

## An Ethno Botanical Survey of Medicinal Plants Used in the Island of Gozo

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**ABSTRACT** This study was conducted on the island of Gozo, a small rural island with a history of herbal medicinal use. Although today this practice has declined, there are still some senior citizens who recall the uses of these plants. Primary and secondary information was sought in order to determine the changes that occurred during the past years in the use of herbal remedies. The Fidelity Level (FL %) was calculated to distinguish the most commonly recorded diseases or conditions for a specific plant, as mentioned by informants. The plants mentioned by the primary and secondary sources were surveyed on site. Out of 35 informants, 63 percent originated from Gharb, a village renowned for a healer. In this region the informants aged between 65-92 years. The most frequently used medicinal plants come mainly from the Asteraceae family (10), followed by the Lamiaceae family (7) and Rosaceae and Poaceae families (5). The most treated conditions were skin disorders (20) and gastrointestinal (20) followed by respiratory problems (18). The plant with the highest Fidelity Level was *Matricaria chamomile* L. (92%), *Erica multiflora* L. and *Micromeria microphylla* (D'Urv) Benth (80%) and *Verbena officinalis* L. (77%). Most of the species were obtained from uncultivated and cultivated plants, as well as some are considered to be weeds and others bought from the pharmacy or the grocery. This was the first systematic ethnobotanical survey conducted for the Island of Gozo. The combination of primary and secondary information and the *in situ* observations provided a comprehensive picture.

### INTRODUCTION

Gozo is the second largest island of the Maltese archipelago, situated some 8 kilometres to the north-west of the Island of Malta, with a 14.5 kilometre length, 7.2 kilometre width, a 45 kilometre shoreline and having an area of 67 square kilometres (Azzopardi 1995). It lies in the northern part of the archipelago, a semi-arid region, in the centre of the Mediterranean Sea. In demographic terms, it is one of the smallest regions in Europe. This small island has grown into a well-defined uniqueness in individuality and distinctiveness, along the years. Its official languages are Maltese and English, whereas the inhabitants of the different villages have their own dialect, still existent mainly among senior citizens. The Maltese language is very similar to Arabic with orthography being the principal difference. It comprises an important element of Italian and English words. The Gozitan people are generally Roman Catholics and are mainly very faithful to their beliefs.

Gozo is chiefly composed of Upper Coraline Limestone, Green Sand and Blue Clay, as

well as Globigerina and Lower Coralline Limestone (House et al. 1961). The soil is of local origin which developed mostly by fragmentation and pulverisation of the parent rock (Zammit-Maempel 1977). There are no mountains, rivers or lakes, but it has a considerable number of valleys which are very dry during summer but wet in winter, able to hold water for the greater part of the winter season with an annual rainfall of about 550 millimetres (Malta Water Resource Review 2006).

Therefore, there is no surface water and the only kind of water resource is the ground water which percolates down to the limestone aquifers. Winter months are moderately cold. The coldest month having an average temperature of 9.2 °C – 15.2 °C, whilst the summer months are very hot, having an average temperature of 21.2 °C – 30.7 °C (Cutajar et al. 1992). The most common prevailing winds are the cool north-westerly wind (Majjistral) and the dry north-easterly winds (Grigal) in March and September, whilst from among the winter winds, the north wind (Tramuntana) is the coldest (Ransley 1973).

Although having such natural constraints, flora is rich on the Island of Gozo and there are several hundreds of plant species, 700 being local, 200 or more introduced species and 25 circa endemic or sub-endemic. Such species thrive in

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different ecosystems which include Maquis - Makkja, Garrigue - Xaghri and Steppe - Steppa (Weber 2004), forming large areas on the island, whilst others thrive in minor areas such as coastal wetlands, sand dunes, woodlands and rupes-tral communities (Schembri 1993). In the majority of instances, these habitats form a mosaic pattern. Many of the plant species are also grown in home gardens but, differently from that of bygone times, gardens were larger than those of today. Figure 1 illustrates those areas of biological diversity, vis-à-vis urban areas, situated on the Island of Gozo (MEPA 2013).

### Objectives of Study

In this present study, we attempted to identify and collect medicinal plants used in traditional Gozitan herbal medicine and report on their uses, as recalled by senior citizens within the Gozitan community. The objective is to document and preserve knowledge of the use of herbal medicines by this community and to raise awareness on the floral richness of Gozo, and the potential commercialisation of these past remedies.

### MATERIAL AND METHODS

The study was based on the systematic compilation of data from primary and secondary sources. Secondary sources of information had to be referred to, in order to analyse the key areas of the study. The most conspicuous among the objectives were to identify wild plant species collected for medicinal purposes by the Gozitan community and to identify the uses of these plants. This entailed a substantial amount of time dedicated to desktop study, seeking secondary data from various sources. With regard to local ethnobotanical information, especially the history of ethnobotany in Malta and Gozo, this was very scarce, as only sparse data was recorded. Ethnobotanical data in Malta started being recorded only as recently as the Order of St. John, since the plant known as *Cynomorium coccineum* L. (General's Root), was very popular in those days. Yet, with regard to other plants, no information was available. Having said that, in recent years, some authors showed a certain interest on the subject which was used to compare what was discovered verbally with what had been recorded in writing.

A collection of voucher specimens was necessary to help in the identification of plants and,

where possible, experiments in domesticating certain plants had to be made, to compare phenotypical characteristics in different environments and conditions. Photographs of various local plants and the various habitats mentioned in this study were taken during the multiple visits to various areas. Visits did not only include different areas open to the general public, but also home gardens in which informants still kept in cultivation the different types of plants to be solely used for specific ailments. Voucher specimens were taken from gardens for identification and as supporting evidence. In most instances, these were re-planted, for the purpose of being observed and compared with others grown in different surroundings.

Despite the abundant availability of various types of secondary data, this alone would not have been adequate enough to tackle the objectives of a research study. Both qualitative and quantitative data selection methods were included in the cross-sectional explanatory research, as a primary source of data collection. The key informants' approach, which is the optimal expert's technique (Marshall 1996; Hoffman and Gallaher 2007), was applied to this present evaluation. Therefore, informants were selected according to their type of knowledge, since they most probably would have kept ethnobotanical data because of their interest in retaining family traditions. Regarding the main method of obtaining the relevant information for this study, a one-to-one structured interview was considered unsuitable for elderly people, in spite of their acquaintance with the subject. A structured interview would have been too limited, as it allowed only restricted participation from informants (Gill et al. 2008). The key method, being a combination of a structured interview and an informal conversation, helped in acquiring the maximum of information possible.

In the present study, informants furnished medicinal information on plants that they were familiar with. A list of species was established and the specified use by each respondent was added thereto. From this, the percentage of popularity of each species mentioned by the informants was obtained. Subsequently, the acquired ratio was described as the fidelity level (FL) (Friedman et al. 1986; Hoffman and Gallaher 2007). Therefore, the percentage of informants touching on the use of a particular plant species for the same ailments was measured for the most-

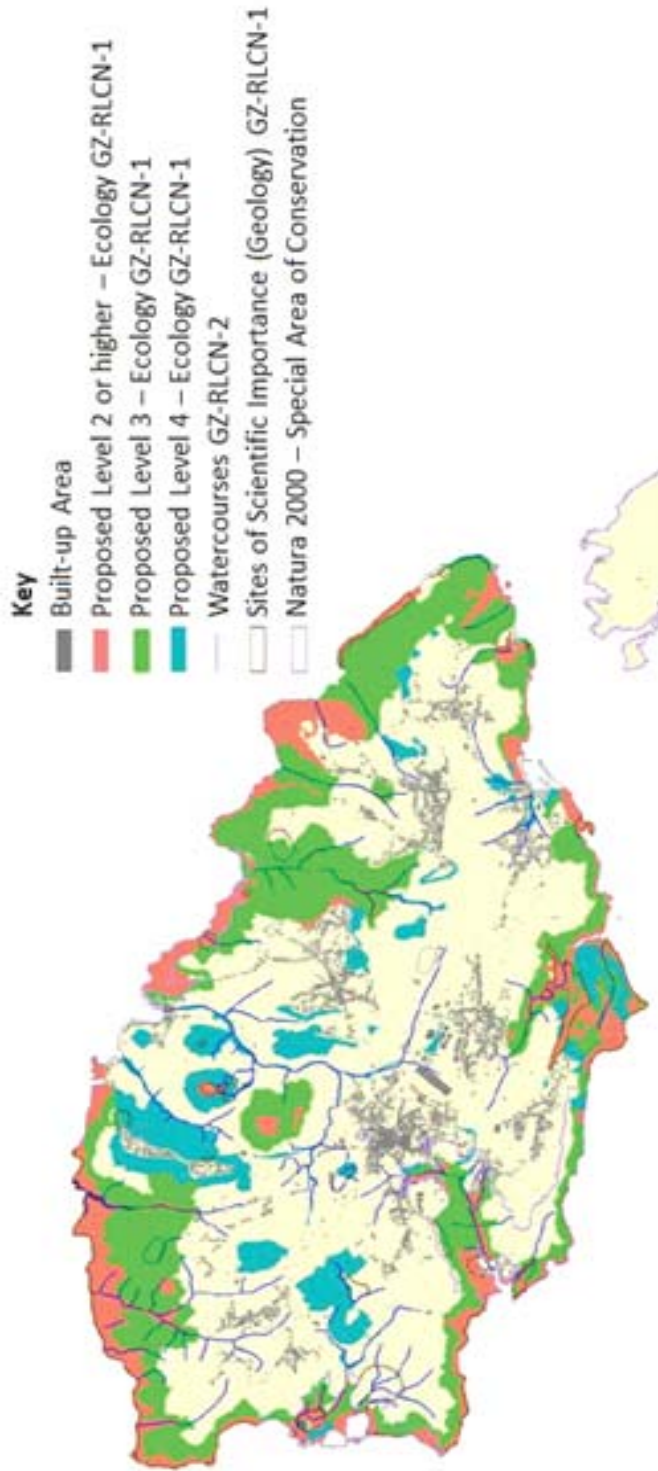


Fig. 1. The areas of biological importance in Gozo according to MEPA (Malta Environment and Planning Authority)

frequently claimed illnesses or conditions as FL (%) =  $(N_p/N) \times 100$ . Here  $N_p$  corresponds to the number of informants who cited the use of a plant species as a remedy for a specific disease, and N is the number of informants who use vegetation as a medicine to cure an illness.

## RESULTS AND DISCUSSION

### Knowledge of Informants on Medicinal Plants

Altogether, thirty-five senior citizens were interviewed, between July and October 2012, although field work continued up to 2013. The conversations and on-the-spot research were conducted in the villages of Gharb, Xaghra, Fontana, Victoria, Zebbug and Nadur. Those from Victoria originally came from Sannat and San Lawrenz. All communication was conducted in the dialect of the various local Gozitan communities. The locality, age and gender of the informants are reported in Table 1. However, the most important aspects of this work were the types of plants used and their vernacular name, the manner of preparation, the plant part used and the uses for different ailments. Some of the informants also mentioned types of medicinal plants used for the treatment of veterinary ailments. Seventy-three plant names that either grow in wild habitat (32 species), or are cultivated (38 species) or bought from food establishments or pharmacy (2 species), were mentioned. These plant names derived from thirty-three families which include the following; each name being accompanied by the number of species in brackets: Apiaceae (4), Araceae (1), Asteraceae (10), Boraginaceae (1), Brassicaceae (2), Cactaceae (1), Caprifoliaceae (1), Crassulaceae (1), Cucurbitaceae (2), Cynomoriaceae (1), Equisetaceae (1), Ericaceae (1), Euphorbiaceae (1), Fabaceae (4), Faboideae (1), Juglandaceae (1), Lamiaceae (7), Lauraceae (1), Liliaceae (4), Malvaceae (1), Moraceae (1), Myrtaceae (1), Oleaceae (1), Plantaginaceae (1), Poaceae (5), Polygonaceae (1), Resedaceae (1), Rosaceae (5), Rutaceae (3), Solanaceae (2), Urticaceae (2), Verbenaceae (2), Vitaceae (1). The botanical, common and vernacular names are listed in Table 2.

According to the results, various conditions and certain properties were mentioned which included: gastrointestinal disorders, vermifuge, anti-diabetic, respiratory system disorders, ophthalmic disorders, febrifuge, mouth disorders, sedative, ear infections, gynaecological disor-

**Table 1: The locality age and gender of informants**

Locality	No. of informants	Age	Males	Females
Fontana	1	89		1
Gharb	22	65-92	5	17
Nadur	2	55-63		2
Victoria	3	64-88	1	2
Xaghra	5	55-86		5
Zebbug	2	2	1	1

ders, pain and inflammation, skin disorders and minor wounds, hypertension, purifying and detoxifying, urinary tract disorders, circulatory disorders and veterinary issues (Fig. 2).

### Plant Parts Utilized, Preparation and Administration

All the different components of the plants were mentioned for the various ailments, including seeds, rhizomes, roots, flowers, leaves, stem and fruit. At times, it was also stated that the remedy did not include only one plant but, sometimes, two or three or several boiled together, then sweetened with either sugar or honey. As a point of interest, according to the Gozitan healer, Frenç tal-Gharb, honey was used for the healing of various conditions because the "bee draws the pollen from a great variety of flowers and, if one brings no relief, another certainly will". In fact, he suggested honey for various ailments which definitely left positive results (Bezzina 1993). Additionally, plant parts, immersed in other substances to be used as solvents, such as vinegar and any alcohol (Wood 2008) or water, are extracted relatively easily, whereas plants composed of hydrophobic compounds only dissolve easily in beeswax (Rakel 2012) or oil, resulting in a better extraction (Saad and Said 2011). All these were used for blending, until the proper consistency was reached, in order to facilitate the application of such remedies.

When asked whether the plants used for medicinal purposes were dry or fresh, the informants did not display any particular preference in either, except the one already mentioned from Gharb; they simply dried their herbs in order to have them available all year round. On the other hand, using fresh vegetation might have been common, due to the fact that places in Gozo were not too distant from each other. One of the advantages of using dried plants is that they still

**Table 2: Medicinal plants, with family, scientific and local name, for selected ailments, with parts used and preparations, as claimed by the Gozitan informants**

Family	Scientific name	English name	Vernacular name	Voucher no.	Use/s	Parts used/Preparation		
Apiaceae	<i>Apium graveolens</i> L	Celery	Karfus	G01	1	Seeds, stalk and leaves – decoction		
	<i>Coriandrum sativum</i> L	Coriander	Kosbor	G02	1	Seeds – decoction		
	<i>Foeniculum vulgare</i> Mill.	Fennel	Busies Selvagg	G03	1	Seeds – decoction		
	<i>Petroselinum crispum</i> Mill	Parsley	Tursin	G04	1	Leaves – decoction		
	<i>Arisarum vulgare</i> Targ-Toz	Friar's Cow	Garni tal-Pipa	G05	1	All aerial parts – decoction		
	<i>Achillea Millefolium</i> L	Common Yarrow	Haxixa tal-Morliti	G06	1	All aerial parts –decoction and expose the area infected to steam		
	<i>Artemisia abrotanum</i> L	Southern Wormwood	Ganfra	G07	4	Leaves – mixed with lard		
	<i>Artemisia absinthum</i> L	Wormwood	Erbabjanka	G 08	3	Leaves – decoction		
	<i>Calendula arvensis</i> L	Field calendula	Suffeja tar-Raba'	G09	1	All aerial parts – decoction		
	<i>Centaurea nitransis</i> L	Southern Star	Xewk il-Ghotba	G010	1	All aerial parts – decoction		
Araceae	<i>Cichorium spinosum</i> L	Spiny Chicory	Qanfuda	G011	1	All aerial parts – decoction		
	<i>Cynara scolymus</i> L	Globe artichoke	Qaqoc	G012	3	Flower and stalk – decoction		
	<i>Inula viscosa</i> L	Larch flea bane	Tullier	G013	5	Leaves – baigne marie with olive oil, decoction to be drunk and with its steam expose the affected area, poultice		
	<i>Matricaria chamomilla</i> L	Wild chamomile	Kamomilla Selvagg	G014	5	All aerial parts–decoction - compress		
	<i>Tanacetum balsamita</i> L	Costmary	Erba ta' Santa Marija	G015	2	All aerial parts – decoction, poultice		
	Boraginaceae	<i>Borago officinalis</i> L	Borage	Fidloqqom	G016	3	All aerial parts – decoction	
		Brassicaceae	<i>Brassica oleracea</i> Gongylodes group	Kohlrabi	G017	1	Roots –decoction	
			<i>Capsella bursa-pastoris</i> L Med.	Shepard's Purse	Gargir	G018	1	Leaves – poultice
		Cactaceae	<i>Opuntia ficus indica</i> L Mill	Prickly Pear	Pal tal-Bajtar/Cuplajjs/Weraq ta' Dindja	G019	1	Pulp from leaves applied fresh
			<i>Sambucus nigra</i> L	Common Elder	Sebuka	G020	2	All aerial parts – poultice
Crassulaceae	<i>Echeveria coccinea</i>	Morning Glory	Pjanta tal-Kallu	G021	1	Leaves – dividing the leaves and applying the inner part		
Cucurbitaceae	<i>Cucurbita pepo maxima</i> L	Pumpkin	Qargha Hamra	G022	1	Seeds – eaten fresh		
	<i>Ecballium elaterium</i> L Ric.	Squirting cucumber	Fiaqqus il-Hmir	G023	1	Fruit – poultice		
Cynomoriaceae	<i>Cynomorium coccineum</i> L	General's Root	Gherq Sinjur	G024	1	Aerial part – decoction		
	<i>Equisetum ramososomum</i> Desf.	Branched Horsetail	Denb i <sub>z</sub> -temel	G025	3	Aerial parts – decoction		
Ericaceae	<i>Erica multiflora</i> L	Erica	Xkattapietra	G026	2	All aerial parts – decoction		
	Euphorbiaceae	<i>Euphorbia pinea</i> L	Pine Spurge	Tenghud komuni	G027	1	Apply latex	

Table 2: Contd...

Family	Scientific name	English name	Vernacular name	Voucher no.	Use/s	Parts used/ Preparatio
Fabaceae	<i>Ceratonia siliqua</i> L	Carob	Harruba	G028	1	Seed pod - prepared in a traditional way
	<i>Hedysarum coronarium</i> L	Sulla/French Honey-suckle	Silla	G029	1	Flower - decoction
	<i>Lotus edulis</i> L	Edible Bird's Foot Trefoil	Qrempuc	G030	1	Seed pod - fresh
Faboideae	<i>Vicia faba</i> L	Field Beans	Favetta/Ful	G031	1	Beans - poultice
	<i>Myroxylon balsamum</i> var <i>balsamum</i> - <i>Myroxylon balsamum</i> var <i>pereirae</i>	Balsam of Peru - Balsam of Tolu	Balzmu	G032	1	Purchased from the pharmacy - inhalation of its steam
Juglandaceae	<i>Juglans regia</i> L	Walnut	Gewz	G033	1	Leaves - poultice
Lamiaceae	<i>Marrubium vulgare</i> L	White Horehound	Marrubija	G034	2	All aerial parts - applied fresh
	<i>Melissa officinalis</i> L	Lemon Balm	Melissa	G035	1	All aerial parts - distilled
	<i>Mentha pulegium</i> L	Pennyroyal	Plejju	G036	2	All aerial parts - fresh
	<i>Micromeria microphylla</i> (D'Urv) Benth./ <i>Satureja microphylla</i> (D'Urve)Guss.	Small Leaved S Micromeria	Xkattapietra	G037	2	All aerial parts - decoction
	<i>Rosmarinus officinalis</i> L	Rosemary	Klina	G038	3	All aerial parts - decoction and expose its steam to the affected area
Laureaceae	<i>Salvia officinalis</i> L	Common sage	Salvia	G039	1	All aerial parts - decoction, poultice
	<i>Thymus capitatus</i> L Hof	Med. Wild Thyme	Saghtar	G040	2	All aerial parts - decoction
Liliaceae	<i>Laurus nobilis</i> L	Laurel	Randa	G041	1	Leaves - decoction
	<i>Allium cepa</i> L	Common Onion	Basla	G042	4	Bulb - maceration, decoction
	<i>Allium sativum</i> L	Garlic	Tewm	G04543	2	Leaves - decoction
	<i>Lilium candidum</i> L	Madonna Lilly	Bastun ta' San Gu, epp	G044	1	Bulb - poultice
	<i>Urignea maritima</i> L	Seaside Squill	Basal tal-Ghansar/ Gandar	G045	2	Bulb - applied fresh or added to water
Malvaceae	<i>Malva sylvestris</i> L	Common Mallow-				
	<i>Lavatera arborea</i> L	Tree Mallow	Hubbejja, ghira	G046	5	Leaves - decoction, poultice
Moraceae	<i>Ficus carica</i> L	Fig	Hubbejja Kbir Tim/Bajjar ta' San Gwann	G047	1	Latex - applied directly
Myrtaceae	<i>Eugenia caryophyllata</i> L	Cloves	Tacci tal-Qronfol	G048	2	Purchased from the grocery - decoction
Oleaceae	<i>Olea europea</i> L	Olive	- ebbuga	G049	4	Leaves and fruit - decoction from leaves and oil from fruit
Plantaginaceae	<i>Plantago major</i> L	Greater Plantain	Bi, bula	G050	1	Leaves - poultice
Poaceae	<i>Arundo donax</i> L	Giant reed, Great Reed	Qasab	G051	1	Rhizome - decoction
	<i>Cynodon dactylon</i> L	Bermuda Grass	Nigem	G052	4	Aerial parts and roots - decoction
	<i>Hordeum vulgare</i> L	Barley	Xghir	G053	6	Aerial parts - decoction
	<i>Triticum</i> sp.	Wheat	Qamh	G054	3	Bran - poultice, aerial part - compress
	<i>Zea mays</i> L	Maize	Qamhirru	G055	1	Corn silk - decoction

Table 2: Contd...

Family	Scientific name	English name	Vernacular name	Voucher no.	Use/s	Parts used/Preparation
Polygonaceae	<i>Muehlenbeckia sagittifolia</i> Meisn.	Zarzaparrilla Colorado	Senzaperijja	G056	1	All aerial parts – decoction
Rosaceae	<i>Crataegus monogyna</i> Jacq – <i>Crataegus oxyacantha</i> L	Hawthorn	Ghanç'alor	G057	1	Leaves and fruit – decoction f leaves and jam from fruit
	<i>Pyrus cydonia</i> L	Quince	Sfejgel	G058	1	Fruit – decoction
	<i>Pyrus malus</i> L	Cultivated Apple	Tuffie' ta' Belludja	G059	2	Fruit – decoction, poultice
	<i>Rosa centifolia</i> L	Provence Rose	Centifoljja	G060	1	Flower – decoction
	<i>Rosa bifera</i> L	Rosehip	Ruç'ell	G061	2	Flower – decoction
Resedaceae	<i>Reseda alba</i> L	White Mignonette	Denb l-aruf	G062	1	All aerial parts – decoction
Rutaceae	<i>Citrus limon</i> L. B	Lemons	Lumi	G063	4	Fruit – decoction, fresh
	<i>Citrus aurantium</i> L	Seville Oranges –	Laring tal-	G064	2	Leaves and flowers – distilled
	<i>Citrus sinensis</i> L. Osbeck	Oranges	Bakkaljaw – Laring			
	<i>Ruta chalepensis</i> L	Common Rue	Fejgel	G065	4	Leaves - in heated olive oil, chewed and exhale on the eye
Solanaceae	<i>Lycopersicon esculentum</i> Mill.	Tomato	Tuffieha Tadama	G066	1	Fruit - apto plied fresh
	<i>Solanum tuberosum</i> L	Potatoes	Patata	G067	2	Tubers – applied fresh
Urticaceae	<i>Parietaria officinalis</i> L	Pellitory-of-the-Wall	Xehet ir-Rih	G068	5	All aerial parts – decoction and expose the body part to its steam, poultice
	<i>Urtica dubia</i> Forsk	Large-Leaved Stinging Nettle	Haxix ir-Rih	G069	3	All aerial parts – decoction to be used on the effected area
Verbenaceae	<i>Lippia citriodora</i> Kunt	Lemon Verbena	Ilwiça	G070	2	Leaves - decoction
	<i>Verbena officinalis</i> L.	Vervain	Buquxrum	G071	6	All aerial parts – decoction to be drunk or expose the effected areas to its steam or to wash with
Vitaceae	<i>Vitis vinifera</i> L	Grapevine	Dielja tal-Gheneb	G072	5	Fruit - wine or vinegar

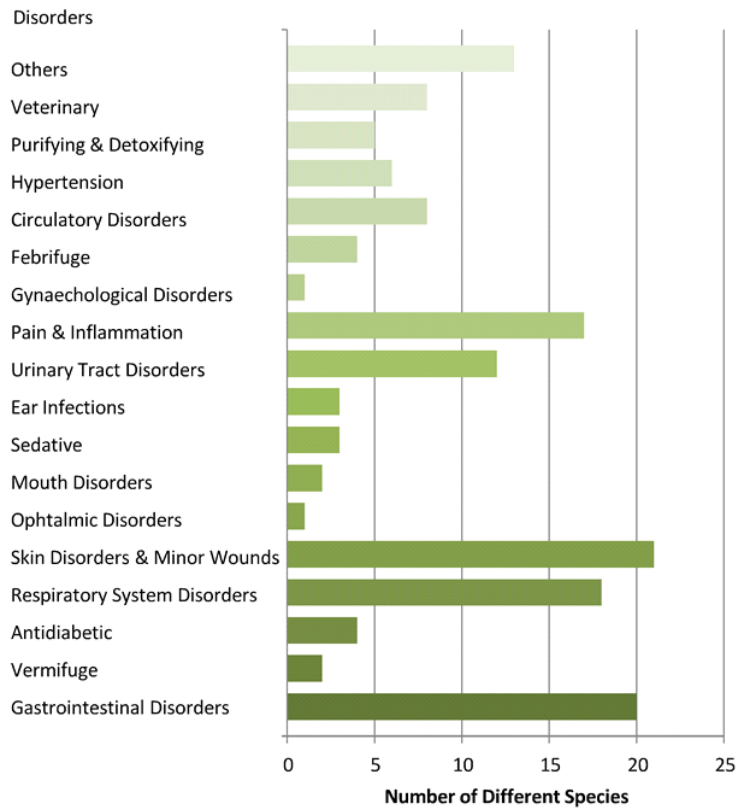


Fig. 2. The relationship between disorders/diseases and plant species used by the Gozitan community

retain their medicinal characteristics when dried at low temperatures (Muller and Heindle 2006). In fact, this had been popular for ages, and Hoffman (2003) defined the word “drug” as a transcription of the mid-English derived form from the mid-Dutch word “droge” signifying “dry”.

Of the thirty-five informants, five of them mentioned the fact that they used to prepare the decoction of the “duwa tal-qatgha”, which one referred to as “il-morr” - the bitter which is, as described by Hoffman (2003), a prepared mixture of boiled plants having a bitter taste. It treats the body as a whole, and has special functions by exhilarating appetite, increasing digestive juices, increasing bile and, in liver detoxification, controlling the secretion of pancreatic hormones and restoring damage of the intestinal wall but, most important of all, sustaining the heart and circulation. It has been recalled that drinking this solution when weak, will increase

appetite again. Two of the informants who cited the know-how of this kind of decoction were from Gharb and the other three from Xaghra, but admitted they had close connections with Frenctal-Gharb who had taught them how to mix it. One of the two from Gharb actually is a relative of Frenctal-Gharb, and used to help him personally prepare the decoction, as the healer engaged several other persons to prepare the tonics. The other respondent from the same village happened to be a very close friend of his. Only two of the respondents, both from Xaghra, still prepared this decoction. A total of twenty herbs were mentioned: *Equisetum ramososomum* Desf., *Verbena officinalis* L., *Artemisia absinthum* L., *Ruta chalepensis* L., *Borago officinalis* L., *Matricaria chamomile* L., *Rosmarinus officinalis* L., *Citrus sinensis* L.Osbeck., *Citrus limon* L.B., *Lippia citriodora* Kunt., *Marrubium vulgare* L., *Muehlenbeckia sagittifolia* Meisn.,



*Reseda alba* L., *Micromeria microphylla* (D'Urv) Benth. or *Erica multiflora* L., *Tanacetum balsamita* L., *Cynodon dactylon* L., *Cichorium spinosum* L., *Arundo donax*, L. and *Eugenia caryophyllata* L. Apart from the decoction against shock, other respondents mentioned additional combined mixtures of plants to be used as a remedy. These included the decoction of corn silk and orange for gallstones; a decoction of lemon verbena, muehlenbeckia and spiny chicory, or lemon verbena and spiny chicory only for diabetes; a decoction of Pellitory-of-the-Wall, nettle and dried garlic leaves, or chamomile instead of the Pellitory-of-the-Wall, together with the other two plants. These two decoctions were used by exposing the effected hemorrhoidal areas to the steam generated; a decoction of lemon and cloves for upset stomach; a decoction of apple and cloves for sore throat; two types of poultices of cooked Pellitory-of-the-Wall and bran or chamomile used to be placed on painful areas including knees, back and chest. A decoction of laurel and rose to help in the expelling of gas; a decoction of common rue and chamomile was used to use its steam for ear infections; a decoction of celery and fennel seeds for gout, rheumatism and bone joint pain; a decoction of rosemary and lemon leaves, to inhale the steam, against influenza and high fever; and a poultice of mallow, bread and milk for pustules. It should be noted that information about the amount of plant material to be used for the treatment was never mentioned precisely; even when the informants were asked, there still were doubts. The dosage was mentioned intermittently, but most of the informants stressed that, whenever a decoction needed to be taken, it had to be drunk early in the morning on an empty stomach - something which they themselves always used to term ghar-rieq, a word which has today, fallen into relative disuse.

### **Women's Role in the Preparation of Medicinal Remedies**

With regard to gender, twenty-eight females and seven males were interviewed. This because the former proved to be more effusive on the topic. According to Talberth and Leolpold (2013), for several years, ethnobotanical knowledge has played a fundamental role in daily human diet, deriving from the locally grown produce as food, and the use of wild plants as a medicinal source. While so much of this knowledge had got adulterated in the course of time, worse still, cases

have been recorded where it had disappeared completely, whereas certain people kept it to themselves and refused to divulge it, or it lay dormant in others, but still remained in good practice among a few. Among the respondents, especially women, acquaintance with an aptitude in dealing with herbal cures had been acquired in their early lives, while helping their mother look after the family, whilst the husband was at work in the fields. This had maintained the tradition of using plants for a medicinal purpose because of the interest in preserving family tradition and being keen on healthcare (Silva et al. 2015).

Verlag (2000) states that, in their everyday life, women associated themselves with the natural supplies they had at hand and, consequently, became aware of the varying uses of their surrounding natural resources. They did not keep that knowledge to themselves, but were willing to pass it on to younger women. On the other hand, this association did not seem to be common among men. In fact, most of the female respondents explained that they usually stayed at home, keeping house, looking after the family and cooking, whilst other women actually lent a helping hand in the family fields, in addition to their normal responsibilities.

A female respondent explained how, when her children fell ill, she was the one to take them to Freñc tal-Gharb, hailing him as the "best doctor around", since he always set her mind at rest with his ability to cure, using various herbal formulas and always assuring her that her several children would be fine. All the women who were interviewed somehow or other mentioned that they had been to Frenc, or otherwise remembered what he used to prescribe, as they were told by their parents, that he was a "very reliable person whom one had to consult when feeling unwell or when one developed a certain condition."

Women differ from men in various ways on this topic; they have different views about the self-same knowledge they possess. They deal with it differently and they conserve and pass it on differently (Verlag 2000). This was why most of these women had probably defined the role of males as going to the fields and succeeding in carrying out all external chores. Besides being thus engaged, males had to see to their livestock, too, providing food for them as well, in order to increase the nutritional amount needed daily, and to provide a variety of different foods

for the family. Furthermore, no machinery was available to facilitate their type of work. This was the reason why women had to prepare food and medicinal therapies for their families, following consultation with those at home and in the neighbourhood. On the other hand, Howard (2003) emphasised that, around the world, in particular in areas where bio-diversity is considerably abundant, such as in remote rural areas, women were the main figures that did the job of administering the natural resources as they had the intellectual capability to store information regarding the local vegetation. In addition, they prevailed as vegetation and seed collectors, house gardeners, plant breeders and practitioners of herbalism (Hunde et al. 2015). Warren (1997), in his article: "Taking Empirical Data Seriously – An Eco Feminine Philosophical Perspective", taken from the book: "Ecofeminism: Women, Culture, Nature" (Warren and Erkal 1997), explains that women rely more than men on

goods derived from trees and forests, they suffer more when the environment is degraded, are more prone than men to recount tradition, regulations and restraints that males do not necessarily themselves with. In addition, plants are generally considered a female interest, for diverse reasons, including beauty treatments, scent, amongst others.

### Commonly Used Plant Species among the Interviewed Informants

A quantitative ethnobotanical tool, the Fidelity Level (FL %) was used to distinguish the most commonly recorded diseases or conditions for a specific plant, as mentioned by respondents. The following list shows the Fidelity Level (FL %) of the most frequently used plants, starting with those amounting to 37 percent of fidelity level, and incorporating fourteen plants (Table 3). Those mostly resorted to indicate that

**Table 3: The Fidelity Level of the most commonly used medicinal plants**

Scientific name	Uses	Fidelity Level (FL %)
<i>Matricaria chamomilla</i> L.	Gastrointestinal disorders, skin disorders and minor wounds, mouth disorders, sedative, ear infection	92
<i>Erica multiflora</i> and L. <i>Micromeria microphylla</i> (D'Urv) Benth.	Urinary tract disorders, for shocks	80
<i>Verbena officinalis</i> L.	Skin disorders and minor wounds, pain and inflammations, febrifuge, circulatory disorders, purifying and detoxifying	77
<i>Borago officinalis</i> L.	Gastrointestinal disorders, respiratory system disorders, skin disorders and minor wounds	66
<i>Citrus limon</i> L.B.	Gastrointestinal disorders, respiratory system disorders, pain and inflammation, veterinary medicine	63
<i>Hordeum vulgare</i> L.	Respiratory system disorders, urinary tract disorders, pain and inflammations, circulatory disorders, purifying and detoxifying, for shocks, veterinary medicine	60
<i>Equisetum ramososomum</i> Desf.	Sedative, urinary tract disorders, pain and inflammations, against shocks, purifying and detoxifying	57
<i>Ruta chalepensis</i> L.	Skin disorders and minor wounds, ophthalmic disorders, ear infections, pain and inflammatory	57
<i>Malva sylvestris</i> L. and <i>Lavatera arborea</i> L.	Gastrointestinal disorders, skin disorders and minor wounds, urinary tract disorders, veterinary medicine	57
<i>Cynodon dactylon</i> L.	Gastrointestinal disorders, sedative, urinary tract disorders, hypertension, purifying and detoxifying	52
<i>Urtica dubia</i> Forsk.	Skin disorders and minor wounds, circulatory disorders, for shocks	46
<i>Vitis vinifera</i> L.	Respiratory system disorders, Skin disorders and minor wounds, febrifuge, hypertension, headaches	43
<i>Zea Mays</i> L.	Urinary tract disorders	40
<i>Rosmarinus officinalis</i> L.	Respiratory system disorders, pain and inflammation, hypertension	37

they have the highest FL, and those with low citations mean that they have a low FL. *Matricaria chamomile* L. has the highest FL, with an amount of 92 percent, mentioned in five different types of uses: gastrointestinal disorders, skin disorders and minor wounds, mouth disorders, sedative effect and ear infection. This plant can be bought dried and readily packed from supermarkets, but informants, said it was commonly found cultivated in their vicinity. The second high percentage of fidelity level is that of *Erica multiflora* L. and *Micromeria microphylla* (D'Urv) Benth, amounting to 80 percent. In contrast to chamomile, these two different, though unrelated botanically, were used for the same ailments, that is urinary tract disorders and shock. This was, and still is, the only reliable means other than conventional treatment, such as surgery or laser therapy, for removing gallstones and kidney stones. These two plant species are mostly found in conservation and protected areas. The third highest percentage of fidelity level was that of *Verbena officinalis* L., a very common weed found sprouting everywhere. Its FL was 77 percent, having six different uses: skin disorders and minor wounds, pain and inflammations, febrifuge, circulatory disorders, purifying and detoxifying. *Borago officinalis* L., a very common plant, with a FL of 66 percent, was used for gastrointestinal disorders, respiratory system disorders, skin disorders and minor wounds. *Citrus limon* L.B, stands at 63 percent FL. This is a common fruit used for gastrointestinal disorders, respiratory system disorders, pain and inflammation, as well as in veterinary medicine. *Hordeum vulgare* L., with 60 percent FL, is a commonly grown cereal, used for respiratory system disorders, urinary tract disorders, pain and inflammations, circulatory disorders, purifying and detoxifying, against shock and also used in veterinary medicine. *Equisetum ramososomum* Desf., with 57 percent FL; not very common but found in wet and humid areas, was used as a sedative, for urinary tract disorders, pain and inflammations, against shocks, purifying and detoxifying. *Ruta chalepensis* L., 57 percent FL, was used for skin disorders and minor wounds, ophthalmic disorders, ear infections, pain and inflammatory disorders. *Malva sylvestris* L. and *Lavatera arborea* L., 57 percent FL, are very common and used for gastrointestinal disorders, skin disorders and minor wounds, urinary tract disorders and in veteri-

nary medicine. *Cynodon dactylon* L, 52 percent FL, is a common weed used for gastrointestinal disorders, sedative, urinary tract disorders, hypertension, purifying and detoxifying. *Urtica dubia* Forsk. (46% FL) is a common weed used for skin disorders and minor wounds, circulatory disorders, and for shocks. *Vitis vinifera* L., 43 percent FL, is a commonly cultivated type of plant used for respiratory system disorders, skin disorders and minor wounds, febrifuge, hypertension, and headaches. *Zea Mays* L. with a FL of 40 percent, was a commonly cultivated cereal used for urinary tract disorders. *Rosmarinus officinalis* L., 37 percent FL, is a commonly cultivated herb for respiratory system disorders, pain and inflammation, and hypertension.

### Lesser Known Medicinal Plant Species

Some of the plants with a FL lower than 37 percent include those that although effective as remedies, they were not popular with informants. In reality, their low FL might be due to the fact that they could have been forgotten because of their prolonged disappearance, and consequent replacement by other conventional remedies. In fact, those still being used have the highest FL. Others which might have been efficient although not mentioned often by respondents include the following species: *Crataegus monogyna* Jac; *Crataegus oxyacantha* L., *Plantago major* L., *Artemisia absinthum* L., *Ecballium elaterium* L. A. Rich., *Artemisia abrotanum* L., *Achillea millefolium* L., *Melissa officinalis* L., *Cynodon dactylon* L., *Sambucus nigra* L., *Calendula arvensis* L., *Inula viscosa* L., *Parietaria officinalis* L., *Centaurea nicaeensis* L., *Triticum* sp, *Allium cepa* L. and *Olea europea* L.

The present ethnobotanical study evaluated the traditional medicinal use of several cultivated and wild plant species. The study was also extended to two other ethnobotanical products, namely: Cloves and Friar's Balsam that may be obtained from the local grocery shop or pharmacy.

The cultivated species include fruits, vegetables and herbs which likewise form part of the daily diet, but also others that are intrinsically part of the flora kept in the home garden for personal medicinal use. Herbs for medicinal purposes are on the decline, since 'home-made' remedies are falling into disuse and such plants are, consequently, rarely found in people's home

gardens. These are many reasons for this trend, primarily due to the advent of modern medicines and a decline in knowledge of herbal medicines.

On the other hand, with regard to the uncultivated species, it is worth noting that these fall under two sub-sections: common weeds and protected species, mainly found in conservation areas. A considerable number of weeds pertaining to the uncultivated species cited in this research grow abundantly, as the greater part are generally considered common weeds, by most lay people and farmers alike. Additionally, the protected species include the many floral species, which thrive in many of the different habitats of Gozo and quite a few of which are endemic.

The Malta Environment and Planning Authority listed protected areas on the Islands of Malta and Gozo where the flora, fauna and natural habitats are safeguarded. Furthermore, this had to take place in accordance with published Legal Notice 311 of 2006, Environment Protection Act (Cap 435) and Development Planning Act (Cap 356) under the title of Flora Fauna and National Habitats Protection Regulations which were adapted in order to be in line with the Habitats Directive (Council Directive, 92/43 EEC). Besides, every Member State of the European Union was bound to the previously mentioned EC Habitats Directive, to form part of the Natura 2000 framework. Therefore, to be in conformity with the aforementioned policy, an area of natural surroundings hosting different kinds of species described in the Directive Annex had to be included. To date, these areas amount to twenty-eight sites of community importance in Malta and Gozo. Those on the Island of Gozo are as follows: Ghajn Barrani area, Ramla area, the Cittadella area, Dwejra area (including Qawra area and Fungus Rock), Xlendi (Kantra area), Il-Qortin tal-Magun u l-Qortin il-Kbir (limits of Nadur) and ta'h Cenc area (limits of Sannat) shown in Figure.

Amongst all the cultivated plants and trees, the common elder (*Sambucus nigra* L., sebuka) used to be commonly found and used for various medicinal purposes. Today it has become very rare. According to some respondents, this was grown in their home garden and, in actual fact, one of the respondents still had one, as was observed in this current research. In fact, today, it is included in the list of several others which are protected under Legal Notice 12 of

2001, Environment Protection Act (Cap.348), under the title Trees and Woodlands (Protection) Regulations 2001.

Hawthorn (*Crataegus monogyna* Jacq., ghanzalar) is another plant that is protected but, contrary to common elder, this was only found (and still is) growing abundantly in wild habitats, but was not commonly mentioned for its medicinal uses. However, it is still found growing profusely in certain uncultivated areas. Other species mentioned in this study and which are protected within their habitats are the local species of wild thyme (*Thymus capitatus* (L.) Hof., sagħtar selvagg), erica (*Erica multiflora*, xkattapietra), spurge (*Euphorbia melitensis*, teng hud tax-xagri), carob trees (*Ceratonia siliqua* L., sigra tal-harrub), olive trees (*Olea europaea* L., zebbug) and laurel trees (*Laurus nobilis* L., sigar tar-rand). The latter three types of trees refer to local species which have been planted for several years. They are protected under national legislation and also pertain to the Special Areas of Conservation implemented by MEPA.

## CONCLUSION

In spite of its small size, the island of Gozo is rich in wild and cultivated flora with a plethora of medicinal uses. This study captures the knowledge of the local people and consolidates old texts in relation to herbal medicinal practice. This acquired knowledge may provide the basis for a new industry, in the Maltese Islands, which to date has never matured in spite of this rich biodiversity.

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