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Medicinal Plants for the Treatment of Urogenital Tract Pathologies According to Dioscorides' *De Materia Medica*

Abstract

The *De Materia Medica* of the Greek Dioscorides reports about 200 plants used for the treatment of pathologies of the urogenital tract during the 1st century AD. On the basis of explicit and implicit affirmations by Dioscorides, a theoretical system concerning the specific properties of these plants has been attempted. Comparison of the species reported by Dioscorides and Pliny the Elder for renal affections does not support the thesis of a close relationship between *De Materia Medica* and the *Naturalis Historia.*

Key Words

Dioscorides
Medicinal plants
Urogenital disease
History of pharmacology

Introduction

The Greek Dioscorides is the author of the major extant work of the classical world on 'materia medica'. Although nothing, or very little, is known about his life, he is thought to have lived during the 1st century AD; in any case, he was born in Anazarba (Cilicia, Asia Minor). Traditionally, he is considered to have been a military physician to the Roman troops during the reign of the Roman Emperors Caligula (37–41 AD), Claudius (41–54 AD) or Nero (54–68 AD) and to have travelled through the whole Empire, and, during these missions, he is believed to have examined personally the local plants to which he refers in his work. But these biographical elements are far from certain; they repose on a controversial interpretation of an affirmation in his work in which Dioscorides alludes to a 'life similar to that one of the soldiers' [1].

His treatise, entitled *De materia medica* (Greek text: Wellmann [2]; for an English translation: Gunther [3]) presents nearly 800 items, vegetable, mineral and animal, from which were obtained the substances used to prepare the medicines. Dioscorides studied the drugs on a regular pattern: description of the natural element from which they are picked, therapeutic properties and medicines prepared with the drugs, and their indications.

Pliny the Elder (23/24–79 AD; on Pliny and his work, see Serbat [4]), the author of the *Naturalis Historia* [5], who was probably a contemporary of Dioscorides, is thought by modern research to have followed the same sources as the Greek [6–8], so that we may consider both works as two independent re-elaborations of the same corpus of data. The diuretic plants quoted by Pliny have been studied by Aliotta and Pollio [9]. Here, we propose a parallel analysis of the items for which Dioscorides states an activity on the pathologies of the urogenital tract. The present contribution is divided into two parts: an inventory of the plants credited with such properties by Dioscorides and an analysis of this material.

Plants Named by Dioscorides

Table 1 inventories the plants used by Dioscorides in the therapy of affections of the urogenital tract. The first column lists the scientific and English name of plants in alphabetical order, according to Berendes' [10] botanical identification, reported in his German translation of the treatise. The second column gives the Greek name transcribed into the Latin alphabet and accompanied by the reference (book and chapter) in Dioscorides' Greek text. The other columns specify the type of action exerted by the plants, regrouped in five major categories: diuretic action, action on strangury, on stones, on jaundice and on renal and bladder affections.

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Table 1. Index of plants used for treating pathologies of the urogenital tract according to Dioscorides' *De Materia Medica*

Scientific name	English name	Greek name	Reference in *De Materia Medica*	Therapeutical purposes				
				diuretic	strangury	stones	jaundice	renal and bladder affections
Acanthus mollis L.	Acanthus	akanthos	III, 17	×				
Achillea spp.	Yarrow	ageraton	IV, 58	×				
Acorus calamus L.	Sweet flag	akoron	I, 2; V, 63	×		×		
Adiantum capillus-veneris L.	Venushair	adianton	IV, 134		×	×	×	
Ajuga iva Schreb.	Bugle	chamaipitus	III, 158		×			×
Allium ampeloprasum L.	Wild leek	ampeloprason	II, 150	×				
Allium cepa L.	Onion	kromuon	II, 151	×				
Allium porrum L.	Leek	prason	II, 149	×				×
Allium sativum L.	Garlic	skordon	II, 152	×				
Aloe vulgaris Lam.	Mediterranean aloe	aloê	III, 22				×	
Althaea officinalis L.	Marshmallow	althaia	III, 22		×			×
Amomum cardamomum L.	Cardamon	amomon	I, 15					×
Amygdalus communis L.	Almond	amugdale	I, 123		×	×		×
Anchusa tinctorium L.	Bugloss	agchousa	IV, 23				×	×
Andropogon schoenanthus L.	Bluestem	schoinos	I, 17; IV, 52	×				×
Anethum graveolens L.	Common dill	anêthon	III, 58	×				
Apium graveolens L.	Wild celery	selinon kêrainon	III, 64	×				
Artemisia abrotanon L.	Southernwood	abrotonon	III, 24		×			
Artemisia absinthium L.	Wormwood	apsinthion	III, 23	×			×	
Artemisia spp.	Sagebrush	artemisia	III, 113			×		
Arum dracunculus L.	Stink dragon	drakontion	II, 166	×				
Asarum europaeum L.	Wild ginger	asaron	I, 10	×				
Asparagus acutifolius L. *A. officinalis* L.	Asparagus	asparagos	II, 125		×		×	
Asphodelus racemosus L. *A. albus* Willd.	Asphodel	asfodelos	II, 169	×				
Astragalus spp.	Locoweed	tragakantha	III, 20					×
Althamanta macedonica Jacq. *Apium petroselinum* L.		petroselinon	III, 66	×				×
Atractylis gummifera L.	Distaff thistle	chamaileôn leukos	III, 8	×	×			
Atriplex hortensis L. *Chenopodium* spp.		andrafaxus	II, 119					×
Boletus laricis Jacq.	Agaric	agarikon	III, 1		×			×
Brassica oleracea L.	Wild cabbage	krambê	II, 120	×				
Bryonia alba L.	White bryony	ampelos agria	IV, 181	×				
Bryonia celtica L.	Bryony	ampelos leukê	IV, 182	×				
Bryonia celtica L.	Bryony	ampelos melaina	IV, 183	×				
Bunium pumilum Sm.	Hawk nut	bounion	IV, 123	×				×
Cachrys libanotis L.	Cachrys	libanôtis	III, 74	×			×	
Cachrys morisonii Vahl.	Cachrys	ippomarathon	III, 71		×	×	×	
Capparis spinosa L.	Caper	kapparis	II, 173	×				
Carum carvi L.	Caraway	karô	III, 57	×				
Ceterach officinarum Willd.	Scale fern	asplênos	III, 134		×	×	×	
Chrysanthemum coronarium L.	Crown daisy	boufthalmon	III, 139				×	
Cicer arietinum L. *Pisum sativum* L.	Chickpea Garden pea	erebinthos	II, 104	×			×	×
Cinnamomum tamala *Pogostemon patchouli* Pell.	Nees Patchouli oil plant	malabathron	I, 12	×				
Cinnamomum cassia L. Bl.	Cassia bark tree	kassia	I, 13	×				×
Cinnamomum cassia L. Bl. *C. zeylanicum* Breyn.	Ceylon cinnamon	kinamômon	I, 14	×	×			×
Cistus spp.	Rockrose	kisthos	I, 97	×				
Cnicus ferox L.	Blessed thistle	akantha leuke	III, 12	×				
Commiphora africana Engl.	African myrrh tree	bdellion	I, 67	×		×		
Commiphora gileadensis L. Christ.	Myrrh tree	balsamon	I, 19	×	×			
Costus speciosus Lam. *C. arabicus* L.	Arabian costus	kostos	I, 16	×				
Cotyledon umbilicus DC	Navelwort	kotulêdôn	IV, 91	×		×		
Cressa cretica L.	Rosinweed	anthullis	III, 136		×			×
Crithmum maritimum L.	Samphire	krêthmon	II, 129		×		×	
Crocus sativus L.	Saffron crocus	krokos/krokomagma	I, 26–27	×				
Cucumis melo L.	Muskmelon	pepôn	II, 135	×				
Cucumis sativus L.	Cucumber	sikus êmeros	II, 135	×				×
Cupressus sempervirens L.	Italian cypress	kuparissos	I, 74		×			×
Cydonia vulgaris Mill.	Common quince	kudônia mêla	I, 115	×				
Cynodon dactylon Pers.	Bermuda grass	agrostis	IV, 29	×	×	×		×

Table 1 (continued)

Scientific name	English name	Greek name	Reference in *De Materia Medica*	Therapeutical purposes				
				diuretic	strangury	stones	jaundice	renal and bladder affections
Cyperus rotundus L. *C. longus* L.	Nut grass	kupeiros	I, 4	×		×		
Daucus gingidium L.	Wild carrot	giggidion	II, 137	×				
Daucus setulosus Guss.	Wild carrot	stafulinos agrios	III, 52	×	×			
Ecballium elaterium L.	Squirting cocumber	sikus agrios	IV, 150				×	
Echium rubrum Jacq.	Viper's bugloss	bakcharis	III, 44		×			
Elettaria cardamomum White & Maton	Cardamon	kardamômon	I, 6		×	×		×
Equisetuim fluviatile L.	Horsetail	ippouris	IV, 46	×				×
Ephedra fragilis Desf.	Joint fir							
Eruca sativa L.	Rocket salad	euzômon agrion	II, 140	×				
Eruca sativa L.	Rocket salad	euzômon	II, 140	×				
Eryngium spp.	Sea holly	êruggê	III, 21	×				
Ferula rubricaulis Boiss.		chalbanê	III, 83		×*			
F. galbaniflua Boiss & Buhse	Galbanum plant							
Ferula tingitana L.	Giant fennel	ammôniakon	III, 84	×*				
Ferula tingitana L. *Siler trilobum* Scop.		silfion	III, 80	×			×	×
Ficus carica L.	Fig	suka	I, 28	×				×
Genista spp *Spartium* spp	Woad-waxen Weaver's broom	aspalathos	I, 20		×			
Glaucium flavum Crantz	Yellow horn poppy	mêkôn keratitis	IV, 65					×
Helichrysum stoechas L. Moench	Everlasting	elichruson	IV, 57		×			×
Heracleum sphondilium L.	Hogweed, cow parsnip	sfondulion	III, 76				×	
Hordeum vulgare L.	Barley	krithê	II, 86	×				
Hyacinthus orientalis L.	Common hyacinth	uakinthos	IV, 62	×			×	
Hypericum crispum L. *H. barbatum* Jacq.	St. John's wort	uperikon	III, 154	×				
Hypericum cori L.	St. John's wort	koris	III, 157	×				
Hypericum hircinum L. *Origanum maru* L.	St. John's wort Origanum	tragion	IV, 49		×	×		
Inula candida Cass.	Inula	arktion	IV, 105		×			
Inula helenion L.	Elecampane	elenion	I, 28	×				
Inula viscosa L. Aiton	Inula	konuza	III, 121		×		×	
Iris foetidissima L.	Iris	xuris	IV, 22	×	×			
Iris germanica L. *I. florentina* L.	Iris	iris	I, 1					×
Juniperus excelsa L. *J. communis* L.	Juniper	kedros	I, 77		×			
Juniperus sabina L.	Savine juniper	brathus	I, 76	×				
Juniperus spp.	Juniper	archeuthos	I, 75	×				
Laurus nobilis L.	Grecian laurel	dafnê	I, 78			×		×
Leopoldia comosa L. Parl.	Tassel grape hyacinth	boblbos edôdimos	II, 70	×				
Levisticum officinale Koch *Laserpitium siler* L.	Lovage Laserwort	ligustikon	III, 51	×				
Lithospermum officinale L.	Gromwell	lithospermon	III, 141	×		×		
Lonicera spp.	Honeysuckle	periklumenon	IV, 14	×				
Malva sylvestris L.	High mallow	molochê	II, 118					×
Marrubium spp.	Hoarhound	prasion	III, 105				×	×
Matricaria chamomilla	Wild camomile	anthemis	III, 137	×		×		
Matricaria chamomilla L.	Wild camomile	parthenion	III, 138			×		
Medicago arborea L.	Tree alfalfa	kutisos	IV, 112	×				
Mentha aquatica L.	Water mint	sisumbrion	II, 128; III, 41	×	×	×		
Mentha aquatica L.	Water mint	skandix	II, 138	×				×
Mentha pulegium L.	Pennyroyal	glêchon oinos	V, 52	×				
Mentha tomentilla Link *M. gentilis* L. *Calamintha officinalis* Moench	Mint Calamint savory	kalaminthê	III, 35	×				
Mentha vulgaris L. *Prunella vulgaris* L.	Mint Self-heal	poluknêmon	III, 94		×			
Meum athamanthicum Jacq.	Baldmoney	daukos	III, 72	×				
Meum athamnticum Jacq.	Baldmoney	mêon	I, 3		×			×
Myrtus communis L.	True myrtle	mursinê	I, 112	×				×
Nigella arvensis L.	Fennelflower	kuminon agrion eteron	III, 61		×	×		×
Nigella sativa L.	Black cumin	melanthion	III, 79	×				

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Table 1 (continued)

Scientific name	English name	Greek name	Reference in *De Materia Medica*	Therapeutical purposes				
				diuretic	strangury	stones	jaundice	renal and bladder affections
Ocimum basilicum L.	Basil	ôkimon	II, 141	×	×			
Onobrychis caput-galli L.	Sainfoin	onobruchis	III, 153		×			
Ononis antiquorum L.	Restharrow	anônis	III, 18	×		×		
Opopanax chironium L. Koch	Opopanax	panakes êrakleion	III, 48		×			×
Origanum heracleoticum L.	Origanum	origanos	III, 27	×			×	
Origanum majorana L.	Sweet majoram	sampsuchon	III, 39	×	×			
Orobus sessifolius Sibth. & Sm.	Pea vine	astragalos	IV, 61	×				
Osyris alba L.	Gardrobe	osiris	IV, 140				×	
Paeonia officinalis L.	Peony	glukusidê	III, 140				×	×
Paliurus australis Gaertn.	Paliurus	paliouros	I, 92	×		×		
Pancratium maritimum L.	Pancratium	pagkration	II, 172	×				
Panicum miliaceum L.	Millet	kegchros	II, 97	×				
Parnassia palustris Spr.	Wild-world parnassia	agrostis en parnassô	IV, 31	×				
Pastinaca sativa L.	Garden parsnip	elafoboscon	III, 69	×				×
Peganum harmala L.	African rue	pêganon	III, 45	×				
Peucedanum officinale L.	Common hog's fennel	peukedanon	III, 78					×
Phalaris nodosa L.	Canary grass	falêris	III, 142					×
Phoenix dactylifera L.	Date palm	foinix	I, 109					×
Physalis alkekengi L.	Chinese lantern plant	struchnon alikakkabon	IV, 71	×				
Pimpinella anisum L.	Anise	anêsson	III, 56	×				
Pimpinella saxifraga L.	Saxifrage pimpinella	kaukalis	II, 139	×				
Pinus spp.	Pine	pitus	I, 69	×				
Pinus spp.	Pine	strobiloi coni di pino	I, 69	×				×
Piper nigrum L.	Black pepper	peperi	II, 159	×				
Pistacia lentiscus L.	Mastic tree	schinos	I, 70	×				
Pistacia terebinthus L.	Terebinth pistache	terminthos	I, 71	×				
Pistia striatiotes L.	Water lettuce	stratiotes	IV, 101					×
Plantago asiatica L. *P. lagopus* L.	Asiatic plantain	arnoglôsson	II, 126					×
Polemonium coeruleum L. *Hypericum olyimpicum* L.	Jacob's ladder Greek valerian	polemônion	IV, 8		×			
Polygonum aviculare L.	Prostrate knotweed	polugonon arren	IV, 4	×	×			
Populus alba L.	White poplar	leukê	I, 81		×			
Portulaca oleracea L.	Purslane	andrachnê	II, 124					×
Potentilla reptans L.	Creeping cinquefoil	pentefullon	IV, 42					×
Prunus avium L. *P. cerasus* L.	Mazard cherry Sour cherry	kerasia	I, 113			×		
Prunus insititia L.	Bullace plum	kokkumêleas kommi	I, 121			×		
Psoralea bituminosa L.	Scurfy pea	trifullon	III, 109	×	×			
Quercus spp.	Oak	druos balanoi	I, 106	×				
Raphanus spp.	Radish	rafanis agria	II, 112	×				
Raphanus spp.	Radish	rafanis	II, 112	×				
Rheum rhaponticum L.	Garden rhubarb	ra	III, 2		×			
Rosmarinus officinalis L.	Rosemary	libanôtis/rosmarinon	III, 75				×	
Rubia tinctoria L. *R. lucida* L.	Madder	eruthrodanon	III, 143	×			×	
Rumex sp	Dock	lapathon	II, 114			×	×	
Ruscus aculeatus L.	Butcher's broom	mursinê agria	IV, 144	×	×	×	×	
Ruscus hypophyllum L.	Butcher's broom	dafnê alexandreia	V, 36	×				
Ruscus racemous L.	Butcher's broom	chamaidafnê	III, 147	×				
Salvia officinalis L.	Garden sage	elelisfakon	III, 33	×				
Sambucus nigra L.	European elder	aktê	IV, 173	×				
Saponaria officinalis L.	Bouncing bet	strouthion	II, 163	×		×	×	
Satureja capitata L.	Savory	thumos	III, 36	×				
Serapias lingua L.		logchitis	III, 144	×				
Seseli libanotis L. *Seseli annuum* L.	Mountain meadow seseli Seseli	oreoselinon	III, 65	×				
Sison amomum L.	Honewort	sinôn	III, 55	×				
Sisymbrium polyceratum L. *S. irio* L.	London rocket	erusimon	II, 158	×				
Sium latifolium L.	Water parsnip	sion	II, 127	×		×		
Sium sisarum L. *Pastinaca sativa* L.		sisaron	II, 113	×				
Smyrnium olusatrum L.	Alexanders	ipposelinon	III, 67		×			
Smyrnium perfoliatum L.	Alexanders	smurnion	III, 68	×	×	×		×
Solanum dulcamara L.	Bitter nightshade	struchnon upnôtikon	IV, 72	×				
Spiraea filipendula L.	Dropwort	oinanthê	V, 4	×				

Table 1 (continued)

Scientific name	English name	Greek name	Reference in *De Materia Medica*	Therapeutical purposes				
				diuretic	strangury	stones	jaundice	renal and bladder affections
Stachys alopecorus L. *Sideritis syriaca* L.	Betony Iron woundwort	kestron	IV, I	×			×	×
Stachys glutinosa L. *Thymus graveolens* Sibth.	Woundwort Thyme	tragoriganos	III, 30	×				
Statice limonium L. *S. sinuata* L.	Sea lavender	tripolion	IV, 132	×				
Teucrium lucidum L. *T. chamaedrys* L.	Germander	chamairôps	III, 98	×	×			
Teucrium polion L. *T. capitatum* L.	Germander	polion	III, 110		×		×	
Teucrium scordion L.	Water germander	skordion	III, 111	×	×			
Thumus serpyllum L. *T. glabratus* Link	Thyme	erpullos	III, 38	×				
Tordilium officinale L.	Hartwort	tordilon	III, 54		×			
Tribulus terrestris L.	Puncture vine	tribolos	IV, 15			×		
Trinia dioica Gaud. *Pimpinella dioica* Spr.	Trinia Pimpinella	pseudobunion	IV, 124		×			
Urtica pilulifera L. *U. urens* L.	Stinging nettle	akalefe	IV, 93	×				
Valeriana celtica L.	Valerian	nardos keltikê	I, 8	×				×
Valeriana dioscoridis Sibth. & Sm.	Cretan spikenard	fou	I, 11	×				
Valeriana jatamansi James	Valerian	nardos	I, 7	×			×	×
Verbena officinalis L.	European verbena	iera botanê	IV, 60				×	
Vicia ervilia L.	Bitter vetch	orobos	II, 108	×	×			
Vigna sp.	Cowpea	smilax kêraia	II, 146	×				
Vitex agnus-castus L.	Lilac chaste tree	agnos	I, 103	×				
Vitis vinifera L.	Grape	ampelos oinoforos	V, I			×		
Vitis vinifera L.	Grape	stafulê	V, 3					×

The theoretical system underlying the indications of the plants listed in the table [11, 12] can be reconstructed on the basis of explicit as well as implicit affirmations by Dioscorides. The explicit information is constituted by the vocabulary used to specify the properties of the 'materia medica' or the indications of the medicines. This is the case for words such as 'diourêtikos' (diuretic), 'kustis' (bladder), 'nefros' (kidneys) and so on. The implicit data are constituted by reasoning like that which links, surprisingly enough at first glance, jaundice with the renal system, for the treatment of this pathology is explicitly correlated by Dioscorides with the diuretic property of one 'materia medica'; in the chapter dealing with rocket salad (III, 143: 'eruthrodanon' = *Eruca sativa* L.), he states: 'it is diuretic, hence it cures the jaundice'. This principle is repeated in the presentation of the Chinese lantern plant (IV, 71: 'struchnon alikakkabon' = *Physalis alkekengi* L.): 'it eliminates the jaundice, being diuretic'. Consequently, we have to include in our analysis items like 'iktêr' and 'ikterikos' (jaundice). Similarly, the treatment of spasms and hysteric suffocations are linked with the diuretic action of drugs, as can be seen from the presentation of the juniper (I, 75: 'arkeuthos' = *Juniperus* spp.): 'it is diuretic, hence it cures the spasms, the colics and the hysteric suffocations'. As a consequence, it would be necessary to take these indications into account. We will not do so, however, because the discourse of antique medicine dealing with spasm and hysteric suffocation constitutes a special field which should be studied in itself due to its peculiarities [13, 14].

Having delimited our field in this way, we can now specify the kind of data gathered, with some quantitative information, i.e. the numerical importance of the therapeutic actions presented by Dioscorides (in decreasing order of importance):

(1) action on the urinary tract (208 occurrences)
  (a) diuretic action (general, 115 occurrences)
  (b) diuretic action + action against difficulty urinating (35 occurrences)
  (c) diuretic action + action against obstruction of urine (17 occurrences)
  (d) various pathologies of the bladder (31 occurrences)
  (e) toxic action on the bladder (10 occurrences)
(2) action on jaundice (38 occurrences)
(3) action on the kidneys (35 occurrences)
  (a) action on the pathologies of the kidneys (30 occurrences)
  (b) toxic action on the kidneys (5 occurrences)
(4) action on stones (30 occurrences)
(5) action on dropsy (30 occurrences)
(6) aphrodisiac action linked with the diuretic property (1 occurrence)
(7) action on seminal loss (1 occurrence).

The system underlying these affirmations can hypothetically be reconstructed, at least in part. In one case, the diuretic action is explicitly linked with the *bitterness* of a drug (IV, 144: 'mursinê agria' = *Ruscus aculeatus* L.). In another, regarding the action of a drug on dropsy, it is specified that it 'does not bite the stomach' (IV, 150: 'sikus agrios' = *Ecballium elaterium* L.). This suggests, on the one hand, that the diuretic property results from an irritant action exerted by the bitter therapeutic substances on the physiological tissue of the internal organs of the body and, on the other, that this action needs to remain within certain limits, without biting. This concept is confirmed a contrario by the substances which have a negative action on the urinary tract: they are, indeed, those which are naturally bitter and possess a degree of bitterness too high to be administered as therapeutic agents (II, 149: 'prason' = *Allium porrum* L.; and III, 87: 'zuthos' = a fermented beverage, probably similar to our beer).

In 17 occurrences, the diuretic action is considered to be a 'dunamis', i.e. property (I, 4; I, 7; I, 10; I, 11; I, 14; I, 16; I, 17; I, 26; I, 27; II, 159; III, 33; III, 56; III, 65; III, 111; III, 154; IV, 58; IV, 144). This is reminiscent of an Aristotelian notion, which had been transferred from the philosophical to the pharmacological field by the physician of the 4th century BC, Diokles of Karistos [15]. The diuretic action is thus considered as a potentiality, which is present in the drug, but does not become a reality until it is introduced into the physiological system.

Moreover, the diuretic property is often associated with a *heating property* (52 occurrences: I, 1; I, 2; I, 4; I, 7; I, 10; I, 11; I, 13; I, 14; I, 15; I, 16; I, 17; I, 19; I, 20; I, 27; I, 71; I, 75; I, 78; I, 103; I, 128; II, 112; II, 128; II, 150; II, 152; II, 159; II, 166; II, 169; II, 170; III, 1; III, 18; III, 21; III, 23; III, 27; III, 30; III, 38; III, 41; III, 45; III, 48; III, 51; III, 55; III, 57; III, 62; III, 67; III, 68; III, 72; III, 75; III, 80; III, 83; III, 84; III, 111; III, 113; III, 137; IV, 123). This is probably due to the fact that the diuretic action is conceived as a real drying of the body: moisture is dried by heat; consequently, the diuresis is not an action in itself, but the result of another one. This is Aristotelian too: in the *Problems* of the School, we find, indeed, the principle for which the diuretic substances are the heating ones [16]. From an epistemological point of view, it must be pointed out that such a concept is typical of archaic thought: it results from a metaphor, a visual image, which subsequently received the epistemic status of a scientific explanation [17, 18].

The same action (i.e. the elimination of moisture) is also attributed to the astringency of the drugs (22 occurrences: I, 69; I, 70; I, 74; I, 97; I, 102; I, 106; I, 109; I, 112; I, 115; II, 124; II, 126; II, 135; II, 149; III, 1; III, 22; III, 23; IV, 4; IV, 15; IV, 23; IV, 46; IV, 62; V, 4). In this case, the physiological mechanism is different: the moisture is forced out of the tissues by the constriction exerted by the drug.

This variety of causes for a unique action is not surprising: it is typical of archaic thought, which allows for difference in unity, without a clear frontier between the notions (even if opposite), but conceives superpositions (total or partial) of concepts and the identity in the difference, with a highly fluid thinking [19].

Concerning jaundice, the verb used in eight cases to signify the action of the drugs on it is remarkable: 'apokathairein', i.e. 'to wash away' (III, 22; III, 35; III, 71; III, 105; III, 137; IV, 62; IV, 71; IV, 125). It results probably from the theoretical explanation given to the pathology: just as it can be washed away, it appears by changing the usual (i.e. the physiological) color of the body. This sort of visual explanation justifies perhaps the link between jaundice and diuresis: the latter might have been conceived, indeed, as a cleaning agent.

Finally, it must be stressed that there is a certain system of measurement of the properties involved in this field: in 11 cases, Dioscorides affirms, indeed, that a 'materia medica' has a degree of action higher than others (I, 8; I, 12; II, 104; II, 120; II, 135; II, 140; II, 150; II, 151; III, 64; IV, 22; IV, 31). This reveals the presence of a system of measurement, which is not absolute however, with a scale of degrees as will be the case with Galen, but it is relative, with comparisons between the 'materia medica' themselves.

Although it does not appear explicitly, we can trace, however, the presence of a medical theory underlying the uses of the plants prescribed for the treatment of the pathologies affecting the urogenital tract. its main feature is its link with the archaic mode of thinking. The fact is not so surprising as it might seem: on one side, the therapeutic agents were deeply rooted in a traditional practice, which associated the substances with an important body of data of any type; on the other side, Dioscorides did not aim to submit the traditional practice to a critical analysis, but to gather the data in the field.

On the question of the common source of Dioscorides and Pliny, a careful comparison of the medicines reported by both authors for renal affections does not support the thesis of a close relationship between the *De materia medica* and the *Naturalis Historia*. In fact, roughly 50% of the plants reported by Dioscorides are not cited by Pliny. Many of these plants are extra-European specimens like *Commiphora gileadensis* (L.) Christ., which occurs wild in Arabia and East Africa, *Elettaria cardamomum* (Roxb.) Mat., which comes from southern India, and *Cinnamomum zeylanicum* Ness and *C. cassia* (L.) Blume, that are indigenous to Sri Lanka and Far East Asia, respectively. It can be hypothesized that such plants were less known in the Roman world, even if they gave rise to important commercial activity [20].

This oriental origin provides the clue to the system we have tried to reconstruct here: it explains, indeed, the paradigm of dryness we have identified. The Orient was the mythic land of the sun, at the end of the world. The oriental plants were warm, because they shared the qualities of the physical milieu in which they grew, in a material perspective. This reveals the exact nature of the system we have traced, which is a sort of metaphor, a translation into visual images of a real activity, difficult, if not impossible, to conceive in other words.

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