



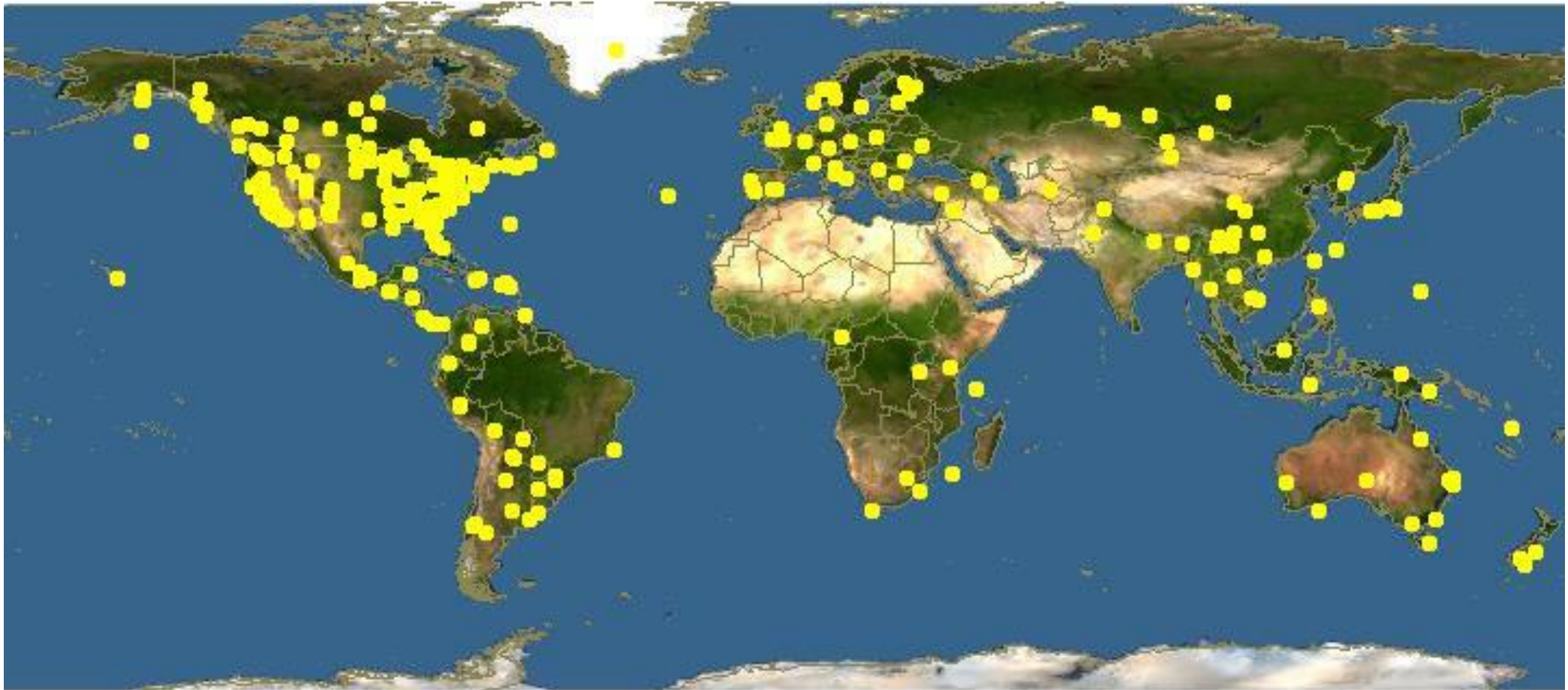
Sambucus: A Global Medicine of Substance and Magic

Bevin Clare

References
provided



Sambucus around the globe



“Hmm...this looks interesting...”





La. cccc vi.

Sambucus. p̄a decta. cap. eccle. xij.
 Sciendum q̄ actis est sambucus
 kameactis d̄r ebulus ⁊ sunt pl̄ate
 omnibus note. Unde versus. Sambucus
 est actis sed ebulus est kameactis. **Sera:**
 li. 9. g. re. co. kameacti kameacti due sunt
 species quaz̄ vna grece d̄r actis. in latino
 sambucus. et secunda nominat̄ in greco
 kameactis ⁊ eius est intentior et en̄ actis
 ⁊ in latino d̄r ebulus. de qua lege capitulu
 lum. clxx. sup̄ de e. **Plinius.** Sambuci
 due sunt species. earum vna assimilat̄ ar
 boribus h̄ntibus ramos siles c̄anis rotū
 dis. quoz̄ color est ad albedinē ⁊ sunt lon
 ga. ⁊ sunt in eis quatuor folia aut quinq̄
 porrecta super ramos quoslibet ⁊ similia
 folijs nucis minora tamen eis h̄ntia gra
 nem odorem. ⁊ in summitatibus ramoz̄
 sunt flores albi. ⁊ grana similia granis vi
 ridibus vel l̄nci. quoz̄ color declinat ad
 purpureitatem cū nigredine. ⁊ sunt velut
 in racemis. ⁊ h̄nt multā h̄ūditatem habē

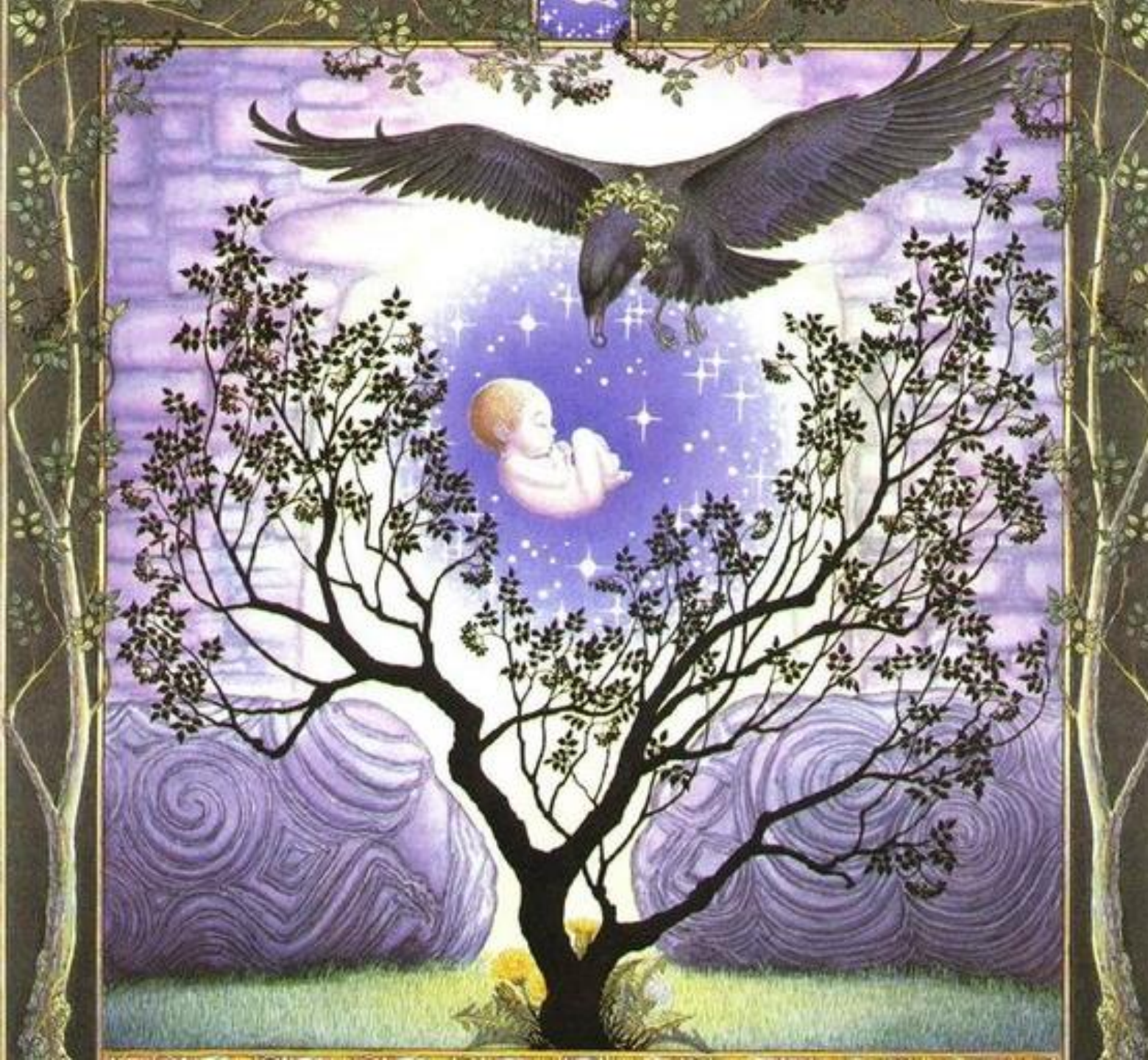
tem odorem lini. ⁊ ista d̄r actis. **Alia** v̄o
 species q̄ d̄r kameactis est minor prima
 habet ramos magis prin̄tes herbe qua
 dratos in quibus sunt multi nodi. ⁊ folia
 inuicem distātia ⁊ singulis nodis similia
 folijs amigdalis in summitatibus suis.
 nisi quia habent venas. ⁊ sunt l̄giora eis
 h̄ntia gravem odorem. ⁊ in summitatibus
 ramoz̄ sunt capitella similia coronis sup̄
 dicte speciei. ⁊ semen ⁊ flos similiter. ⁊ h̄z
 ramos longos grossitudinē digiti habē
 res. **Psidorus** li. etimologiaz̄. **Sambucus**
 est arbor mollis ⁊ pama.

Operationes.

A **Pli.** li. xvj. Sambuci habent acinos
 nigros. ⁊ paruos humoris lenti. **Inficien**
 do maxime capillo. qui et ipsi in aq̄ deco
 cti mandunt. **S** **Idem** li. xv. **Arbor**
 quorundam fructus pediculis depēdent
 vt piri. **Alia** v̄o racemis vt edere atz̄ sam
 buci. **L** **Idem** in li. xvj. **Sambucus**
 germinat inter primas. ⁊ nudat̄ inter no
 vissimas. ⁊ ex his que hieme aq̄la ex orien
 te concipiūt ordine nature florent prime
 siluestriū sambucus. cui medulla est pluri
 ma ⁊ coruus cui nulla **Sambucus** ē arbor
 diuidua nec ramosa l̄tissima. et ideo sc̄a
 tis faciendis aprissima. cuius nimir̄ pla
 ga se prius cōtrahit. suūq̄ vulnus clau
 dit. ⁊ ob id contumacius ferz̄ transmittit
Sambuci atz̄ rabi. generis sunt fungosi
 aliter tamen q̄ ferule. q̄pe plus ligni atz̄
 succi est v̄tq̄ sambuco ex q̄ magis cano
 ram buccinam. tubāq̄ credit pastor. **Ibi**
 ecclē. vbi gallorum cantum non exaudiat
 frutex ille. **S** **Idem** li. xvij. **Inuentū**
 est surdos abscessos ferere. quod sepius cau
 sa factum est **Sambucus** ⁊ coroneo rubilq̄
 depactis. ad palum vinearū firmissima
 est sambucus. taleisq̄ scribitur vt populus.
L **Antenna.** **Sambucus** alba calidi
 or est q̄ citrina ⁊ q̄ purpurea. **Et** est vni
 uersaliter in tercio calida ⁊ sicca. **Est** autē
 subtilissima humiditatum **Senibusq̄** cō
 fert eius oleum. **Pelet** autem pannum et
 facit rubeidinem eius odoramentum.

“I think this plant is
 medicine...”

*“Ah!
This plant is magic”*



Species and Groups of *Sambucus*

Black-berried elder: larger shrubs, occasionally small trees up to 15 m tall

- *Sambucus australis* (southern elder; South America)
- *Sambucus canadensis* (eastern North America)
- *Sambucus cerulea* (western North America; dark blue-black berries with glaucous bloom on surface, giving them a sky-blue appearance)
- *Sambucus javanica* (Chinese elder; southeastern Asia)
- *Sambucus nigra* (elder or black elder; Europe and western Asia; with black berries)
- *Sambucus lanceolata* (Madeira Island)
- *Sambucus mexicana* (Mexican elder)
- *Sambucus palmensis* (Canary Islands)
- *Sambucus peruviana* (South America)

Red-berried elder *Sambucus racemose*: smaller shrubs

- *Sambucus chinensis* (eastern Asia, in mountains)
- *Sambucus latipinna* (Korea, southeast Siberia)
- *Sambucus microbotrys* (southwest North America)
- *Sambucus sieboldiana* (Japan and Korea)
- *Sambucus tigranii* (southwest Asia, in mountains)

Australian elder: flowers are in rounded panicles, and the berries white or yellow; shrubs growing to 3 m high.

- *Sambucus australasica* (yellow elder; New Guinea, eastern Australia)
- *Sambucus gaudichaudiana* (Australian elder or white elder; shady areas of south eastern Australia)

Dwarf elders: herbaceous plants dense cluster of glossy berries.

- *Sambucus adnata* (Himalaya and eastern Asia; berries red)
- *Sambucus ebulus* (central and southern Europe, northwest Africa and southwest Asia; berries black)



Taxonomy

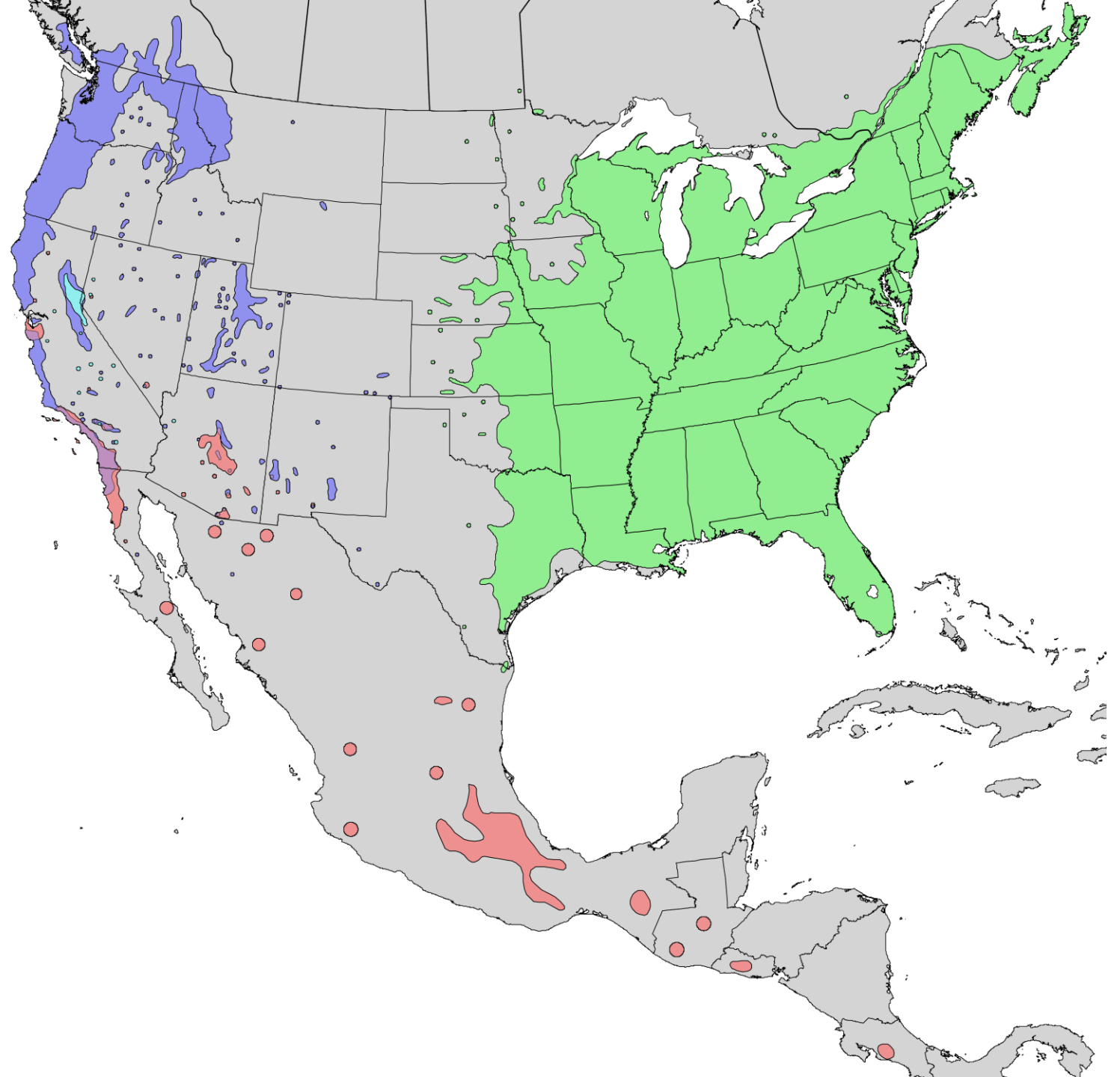
- *S. nigra* subsp. *Canadensis* has anthocyanins not found in other subspecies.
- Modern revision reduced the number of recognized species worldwide from over 30 to nine.
- *S. canadensis*, *S. cerulea*, *S. peruviana*, and the endemic island taxa *S. maderensis* and *S. palmensis*, were placed within *S. nigra* as subspecies.
- The preferred family assignment for *Sambucus* is *Adoxaceae*.

Bolli, 1994 and Applequist, 2017



Sambucus nigra and subspecies

Elbert L. Little, Jr., of the U.S. Department of Agriculture, Forest Service





Sambucus nigra ssp. *cerulea*

- The taxonomy of this species is not finalized, and it is classified by several different botanical names besides *Sambucus cerulea*. Both the current USDA database and The Jepson Manual of California flora (2013) classify the plant as *Sambucus nigra* ssp. *Cerulea*.
- The Sunset Western Garden Book identifies the plant as *Sambucus mexicana*, and note use of *Sambucus caerulea* also.
- The botanist Victor King Chesnut (1867-1938) had classified it as *Sambucus glauca* in 1902, when studying the plants used by the Indigenous peoples of California in Mendocino County.

N. America Ojibwe tribe

- "papaskatcîksi'-gana'tîg" [popgun wood]
- According to the Pillager Ojibwe, this bark is an emetic or a purgative, depending upon how it is prepared for use.
- Four internodes of the stalk are taken, because four is their magic number.
- The inner bark is secured by peeling downward.
- If these same four sticks had been peeled upwards and the resulting tea drunk, then it would have acted as a powerful emetic.

Smith, 1932



The ELDER FLOWER Fairu



South America

- In Northern Peru *Sambucus nigra* aka Cinta de novia is used as a charm.
- Tie a picture on the stems and wrap it
- Pray and spray with fragrance

(Bussmann, Glenn, & Sharon, 2010)

Central American, Chiapas

- With a broken bone:
- *Bathing it in the temazcal, sweeping it with the leaves of ihljiteh , elder and may , he places them hot in the affected part, puts the bone in place and splints the leg with pine board and leaves.*



European Traditions

- Russians believe that Elder-trees drive away evil spirits.
- Bohemians go to it, with a spell, to take away fever.
- Sicilians think that sticks of its wood will kill serpents and drive away robbers better than any other.
- Serbs introduce a stick of Elder into their wedding ceremonies to bring good luck.
- England a twig of it tied into three or four knots, and carried in the pocket, was a charm against rheumatism.



Biblical Mention

*Judas he japed with Jewen silver,
And sithen on an eller hanged hym after.
He is lettere of love and lieth hem alle:
That trusten on his tresour bitrayed arn
sonnest.*

- Langland, 1330



The Tree of Judas. From Maundevile's Travels.



An elder cross?

THE ANATOMIE of the Elder
by Dr. Martin Blochwich

1677

*“It hath a wonderfull force in
purging out of the body all
hurtfull, bilous, pituitous, and
especially serous humors”*

Anatomia Sambuci:
OR, THE
ANATOMIE
OF THE
ELDER.

Cutting out of it,
Plain, Approved, and
Specifick Remedies for most
and chiefest Maladies;

Confirmed and cleared
By Reason, Experience, and History.

Collected in Latine,
By Dr. MARTIN BLOCHWICH,
Physician Ordinary of Oshatin.

Translated for the benefit of all, and
Recommended by the *Royal Society.*

Nullum nomen abest, si sit prudentia.

LONDON,
Printed for Tho. Sawbridge, and to be sold
by H. Brome at the Gun at the West
End of St. Pauls, 1670.

Of the Medicines made of the Flowers of the Elder.

CONSERVES.

- Take the fresh flowers, pull them in little pieces, and to each ounce of them add two ounces of the whitest Sugar, incorporate them well together in a Marble Morter with a wooden pestle.
- Expose it afterward in a Glass, or earthen Vessel to the Sun for some dayes; it being thus prepared, reserve it for your use.

Of The Vinegar and Oximel.

- Pour upon the fresh, or half withered flowers of the Elder, the Vinegar of white Wine;
- let them stand in a close stopped glass Vessel in the Sun, or some other hot place; that the Vinegar more exactly may draw out the vertue of the flowers, let the flowers remain in the Vinegar, till it have drawn out fully all the vertue from them, which you may easily know by its fragrant smell, and golden colour.
- After strain the Vinegar, and reserve it for your use.

Of the Medicines of the Buds or Breakings of the Elder.

The POWDER.

- Take as much as you will of the buds, or first breakings forth of the leaf of the Elder; being dryed in the shadow, pulverise them: either keep this Powder by it self, or mix it with equal parts of Sugar.
- For Catarrah
- The simple Powder of the buds of the Elder, taking a scruple thereof in a soft egg for 14 daies each morning, and fasting two hours at least after it, doth mightily consume the Catarrhous matter.

Blochwich, 1677

- If the belly be bound, dissolve of the Syrup or juice of the berries, and also of the infusion of the flowers of the Elder, *ounc.* 3, or 4. in the water of the flowers, and give it when the Patient is dry like a Julip; for it will not only open the belly, but sweetly quiet the spirits.
- That the stalks and leaves of the hearbs, being boyled, doth purge phlegm, they be macerated a little in hot water, and prepared with oyl and vinegar, and be eaten sparingly before supper, in place of a sallet; for they gently loose the belly



Image from:
Juliana Anicia Codex a copy
of Dioscurides text, 515 AD



Blochwich, 1677

- The tender and recent leaves, with polent or barley meal, applied to inflammations, doth mitigate them, by dissolving and digesting, as was taught before by *Dioscorides*.
- To stay the Hemorrhoides in a night a singular Cataplasme is made of Elder-leaves boiled in water, to the consistency of a Poultice, and mixed with Oyl-olive spread on a scarlet cloath, and apply it warm to the Hemorrhoides.

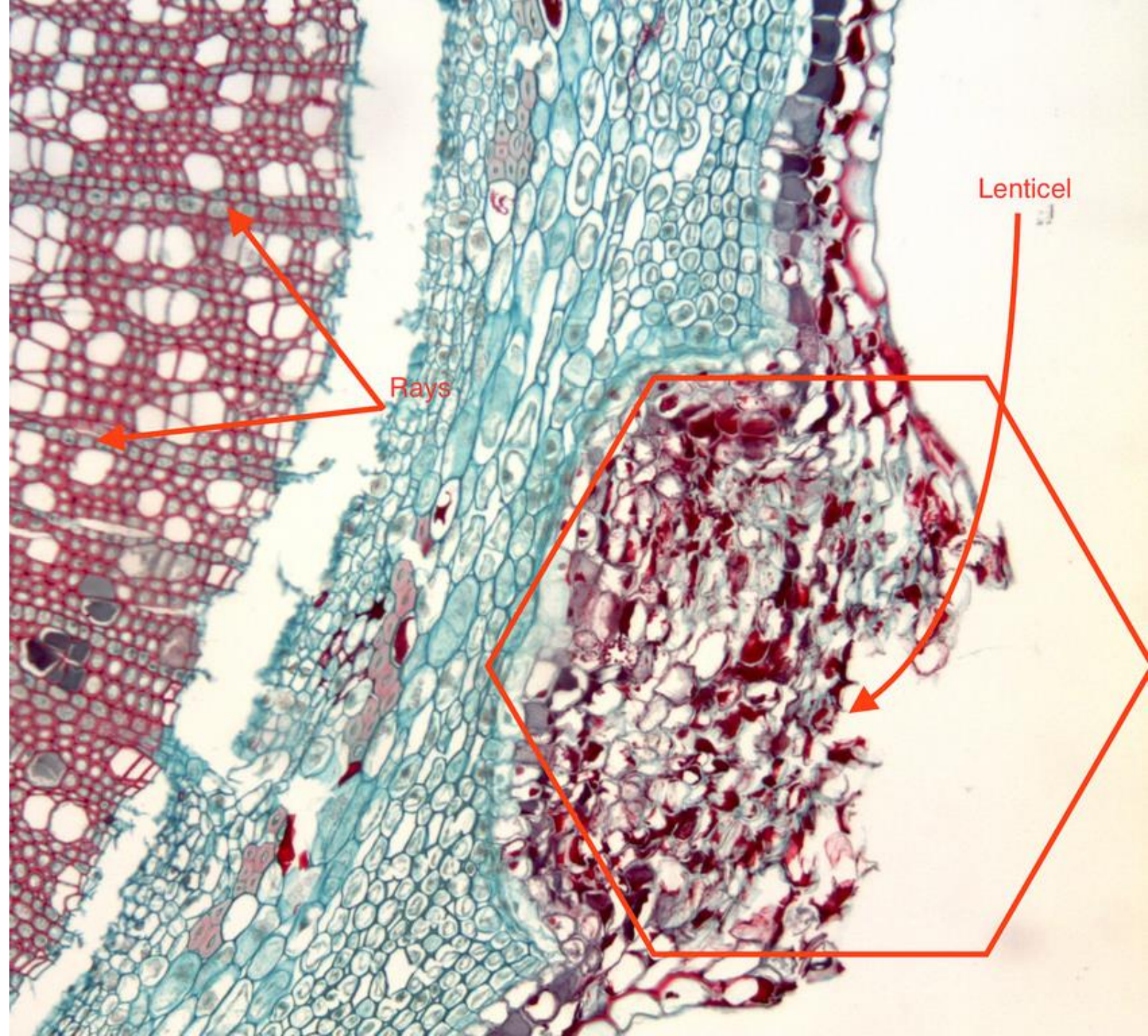
6. Thee-Hollunder
(*Sambucus nigra*).

A close-up photograph of clusters of small, dark purple berries on bright red stems. The berries are round and have a slightly glossy texture. The background is a soft, out-of-focus light grey.

Other Preparations

- Teas, tinctures, extracts, vinegars, capsules
- Fresh or dried flowers mixed with cold water for 24 hours, and then lemon juice is added (Albania) (Mustafa, 2015)
- Fruits, blue dye, textile coloring (Mustafa, 2015)
- Syrups used as medicine, cocktails, flavouring, colouring
- Flowers used in syrups, fritters, toilet waters, wines

Contemporary Research





Elder preserving ecosystems and reducing mosquito-borne infections

- “Exotic invasive plants alter the structure and function of native ecosystems and may influence the distribution and abundance of arthropod disease vectors by modifying habitat quality” (Gardner, 2015).
- Compare three native leaf species (including *Sambucus Canadensis*) to three exotic invasive leaf species.
- How do they alter *Culex pipiens* oviposition site selection, emergence rates, development time, and adult body size?

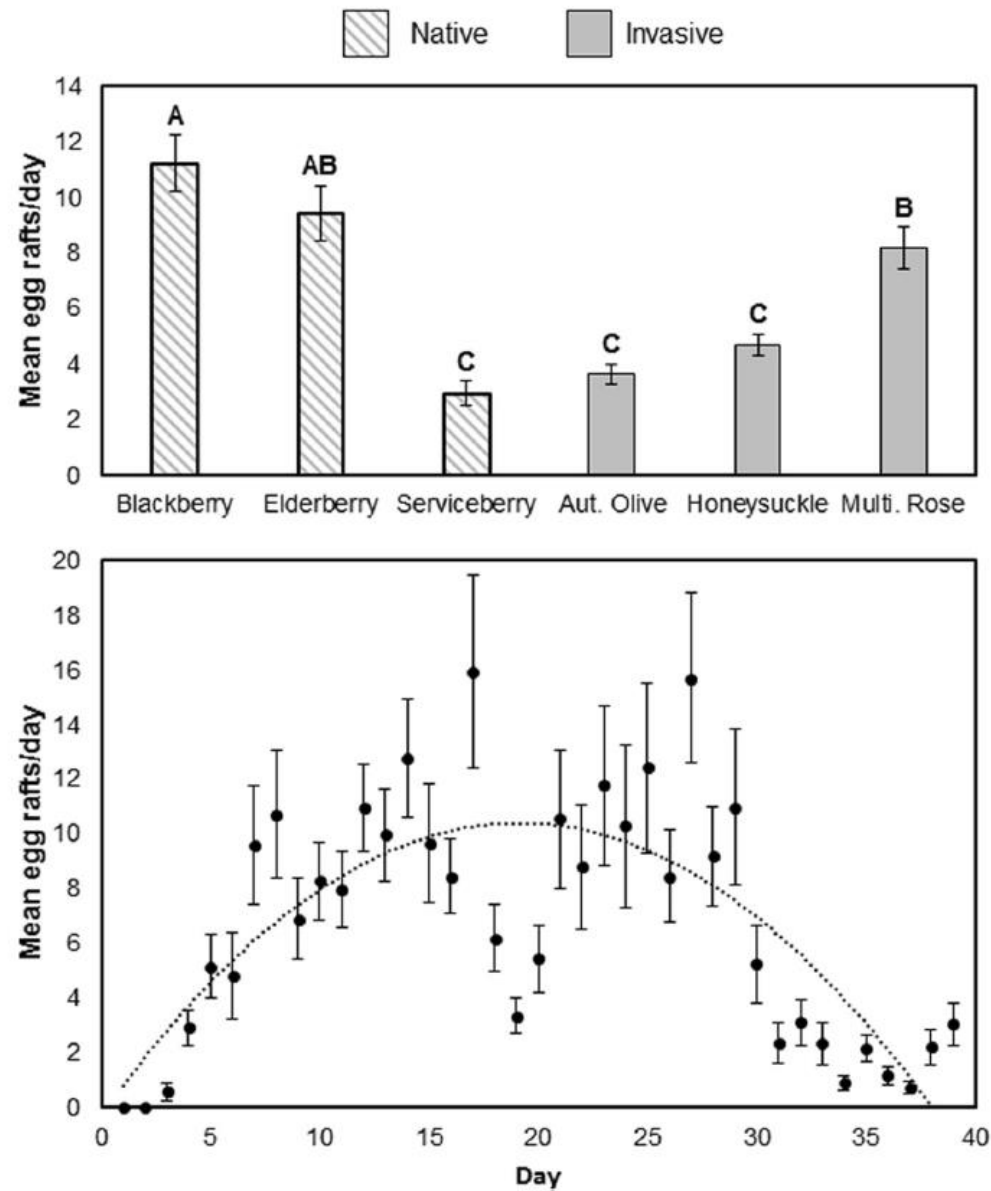


Fig. 1 Mean (± 1 standard error) for *Culex pipiens* egg rafts collected in oviposition traps per day from June 24 to August 5, 2013 (6 weeks) by leaf detritus treatment. Letters indicate significant pairwise differences at $\alpha = 0.05$

Changing the health of invasive populations

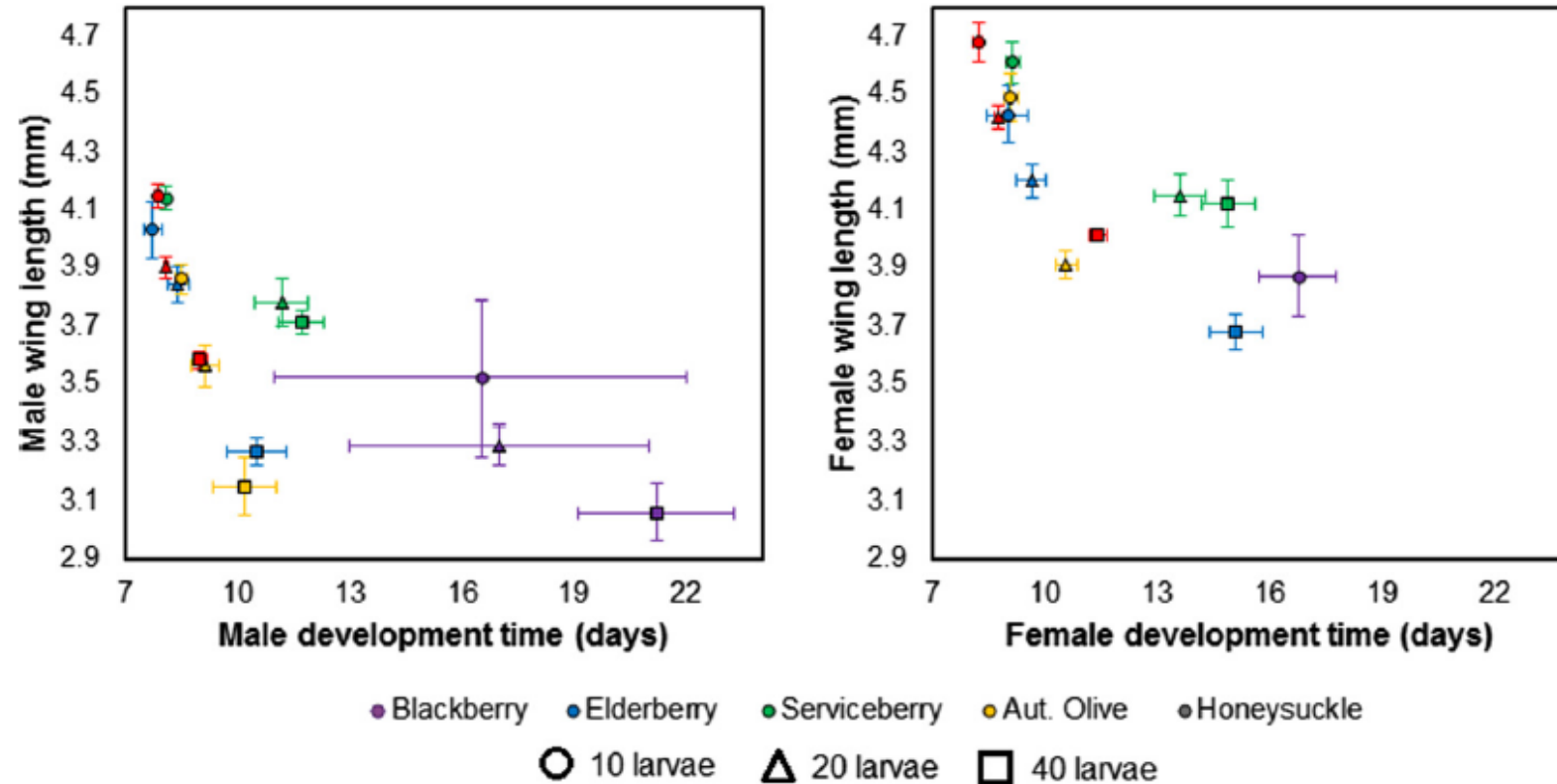


Fig. 3 Mean (± 1 standard error) for *Culex pipiens* female and male time to eclosion and wing length across intraspecific competition by leaf detritus treatments. The following treatments were excluded because no females survived to eclosion: all multiflora rose treatments; blackberry: 20 larvae and 40 larvae; autumn olive: 40 larvae

Bacterial Diversity and *Sambucus Canadensis*

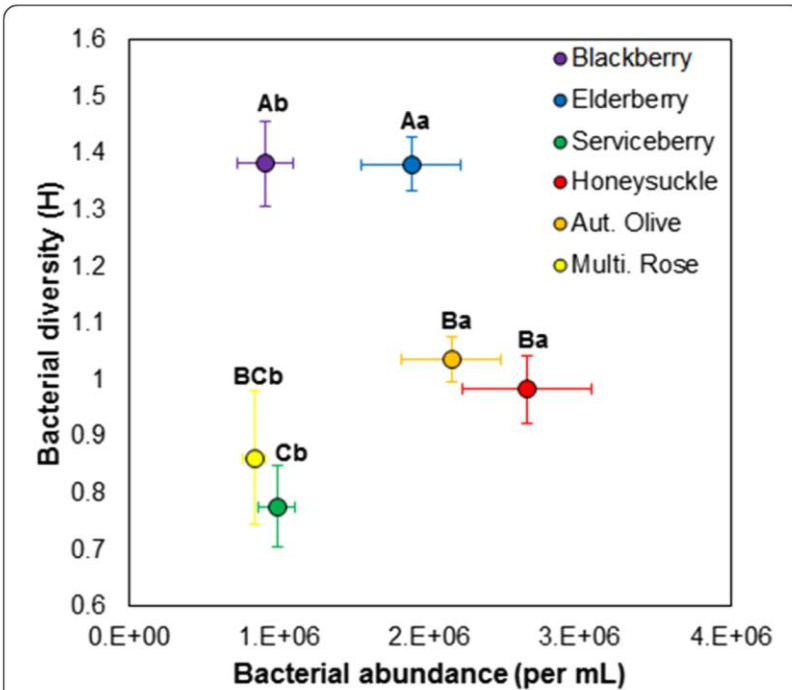


Fig. 4 Mean (± 1 standard error) for cumulative abundance and Shannon's diversity index (H) of bacteria by leaf detritus treatment. Upper case letters indicate significant pairwise differences at $\alpha = 0.05$ for bacterial diversity; lower case letters indicate significant pairwise differences for bacterial abundance

- “Displacement of native understory plant species by certain invasive shrubs may increase production of *Culex pipiens* with potential negative repercussions for human and wildlife health.”

Can native *Sambucus* defend itself from aggressive non-natives?

- Allelopathy is defined as a process of plant-plant or plant-microorganism chemical interaction with either positive or negative effects.
- Non-native plants are often not susceptible.
- (Christina, 2015)



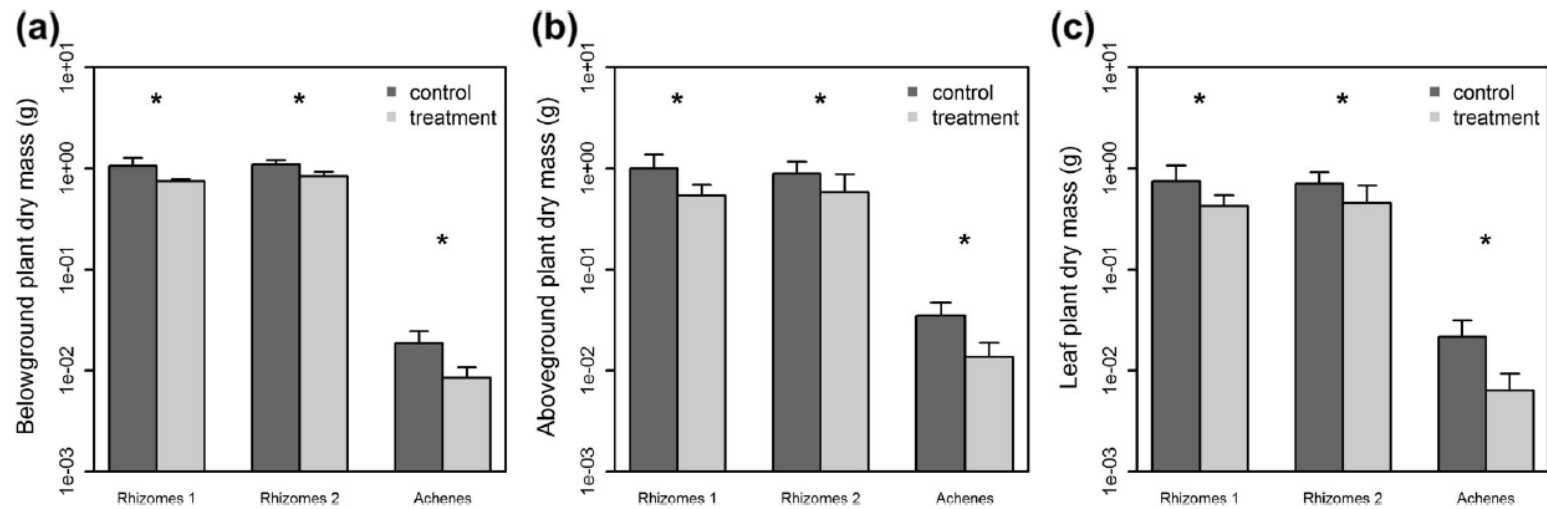


Fig. 4 Final dry masses of the plants grown from three types of propagule watered using leachates from *S. ebulus* pots (*treatment*) or compost pots (*control*), on day 50. Total below-ground plant dry mass (a), total above-ground plant dry mass (b) and plant leaf dry mass only (c) are represented. Bars represent standard deviations ($n=4$ and 5 for

rhizomes 1, $n=5$ and 5 for rhizomes 2 and $n=5$ and 5 for achenes, for treatment and control, respectively, for all types of dry mass). Significant treatment effect after variance analysis (Tables 1 and 2) is shown with symbol (*asterisk*)

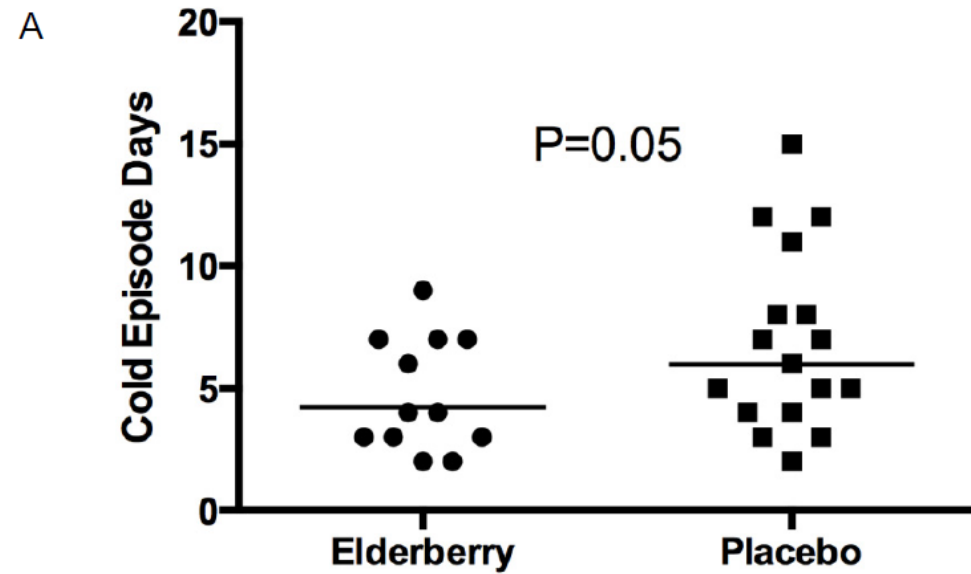
- Allelopathic treatment to achenes resulted in a greater decrease in the height, number of leaves or below-ground dry weight of end plants than to rhizomes.
- Independent of co-evolution inhibition of non-native growth was observed.

Elderberry Supplementation Reduces Cold Duration and Symptoms in Air-Travellers: A Randomized, Double-Blind Placebo-Controlled Clinical Trial

Tiralongo, Wee and Lea, 2016

- Randomized, double-blind placebo-controlled clinical trial of 312 economy class passengers travelling from Australia to an overseas destination.
- 300mg of a standardised elderberry (*Sambucus nigra* L.) extract.
- Effects on physical, especially respiratory, and mental health.
- Cold episodes, cold duration and symptoms as well as upper respiratory health were measured just before travel and at 4-days after travel.





Cold episode days and symptom scores

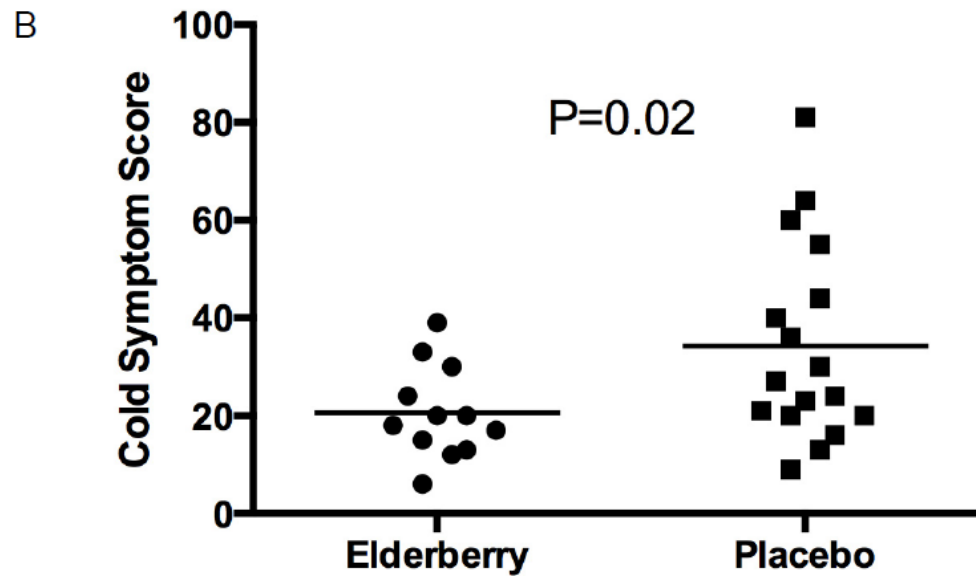


figure 3. Cold episode days (A) and cold symptom score (B) of participants with a well-defined cold established from the Jackson Score.

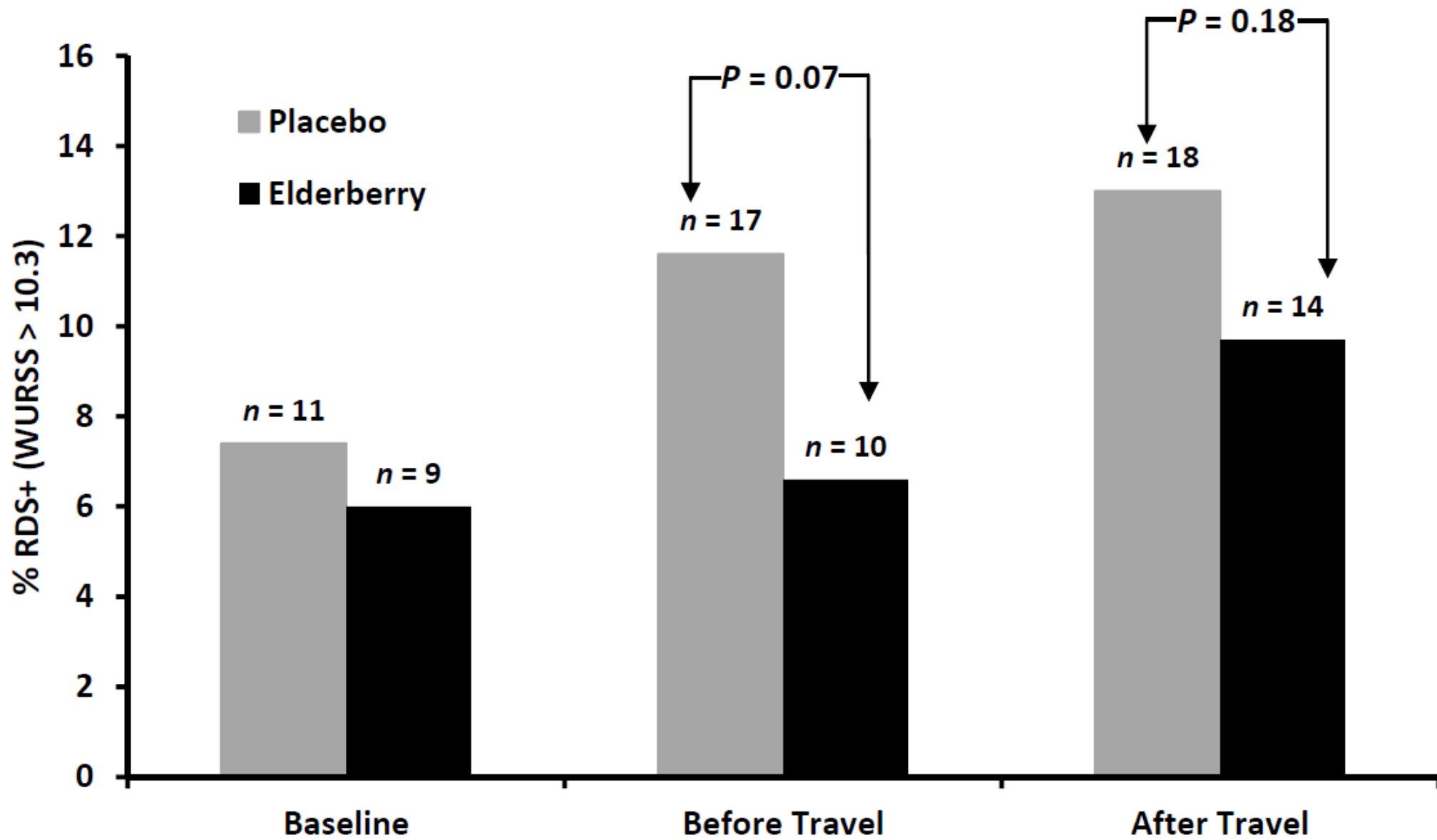
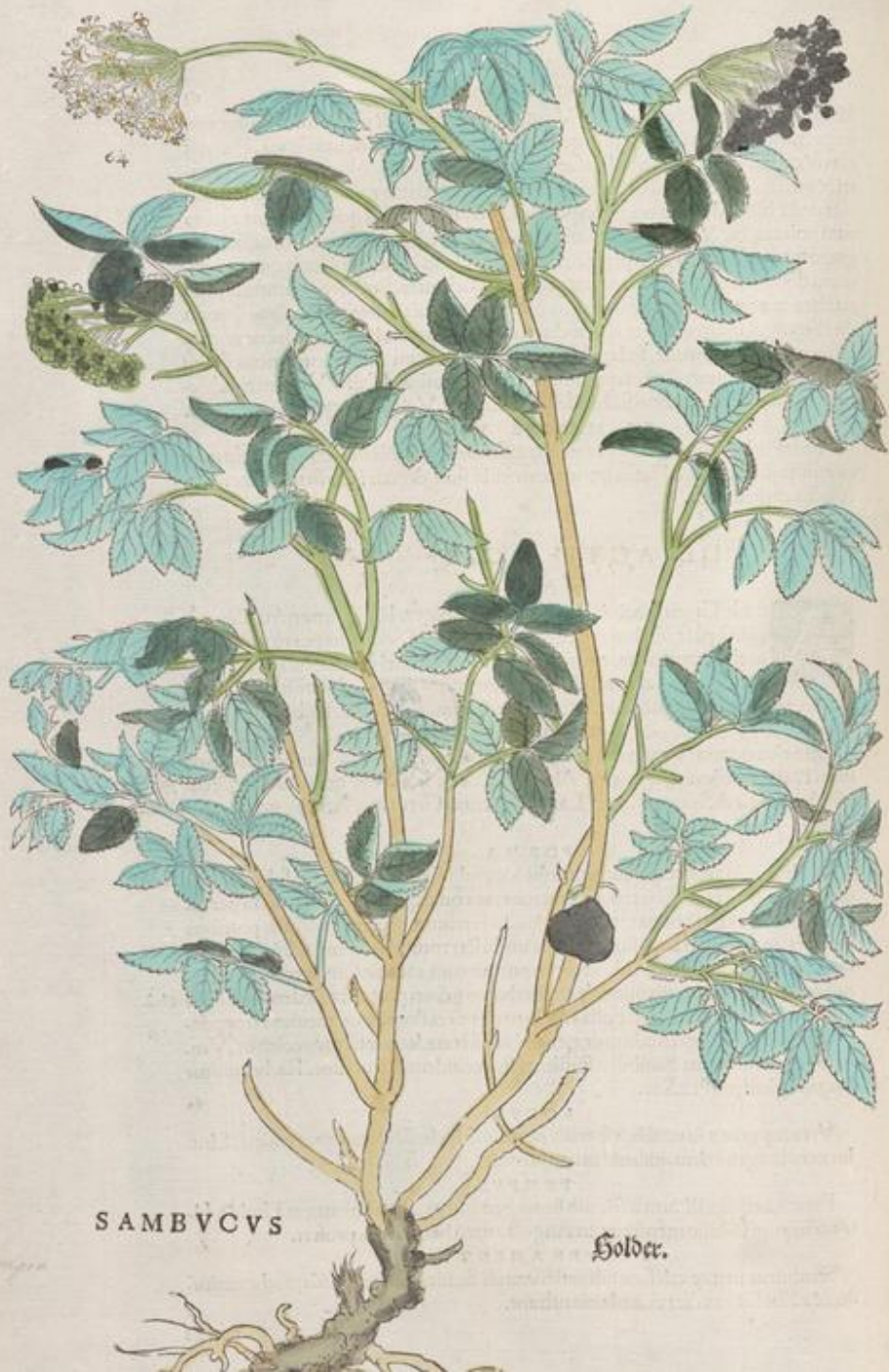


Figure 4. Effect of elderberry supplementation on the prevalence of Respiratory Disease Symptom positive (RDS+) participants.

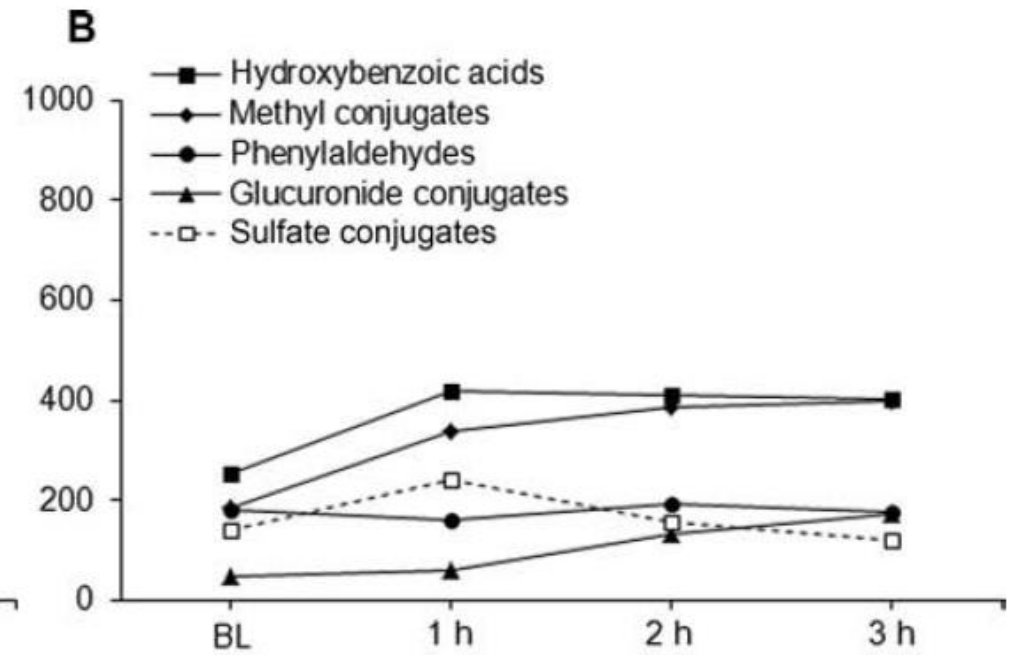
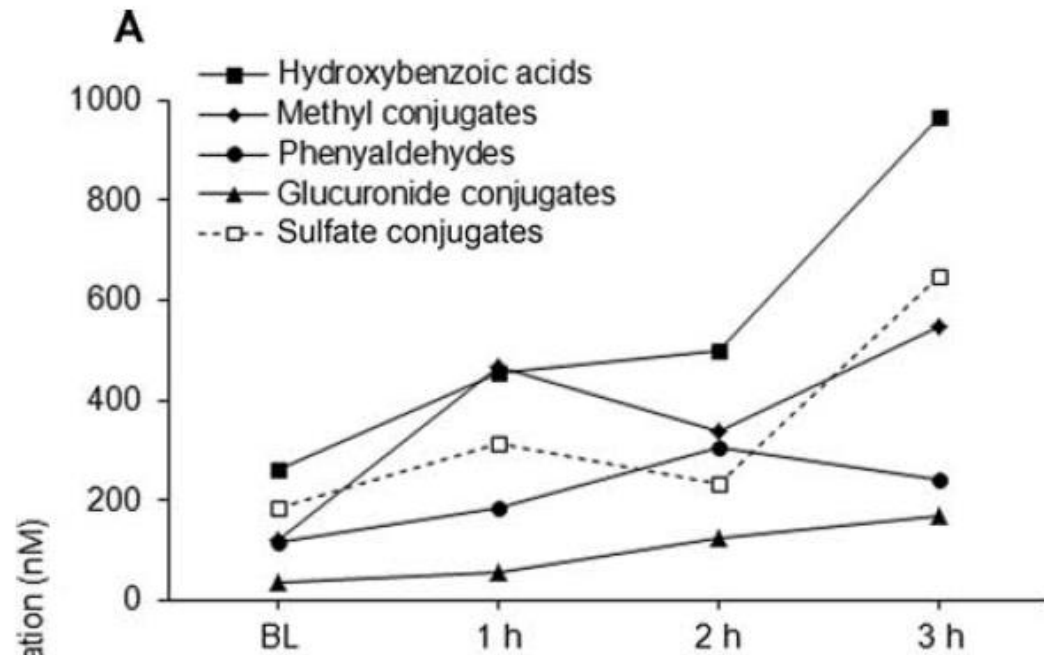


Phenolic metabolites of anthocyanins following a dietary intervention study in post-menopausal women (2014)

Rachel M. de Ferrars, Aed'ín Cassidy, Peter Curtis and Colin D. Kay

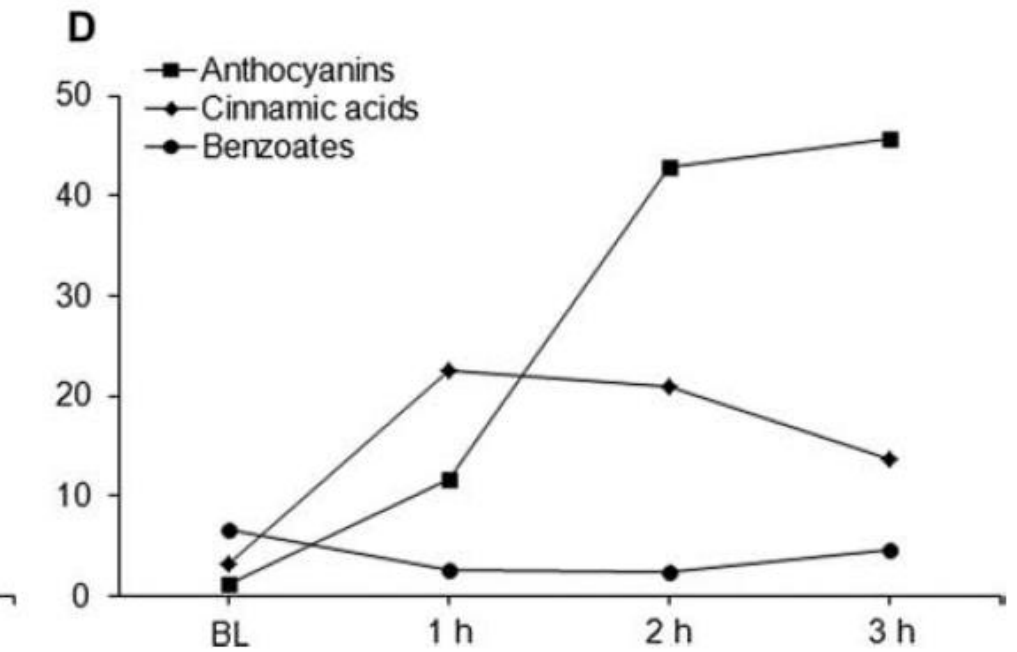
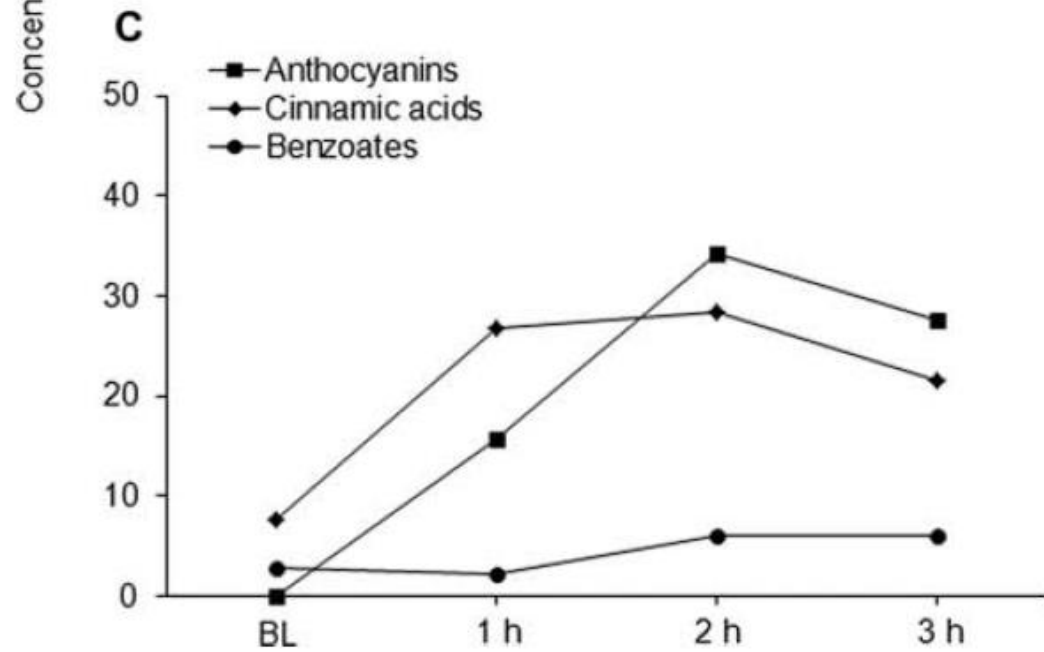
- Numerous studies feeding anthocyanin-rich foods report limited bioavailability of the parent anthocyanins.
- This study explores the identity and concentration of the phenolic metabolites of anthocyanins in humans.

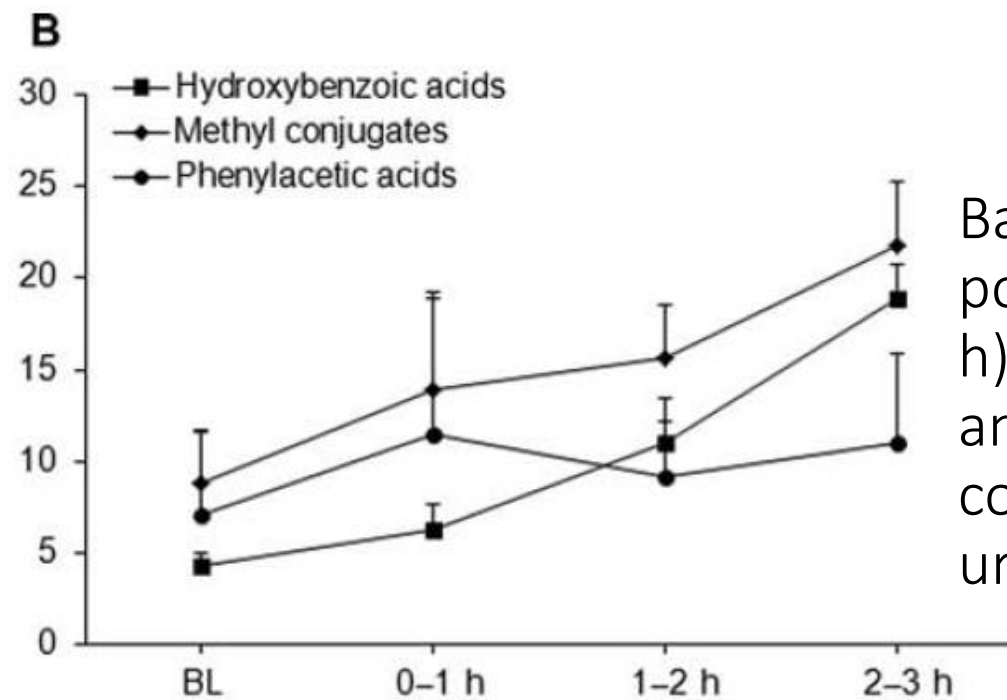
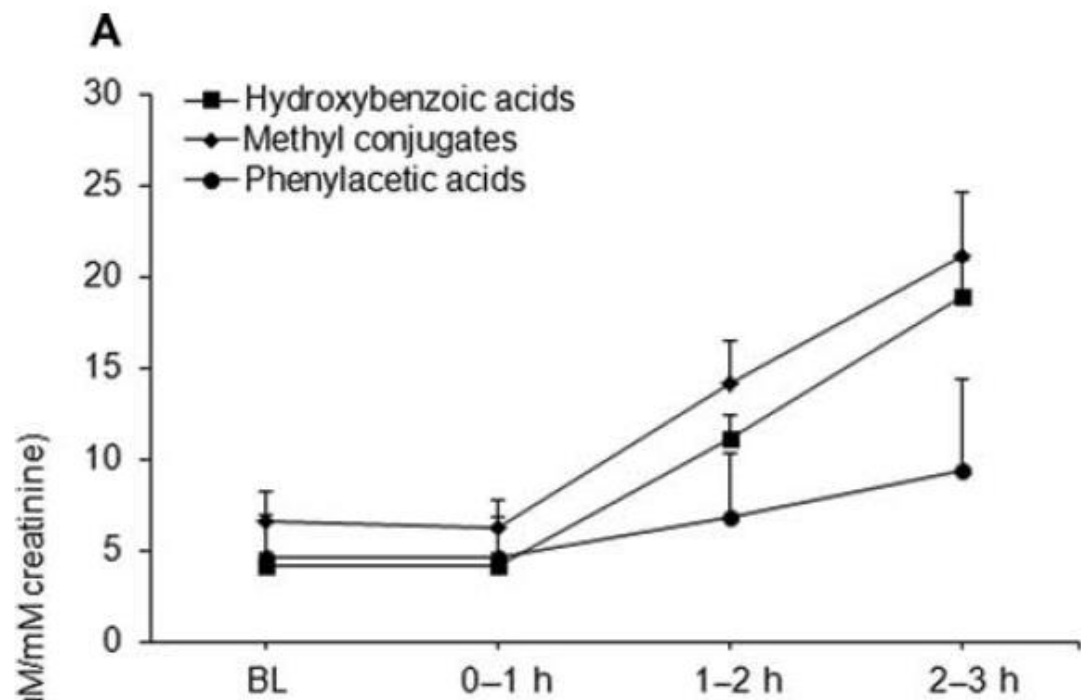
Baseline (BL)
and post-bolus
(0–3 h)
anthocyanin and
metabolite
concentrations
in plasma.



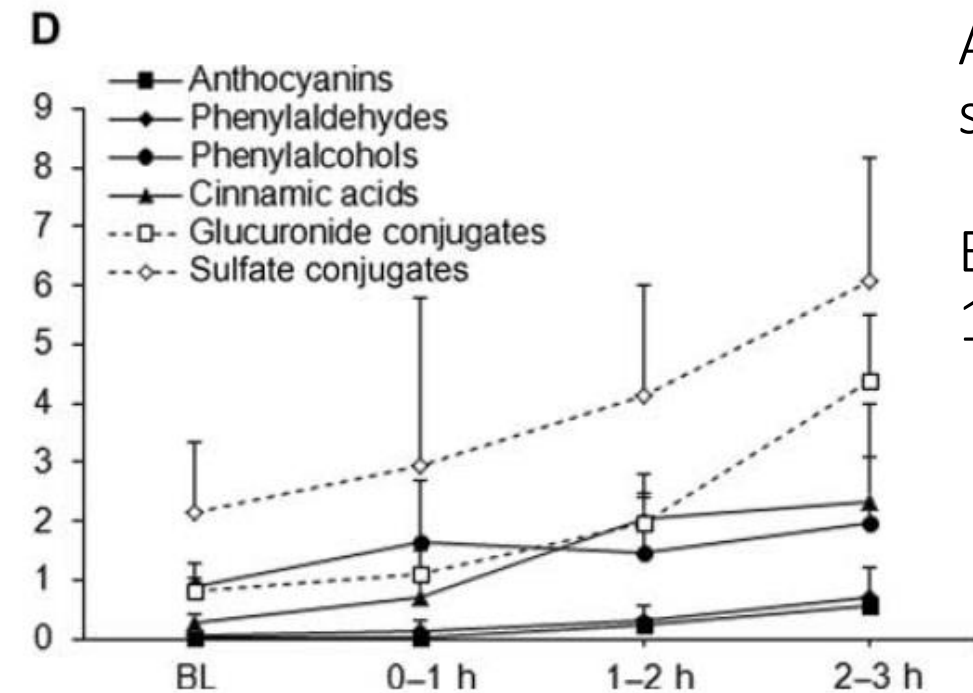
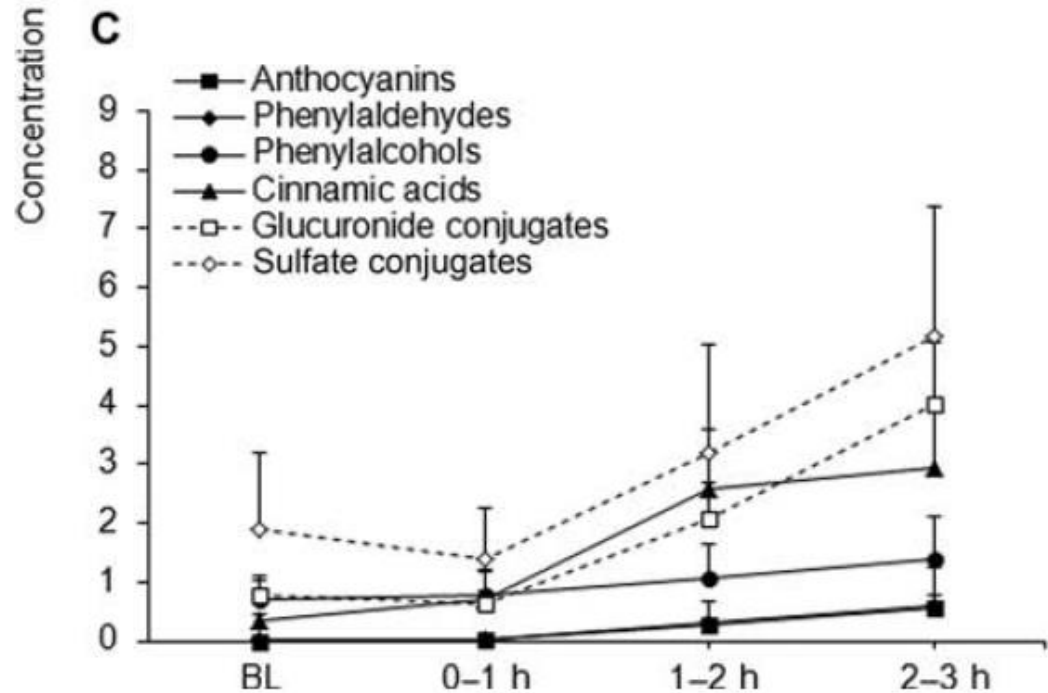
A&C=
single bolus

B&D=
12-week bolus





Baseline (BL) and post-bolus (0-3 h) anthocyanin and metabolite concentrations in urine.



A&C= single bolus

B&D= 12-week bolus

Efficacy and short-term safety of topical Dwarf Elder (*Sambucus ebulus* L.) versus diclofenac for knee osteoarthritis:

A randomized, double-blind, active-controlled trial

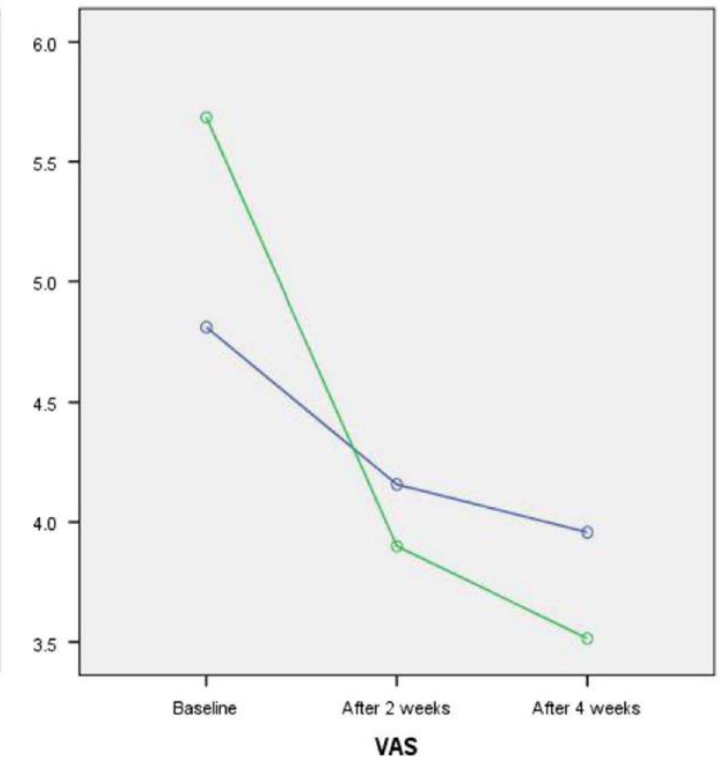
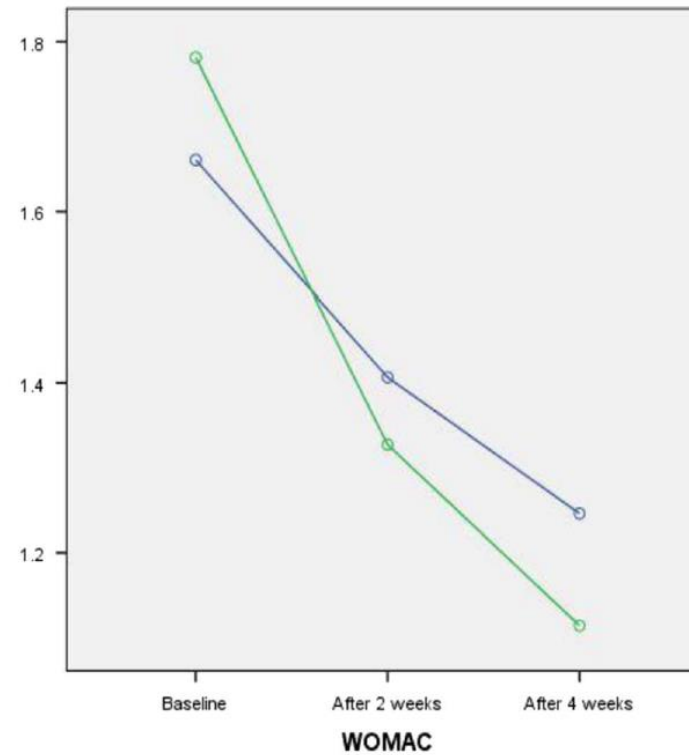
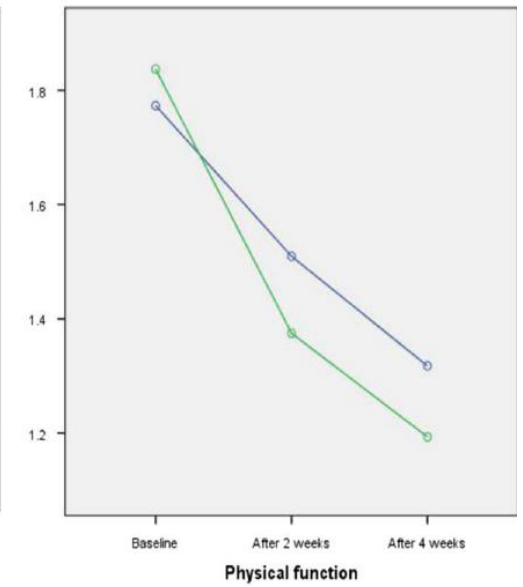
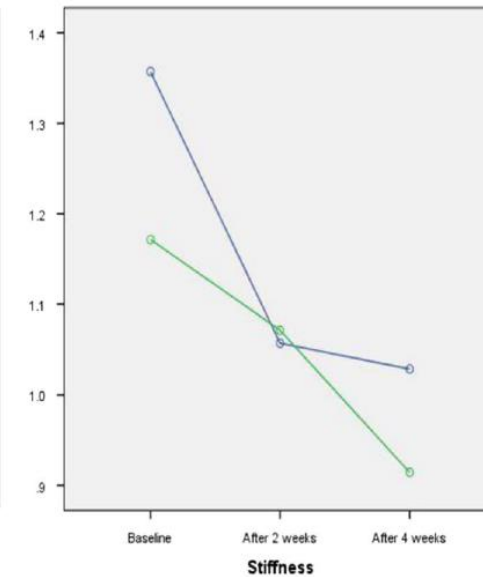
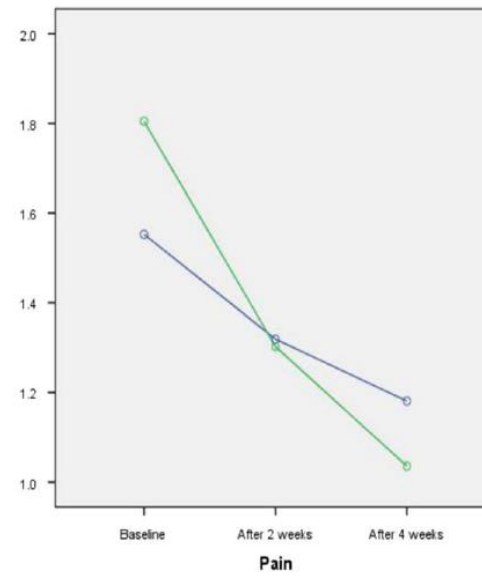
Jabbari et al 2016

- Evaluated the efficacy of topical use of leaf of *S. ebulus* in patients with knee osteoarthritis (OA).
- 79 patients
- *S. ebulus* leaf gel with 10% dried aqueous extract or 1% diclofenac gel, three times a day.



Green=Elder
Blue=Diclofenac

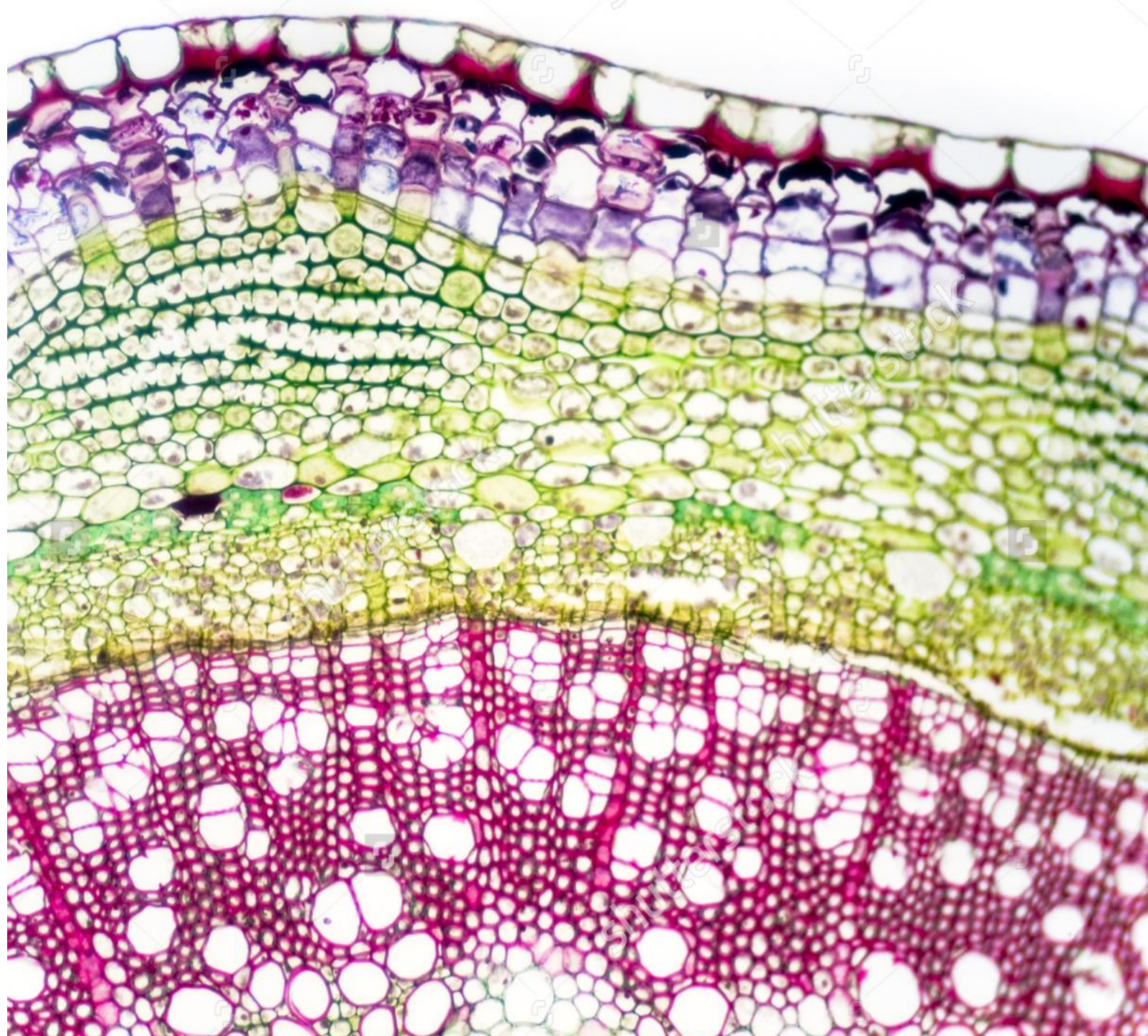
WOMAC and
VAS are arthritis
scales



Lectin Digestibility and Stability of Elderberry Antioxidants to Heat Treatment In Vitro

Jiménez et al 2017

- Elderberry pollen, blossoms and fruits have been found to contain the allergen Sam n1 that triggers type I allergy.
- Short-time heat treatment reduces potential allergy-related risks without seriously affecting its properties.



Effect of incubation in a boiling bath of ripe elderberry extracts on cyanidin-3-glucoside plus cyanidin-3-sambubioside content.

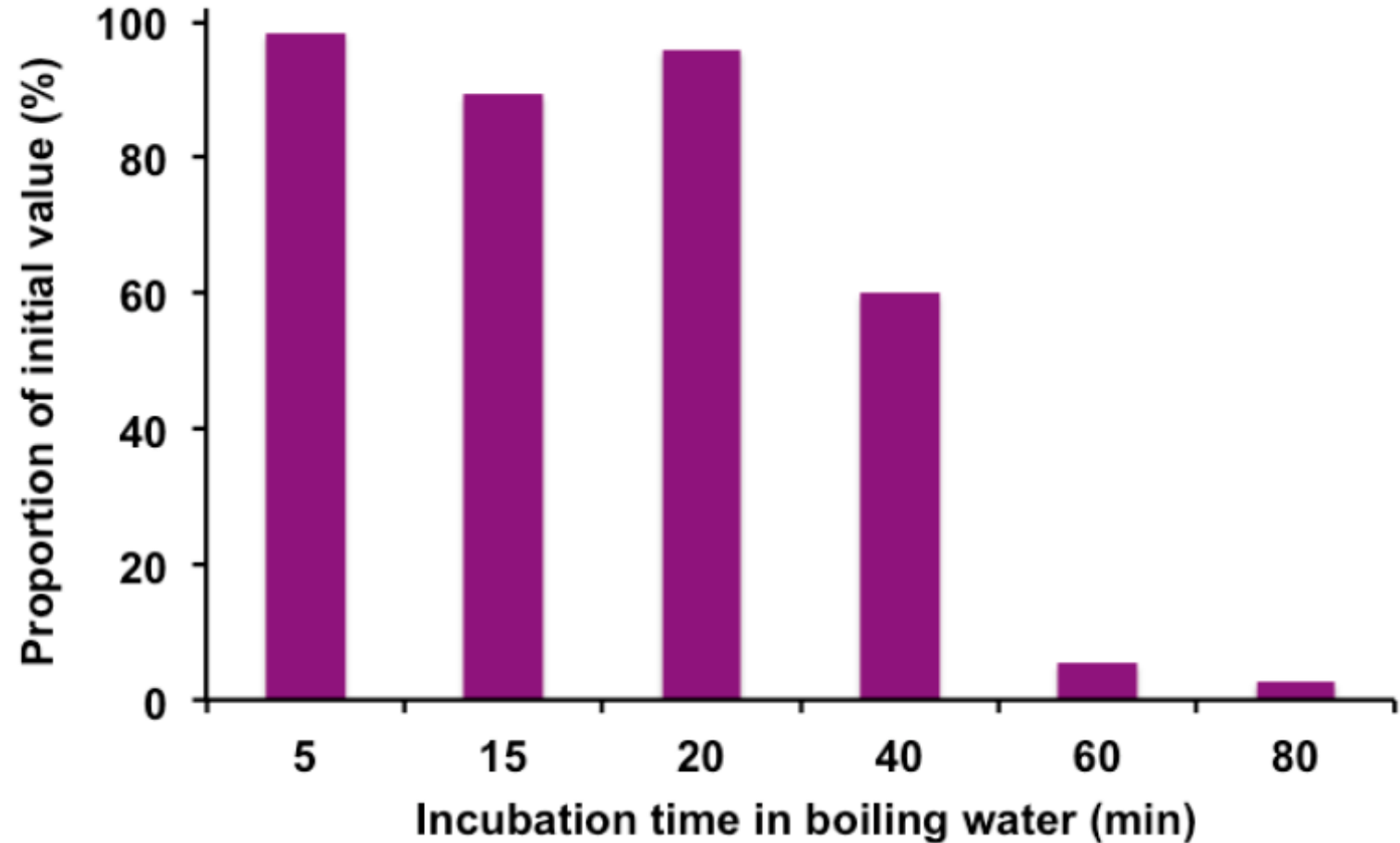


Table 1. Influence of boiling time of fruits extracts on: **(A)** total phenol content [gallic acid equivalents (μg)/wet weight of fruit (g)]; **(B)** free radical scavenging activities [Trolox equivalents (μg)/wet weight of fruit (g)]; **(C)** antioxidant activities [gallic acid equivalents (μg)/wet weight of fruit (g)] and **(D)** total monomeric anthocyanins content [Cyanidine-3-glycoside equivalents (μg)/wet weight of fruit (g)]; data are expressed as mean \pm confidence interval ($p < 0.05$, $n = 3$).

EXTRACT	Time (min)	A	B	C	D
Green fruits	0	4482.8 \pm 94.4	0.79 \pm 0.01	370.7 \pm 3.1	83.5 \pm 5.5
	10	4314.0 \pm 99.6	0.71 \pm 0.02	360.8 \pm 2.1	76.0 \pm 6.8
	20	3993.0 \pm 67.9	0.59 \pm 0.01	327.0 \pm 2.5	62.1 \pm 5.6
	40	2110.2 \pm 67.1	0.37 \pm 0.02	174.4 \pm 7.9	23.0 \pm 4.6
	80	571.0 \pm 43.5	0.19 \pm 0.01	118.8 \pm 18.0	7.5 \pm 4.8
Ripe fruits	0	8928.0 \pm 84.4	9.10 \pm 0.33	4821.4 \pm 42.4	2704.5 \pm 5.5
	10	8795.0 \pm 138.7	8.61 \pm 0.23	4776.8 \pm 57.5	2625.5 \pm 6.8
	20	8617.0 \pm 296.9	7.87 \pm 0.30	4295.4 \pm 247.7	2185.4 \pm 5.6
	40	5491.9 \pm 54.1	3.55 \pm 0.10	2055.9 \pm 224.1	746.4 \pm 4.6
	80	2885.9 \pm 111.6	2.92 \pm 0.08	1380.1 \pm 45.4	404.6 \pm 4.8

A Novel Treatment of Gingival Recession using a Botanical Topical Gingival Patch and Mouthrise

Levine et al, 2013

- *Echinacea, Sambucus, Centella*
- *Hydrophilic gel and herbs*
- *Twice daily mouthwash*

ditto sale, & cum eiuſmodi decoctione
 iendum iubet ventrem hydropicorum
 pedes ſpongijs: non eſſe præſtantius
 in eo caſu. Imponit poſtea & folia
 unguentum hoc modo. Vncias duas ſuc-
 ci, totidemque ſucci foliorum & cum
 olei Chamæmelini decoquit ad ſucco-
 mptionem, tandem & cere vnciam
 it & aliquid aceti roſacei ad maiorem
 nem. Unguenti huius efficaciffimam
 vim ad reſoluendas omnes humorum
 ites in doloribus podagricis cuiuſcun-
 ori, ſiue à frigida ſiue à calida cauſa o-
 etiam paratur ex Ebulo, quod apprimè
 is eſt in quouis articularum dolore
 , ſi eo articularum regiones, iuncturæ
 ntur. Oleum quidem præparat Bonius
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 conſuevit dare ægris drach. cum medio
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 n, aſpergit pauco vino albo, dein tercu-
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 rò, quod equidem Fernellius teſtatur,
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 ccus ordine ſecundo, hydropicorum a-
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SAMBUCVS RACEMOSA, ACINIS RUBRIS.

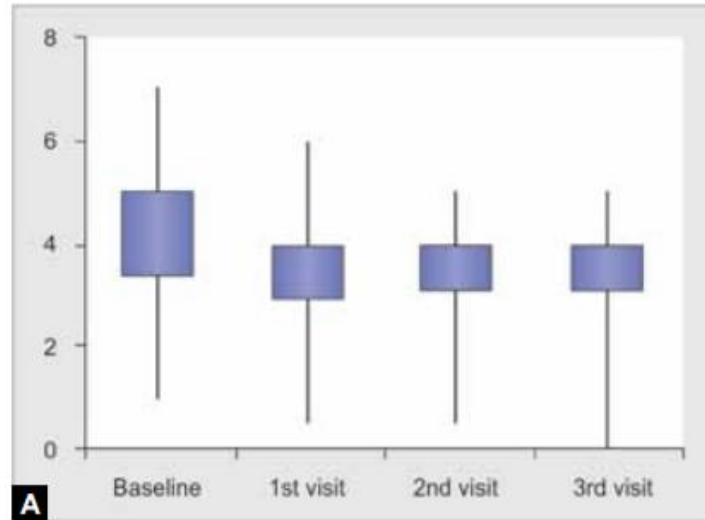
CAP. XXV.



Quæcumque vulgari Sambuco multa habeat communia, sic vt floribus aut baccis vidua, in re Botanica non verſato facile imponere poſſet, folijs tamè eſt paullo minus fortiſſis: at in floribus & baccis clariffimè diſcrimen. Flores enim nullam umbellam faciunt, vt in vulgata, ſed in racemum oblongum digeſti, ſtellati, colore ex albido in luteolum languente. Baccæ conſimili modo racemati frequenter ſuccraſcuat ex rubentibus pediculis.

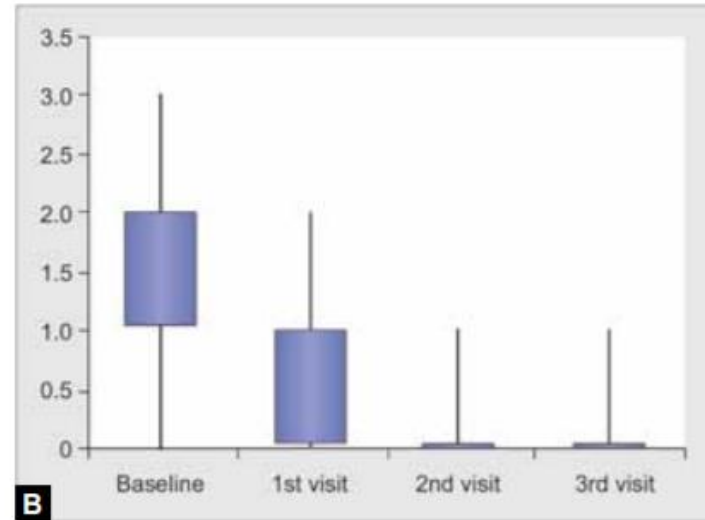


Figs 1A to C: Patch application following scaling and root planing (SRP): (A) Following SRP, prior to patch application, (B) Following patch application, (C) At 8 weeks, following combined patch and oral rinse treatment



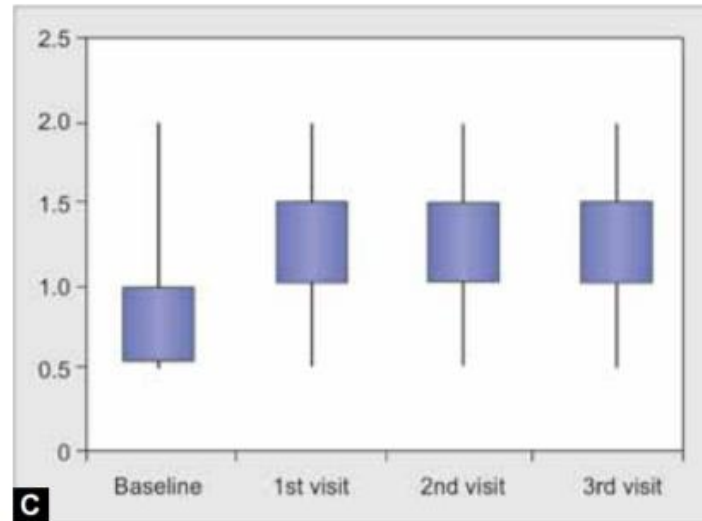
A

Gingival recession (mm)



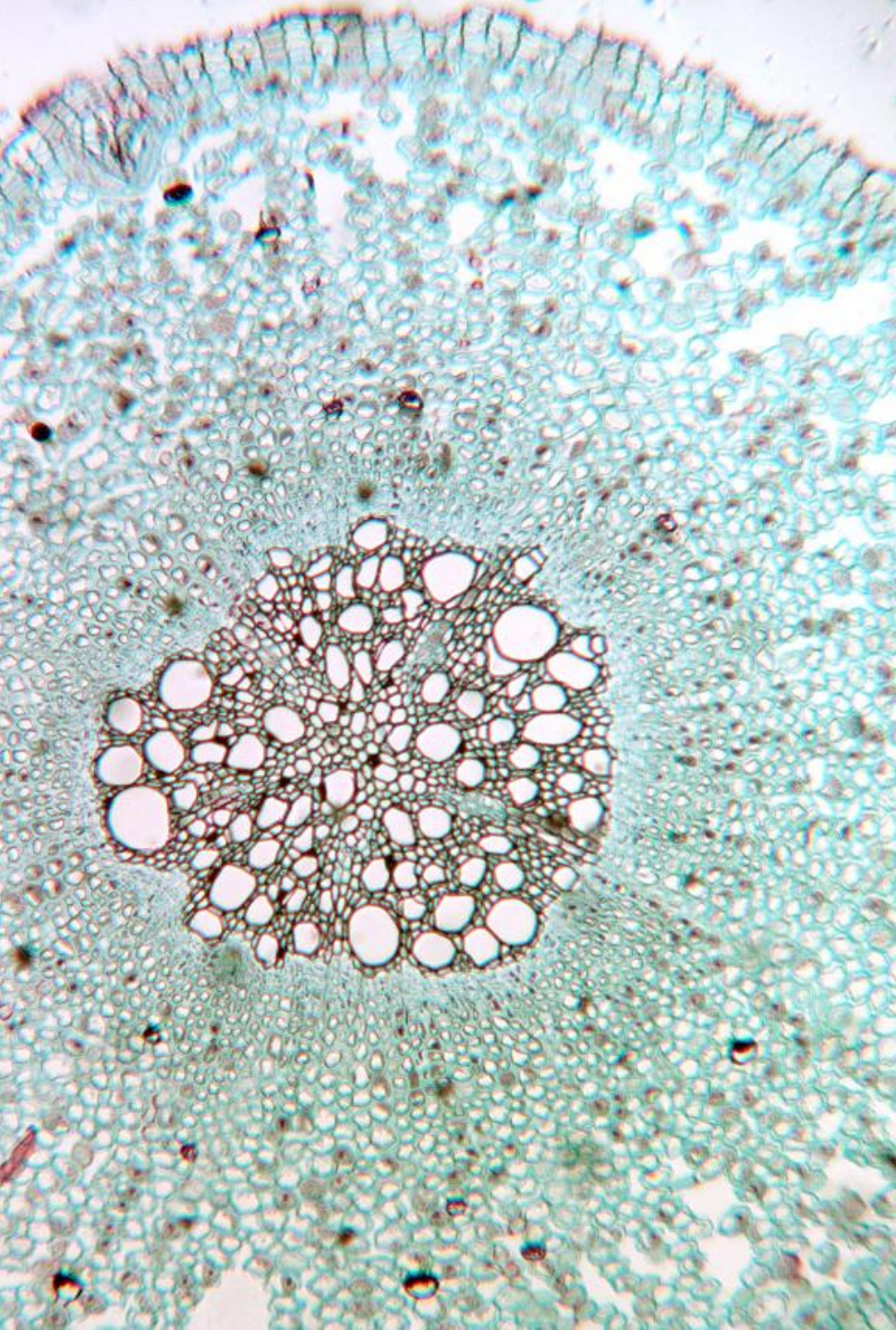
B

Gingival Index gi Scores



C

Gingival thickness (mm)



Comparison of major taste compounds and antioxidative properties of fruits and flowers of different *Sambucus* species and interspecific hybrids

Maja Mikulic-Petkovsek et al, 2016

- Differences in the content of sugars, organic acids, total phenolics and antioxidative activity among three different elderberry species (*Sambucus nigra*, *Sambucus cerulea*, *Sambucus javanica*) and seven interspecific hybrids.



Table 3

Total phenolic content (mg GAE kg⁻¹ FW) and antioxidant activity (mM trolox kg⁻¹ - FW) determined in fruits of different elderberry species or interspecific hybrids.

	TPC		ABTS	
<i>S. cerulea</i>	4155.1 ± 306.4	b	11.62 ± 0.38	b
<i>S. nigra</i>	6831.1 ± 489.9	e	36.50 ± 1.63	e
<i>S. nigra</i> var. <i>viridis</i>	2687.6 ± 88.6	a	3.20 ± 0.05	a
JA × RAC	5487.7 ± 139.7	cd	39.59 ± 0.85	e
JA × CER	5205.8 ± 300.8	d	25.10 ± 0.71	c
JA × (JA × NI)	4293.8 ± 77.8	b	29.20 ± 0.77	d
JA × NI	3138.3 ± 81.1	a	11.78 ± 0.09	b
(JA × NI) × cv. Black Beauty	5892.9 ± 331.6	d	27.22 ± 1.91	cd
(JA × NI) × CER	4657.4 ± 92.1	bc	27.48 ± 1.06	cd
(JA × NI) × NI	4544.7 ± 171.3	bc	26.17 ± 2.59	cd

Fruits

Table 6

Total phenolic content (mg GAE kg⁻¹ DW) and antioxidant activity (mM trolox kg⁻¹ - DW) determined in flowers of different elderberry species or interspecific hybrids.

	TPC		ABTS	
<i>S. cerulea</i>	7410 ± 740	a	44.87 ± 0.54	a
<i>S. nigra</i>	40137 ± 1995	f	118.26 ± 3.10	f
<i>S. nigra</i> var. <i>viridis</i>	11913 ± 795	b	55.78 ± 4.13	b
<i>S. javanica</i>	14815 ± 1592	b	56.32 ± 3.00	b
JA × (JA × NI)	26896 ± 1862	d	82.61 ± 4.63	d
JA × RAC	20304 ± 1597	c	69.16 ± 5.95	c
JA × CER	27166 ± 998	d	79.36 ± 3.64	d
JA × NI	18866 ± 720	c	66.00 ± 2.47	c
(JA × NI) × cv. Black Beauty	32279 ± 850	e	99.21 ± 1.48	e
(JA × NI) × CER	33300 ± 836	e	101.24 ± 1.33	e
(JA × NI) × NI	32279 ± 1296	e	97.46 ± 2.62	e

Flowers



Variation of select flavonols and chlorogenic acid content of elderberry collected throughout the Eastern United States

Mudge et al 2015

- How does climate and terrain alter the phytochemical profile of elderberries throughout the eastern United States?

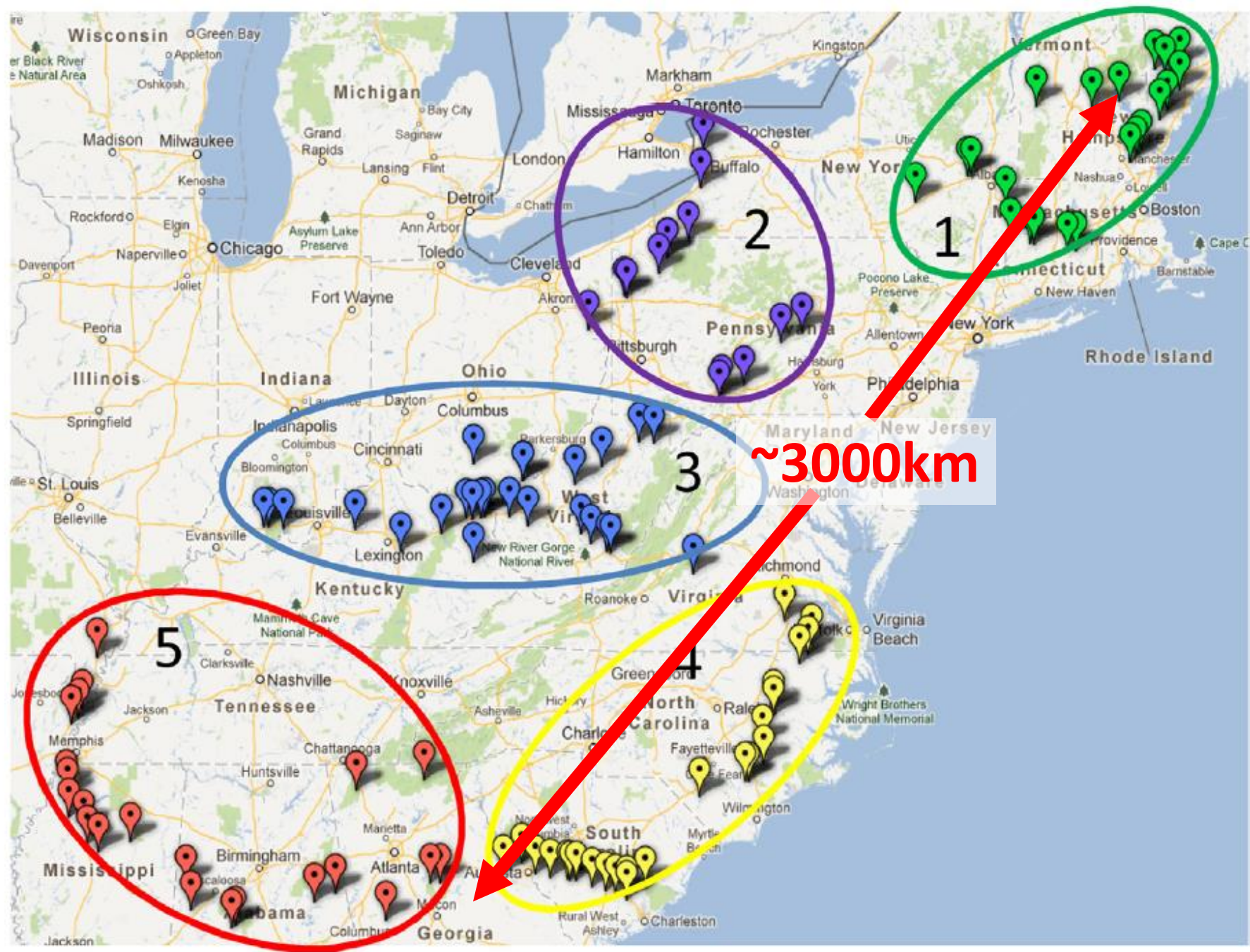
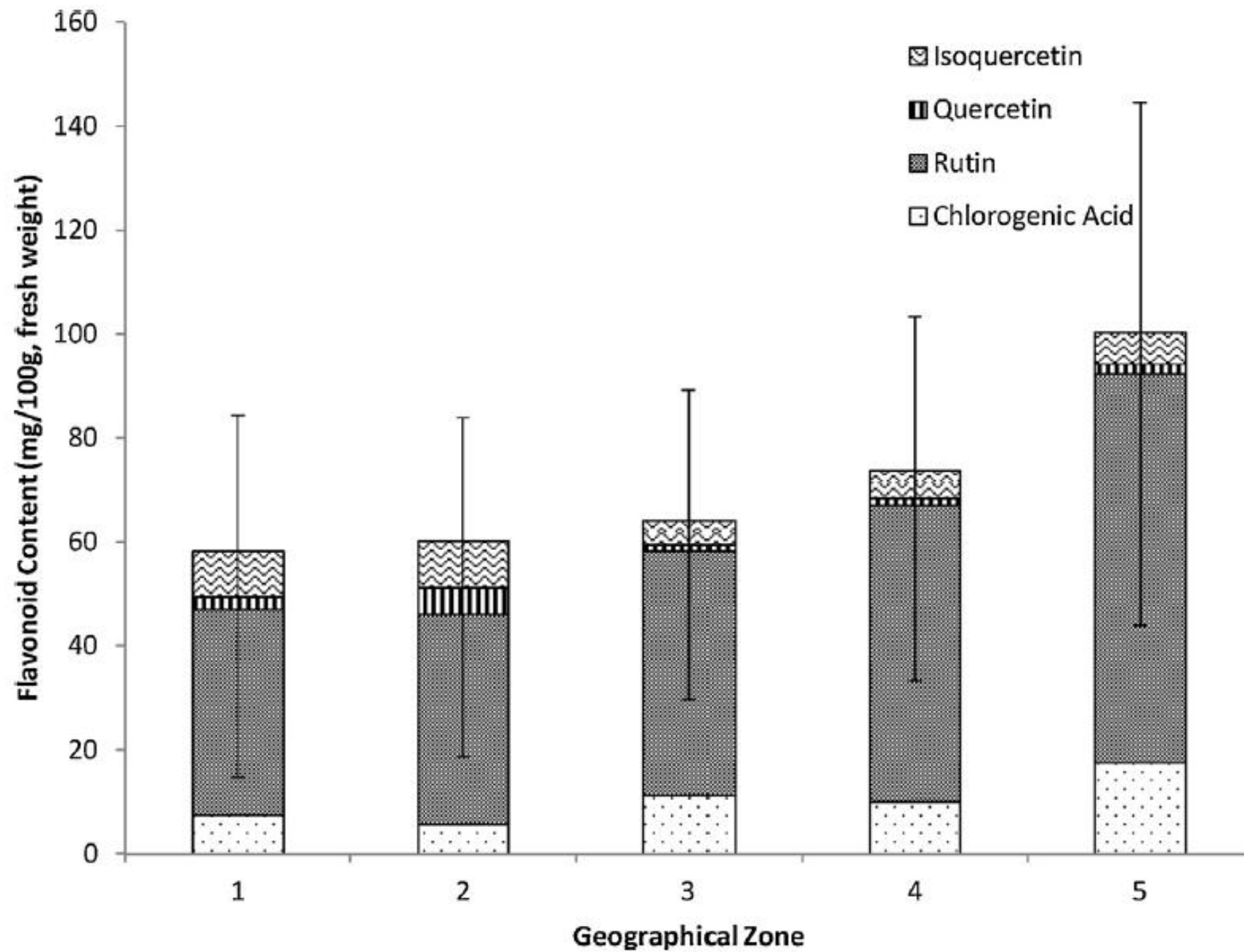


Fig. 5. American elderberry collections separated into five broader geographical zones.



Gastrointestinal digested
Sambucus nigra L. fruit
extract protects in vitro
cultured human colon cells
against oxidative stress

Olejnik et al 2015

- What is the antioxidant potential of the colon-available EDB freeze dried fruit extract, derived from the artificial gastrointestinal tract?



□ Non-digested EDB extract

$p < 0.0001$, $F = 45.5$ (non-induced mutations)

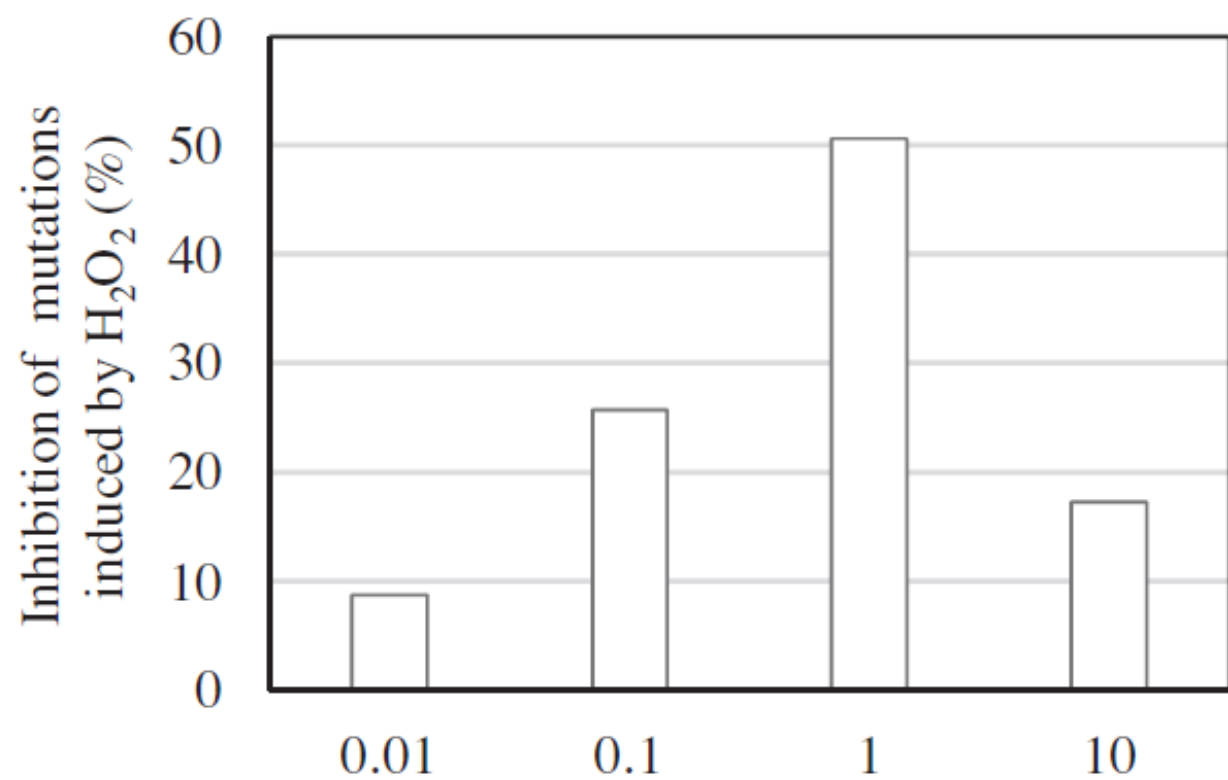
$p < 0.0001$, $F = 42.9$ (induced mutations)

■ Colon digested EDB extract

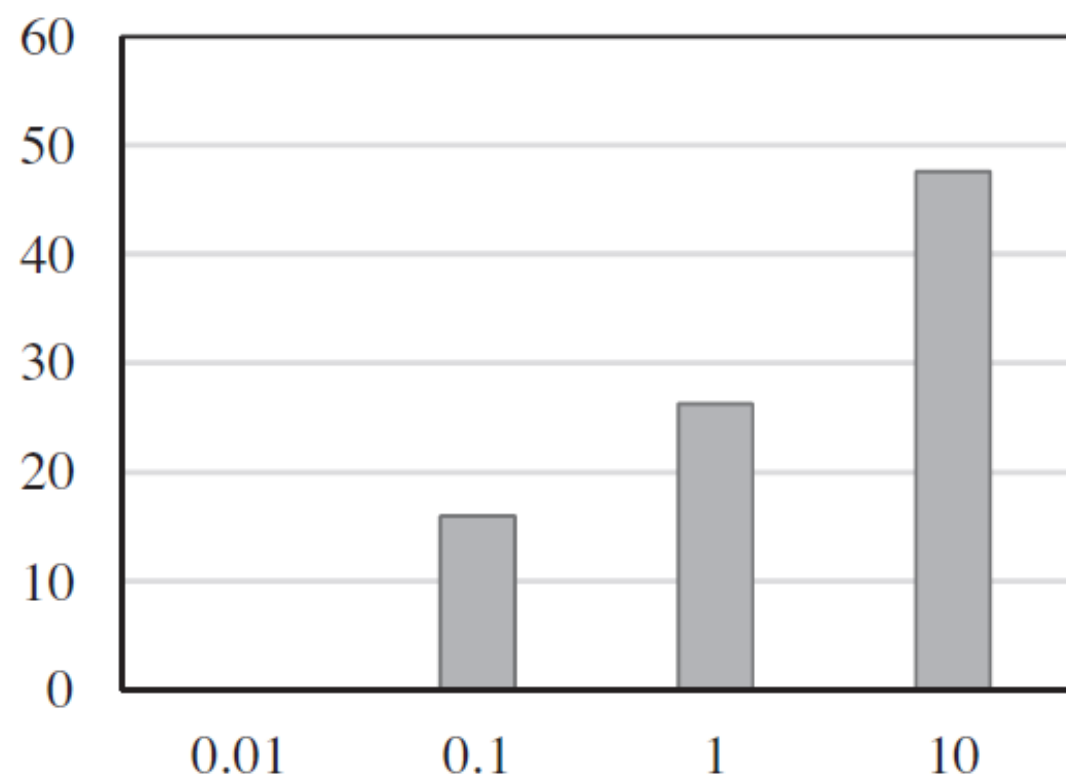
$p < 0.0023$, $F = 9.1$ (non-induced mutations)

$p < 0.0001$, $F = 28.4$ (induced mutations)

B



C



Extract concentration (mg EDB powder/ml)

Improved lipid profile and increased serum antioxidant capacity in healthy volunteers after *Sambucus ebulus* L. fruit infusion consumption

Ivanova, Tasinov and Kiselova-Kaneva, 2014

- Can 200ml / day of *Sambucus ebulus* L. ripe fruit infusion have an effect on body weight, blood pressure, glucose levels, lipid profile and antioxidant markers in healthy volunteers?



Serum total anti-oxidant capacity increased by 26%

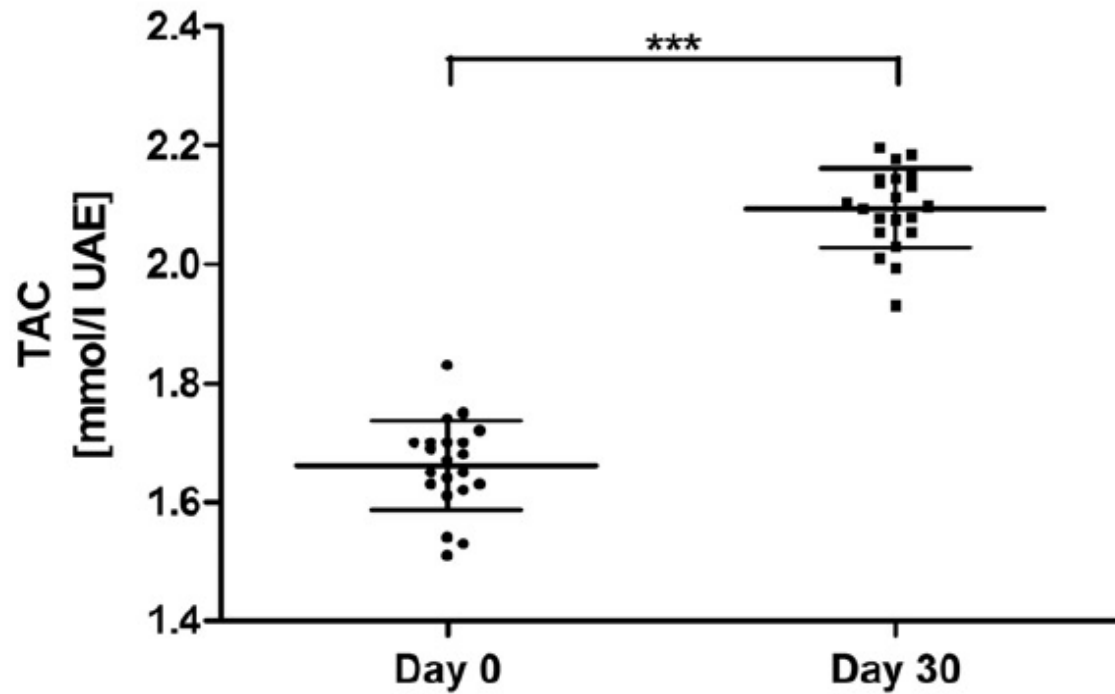


Table 3. Metabolic markers of healthy subjects prior and after 30 d of consumption of *Sambucus ebulus* L. infusion.

Parameter [mmol/l]	Day 0	Day 30	Change [%]	<i>p</i> Value
Glucose	3.89 ± 0.35	3.75 ± 0.51	−3.57	0.1420
TG	1.06 ± 0.49	0.91 ± 0.54**	−14.92	0.0071
TC	5.20 ± 0.85	4.41 ± 0.78***	−15.04	0.0001
HDL-C	1.50 ± 0.37	1.59 ± 0.49	5.76	0.2263
LDL-C	3.15 ± 0.77	2.37 ± 0.62***	−24.67	0.0001
HDL-C/LDL-C ratio	0.54 ± 0.26	0.77 ± 0.47**	42.77	0.0017

Data are presented as mean ± SD.

p* < 0.01, *p* < 0.001 versus day 0.

Sambucus
Evidence Base



Sambucus history
and tradition

The Elder Mothers

(and other magic)



Every inch of an
elder-tree is
connected with
magic.

(Northcote, 1903)

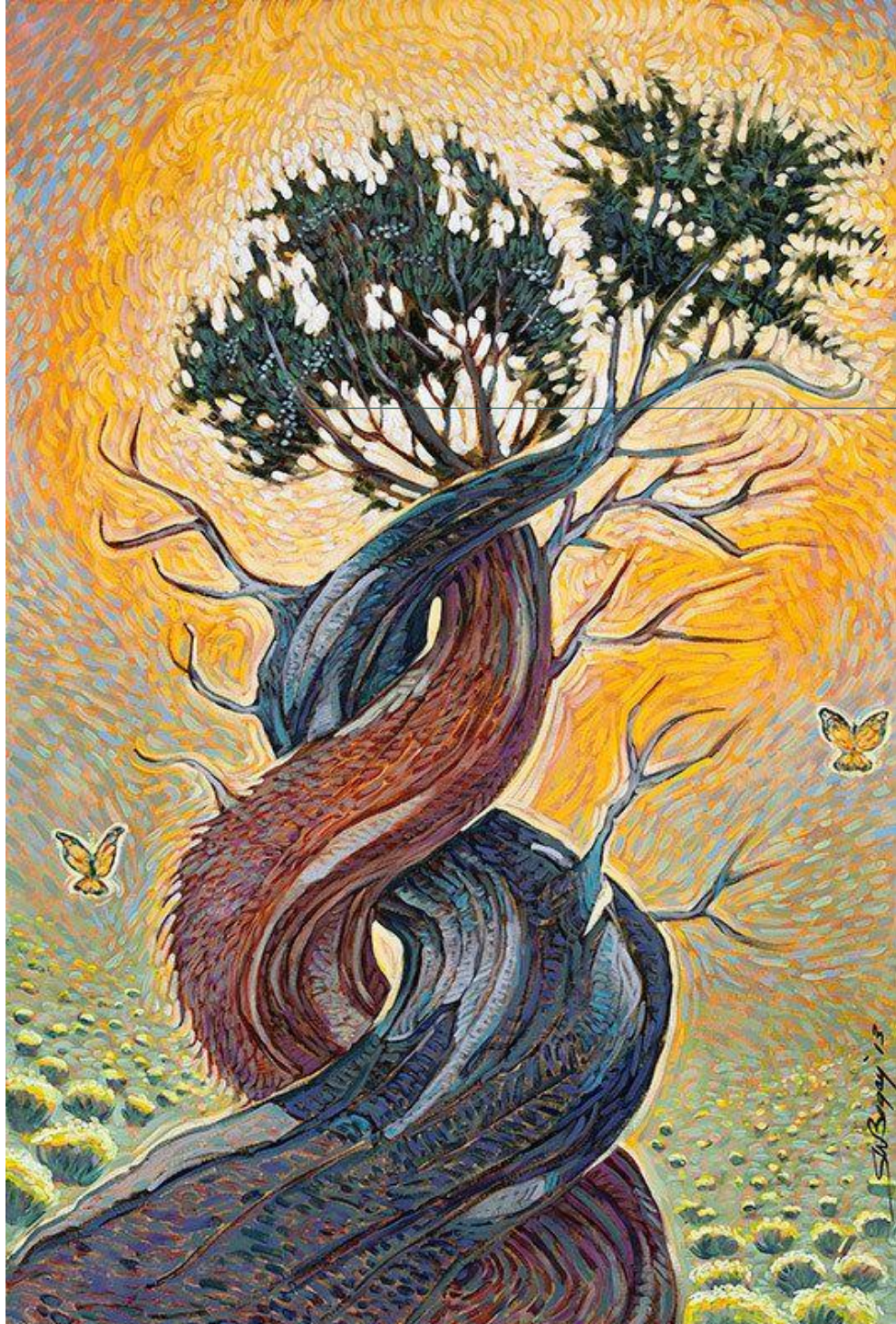




The Little Elder-Tree Mother

“And the little boy looked at the teapot; the lid rose up gradually, the elder-tree blossoms sprang forth one by one, fresh and white; long boughs came forth; even out of the spout they grew up in all directions”

Hans Christian Andersen, 1845



Halo of Elder Trees

- Artwork by Shanto Begay

The Danes believe that in the Elder there dwells a being known as the Hylde-moer (Eldermother) or Hylde-qvinde (Elder-woman), by whom all injuries done to the Elder are avenged.



The Book of Herbs, 1903

- *Pennyroyal and Henbane, Chervil and Vervain, Poppies, Mandrakes, Hemlock and Dittany were specially used by witches in making spells.*
- *Valerian, Wormwood, Elder, Pimpernel, Angelica, and all yellow flowers growing in hedgerows are antagonistic to them.*



Symbolism of Death



The Elder Wand

- Franz Bardon a famous 19th Czech occultist recommended the use of wands made of elder picked from hallowed ground and plugged with amber.
- Bardon, 2014





What are the possibilities?

Thank you John Courie!



Voynich Manuscript
Early 15th century





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