, H. K. 2000. Hepatotoxicity of Botanicals. *Public Health Nutrition*, 3: 113-124.

Zohary, M. 1973. *Geobotanical Foundations of the Middle East*. Gustav Fisher Verlag, Stuttgart, 30-55.

Zohary, M. and Feinbrun-Dothan, N. 1686. *Flora Palaestina*, Hebron University Press, Jerusalem, 77-90.

دراسة وتحر حول النباتات الطبية الشعبية في جنوب الأردن

صالح الفرعان*

ملخـص

ثلاثمئة وخمسة عشر نوعا من النباتات الطبية تنتمي إلى ثمانٍ وثمانين عائلة نباتية كانت محور البحث والتحري في منطقة البحث وهي جنوب الأردن. لقد وجد أن مئة وعشرة أنواع (34.92%) ذكرت من قبل أقل من ثلاثة مخبرين؛ فهي بذلك تستثنى من أية معاملة اعتبارية. مئة وواحد وأربعون نوعا طبيا (44.76%) ذكرت من قبل ثلاثة مخبرين أو أكثر، أي أقل من النصف وهو خمسة عشر، لذلك فهي نباتات طبية غير شائعة. فقط أربعة وستون نوعا (20.31%) ذكرت من قبل خمسة عشر أو أكثر (أي نصف العدد الكلي وثلاثون أو أكثر)، لذلك عدت نباتات طبية شائعة. خمسة وأربعون نوعا (14.28%) لها قيم أولوية ترتيب رتبي خمسون أو أكثر وهي بذلك تمثل أعلى ترتيب رتبي بين جميع القيم المدرجة. مئة وثمانية وستون نوعا (53.33%) لها استعمالات طبية مشابهة للدول المجاورة، بينما الأنواع الأخرى البالغة مئة وسبعة وأربعين (46.66%) ليس لها هذا التشابه. إن المنطقة الواقعة تحت الدراسة يغلب عليها العنصر الصحراوي، البحر المتوسط، الإيراني، والنوبوسوداني. إن المنطقة الواقعة تحت الدراسة أظهرت مستوى كبيرا من التنوع الحيوي الذي يستوجب أخذ الاحتياطات البيئية اللازمة للمحافظة على الأنواع البرية وحمايتها، وخاصة الأنواع المستوطنة المهددة بالانقراض.

الكلمـات الدالـة: النباتات الطبية، التاثيرات العلاجية، مستوى الصحة الدقيقة، مستوى التعرف النسبي، أولوية الترتيب الرتبي.

* قسم الأحياء، كلية العلوم، جامعة مؤتة، الكرك، الأردن. تاريخ استلام البحث 2004/8/16، وتاريخ قبوله 2006/8/28.