Plantain

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Botanical Nomenclature:

Plantago major
Plantago lanceolata
Plantago rugelii
Order: Lamiales
Family: Plantaginaceae

Used interchangeably.[1]

Common names:

Plantago major:
- Broad leaf plantain
- English plantain
- Ripple grass
- Waybread / Waybroad
- Snakeweed
- Cuckoo's bread
- Englishman's / White man's foot
- St. Patrick's leaf[2]
- Pin Yin: che qian cao (whole plant)[3]

Plantago lanceolata:
- Ribwort plantain

Plantago rugelii:
- Rugel's plantain
- Blackseed plantain[4]

Part used: leaves primary, also roots, seeds[5]

Identification:

Plantago major:

"Perennial. Herbage glabrous to puberulent. Leaf blades ovate, 3–15 cm long. Inflorescence: scape 5–25 cm; spikes congested to somewhat sparse, 3–25 cm long,

[1] Bancroft, Betzy. "Plantain." Vermont Center for Integrative Herbalism, Montpelier. 25 Mar. 2020. Lecture.
[2] Cohen, D., & Siegel, A. (2021). *Ashkenazi Herbalism*. North Atlantic Books.
[3] Gardner, Zoë, and McGuffin, Michael, eds. *American Herbal Products Association's botanical safety handbook*. CRC press, 2013.
[4] Bancroft, 2020.
[5] Bancroft, 2020.

narrowly cylindric; bracts 1.5–3 mm long. Flowers: sepals glabrous; corolla lobes 0.5–1 mm long. Capsule 2–4 mm long."[6]

Plantago lanceolata:

"Perennial. Herbage glabrous to villous; caudex sparingly brown-wooly. Leaf blades narrowly lanceolate, 2–15 cm long. Inflorescence: scape 10–60 cm; spikes congested, 5–50 mm long, conical, becoming cylindric; bracts 1.5–2.5 mm long, glabrous, acute to acuminate. Flowers: sepals apically ciliate, the outer 2 united; corolla lobes 1.5–2.5 mm long. Capsule 2–3 mm long."[7]

Plantago rugelii:

Perennial. Very similar to *Plantago major*, but petioles have a red tinge and herbage is less waxy and lighter.[8]

Commercial Sources and Handling:

A lot of the bulk plantain on the market is lousy quality[9] -- best to harvest yourself from a pesticide/herbicide-free lawn or garden edge.

Growing and Harvesting:

Thrives in disturbed areas. Can germinate and thrive in a wide variety of soils -- can tolerate close mowing and even being driven over. It grows in rocky spots and on sunny cliffs in its native habitat,[10] and its Anglo-Saxon name is *waybrode* because it grows along the way (along paths).[11]

Easiest to tend an existing patch as opposed to cultivating. To harvest, select the young, juicy leaves towards the center of the rosette as you would harvest spinach. Gather the seeds when the flowerhead has dried -- tap them onto a piece of paper. Like most roots, harvest in autumn.[12]

Taste/Odor: sweet and salty

Not aromatic. Tastes like fresh mushrooms!

Energetics: cooling, drying to neutral

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[6] Montana Natural Heritage Program. (n.d.). Common Plantain - *Plantago major.* Montana Field Guides. Retrieved October 2, 2021, from https://fieldguide.mt.gov/speciesDetail.aspx?elcode=PDPLN020T0.
[7] Montana Natural Heritage Program. (n.d.). English Plantain - *Plantago lanceolata*. Montana Field Guides. Retrieved October 2, 2021, from https://fieldguide.mt.gov/speciesDetail.aspx?elcode=PDPLN020R0.
[8] Bancroft, 2020.
[9] Bancroft, 2020.
[10] Del Tredici, P. (2020). Wild urban plants of the northeast: A field guide. Comstock Publishing Associates, an imprint of Cornell University Press.
[11] Cohen, 2021.
[12] Bancroft, 2021.

Can also be slightly moistening -- depending on the species, individual plant, location, and weather, it can be more demulcent or astringent.[13]

Hildegard considered it warm and dry.[14]

Physiological Actions:

- Alterative
- Anticatarrhal - drying
- *Anti-inflammatory
- Antiseptic/antimicrobial
- Astringent
- Demulcent/Emollient
- Diuretic - drying
- Drawing
- Expectorant
- *Immunomodulant
- *Vulnerary[15][16]

Seed is a bulk laxative, though the more commonly used spp is P. ovata (psyllium). Root is styptic.[17]

Specific Indications:

Healing epithelial tissue. Bites and stings, internally and as a poultice.[18]

Ellingwood: “The remedy is of value in the internal treatment of all diseases of the blood…. It is used in ulcerations of the mucus membrane, due to depraved conditions.”[19]

Traditional Uses:

Plantain’s use has been documented for centuries, including by the Ancient Greeks, Galen, Hildegard, and Shakespeare. My ancestors from both sides of my family and from both sides of the European continent -- Ashkenazi Jews and Anglo-Saxons -- were familiar with plantain as a weed that grew on the edges of traveled paths and gardens. Jewish healers in the Pale in the early 20th century used every part of plantain in countless forms: infusion, decoction, tincture, poultice, wash, juice, and a paste mixed with sour cream or grease. A medieval Hebrew remedy

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[13] Bancroft, 2021
[14] Cohen, 2021
[15] Hoffmann, D. (2003). *Medical herbalism: The science and practice of Herbal Medicine*. Healing Arts Press.
[16] Cohen, 2021.
[17] Bancroft, 2020.
[18] Bancroft, 2020.
[19] Hoffmann, 2003.

book claimed: “I have heard that the juice of [plantain] is equally good when there is no olive oil” in preparing a styptic ointment.[20]

Hildegard used plantain for both spiritual and physical healing.[21] Culpepper indicated plantain for coughs from heat.[22] Ellingwood used it for a variety of uses, including:

- blood: scrofula, syphilis, specific or nonspecific glandular disease, mercury poisoning
- GI: diarrhea (inc. diarrhea of consumption), dysentery, and longstanding hemorrhoids
- Generative: “female disorders” with discharges
- Renal: hematuria and dysuria[23]

Clinical Use:

Digestive System:

- any kind of inflammation / irritation in the gut
- internally or topically for hemorrhoids and anal fissures
- ulcers, inc. esophageal ulcerations
- leaky gut
- irritable bowel syndrome, esp if back and forth between diarrhea and constipation, or if marked by a lot of sensitivities
    - balancing to diarrhea and constipation - dual demulcent and drying
- seeds as bulk laxative (hydrated ahead of time)

Respiratory System:

- irritation of mucosa, esp. when red and hypersensitive and even with blood in mucus
- sinusitis and allergic rhinitis
- tickly, irritated dry cough
- sore throats
- bronchial irritations

Epithelial tissue:

- allergic reactions and hives
- styes in eyes
- boils, carbuncles, staph infections
- ulcerations
- burns and scalds
- bruises (in a pinch)
- abrasions, especially once they start to heal
- excellent drawing agent - splinters, tattoo ink, glass, hexes, etc.
- pink eye
- tooth extractions
- cervical dysplasia, topically, in formula

[20] Cohen, 2021.
[21] Cohen, 2021.
[22] Bancroft, 2020
[23] Hoffmann, 2003.

Urinary:

- painful or difficult urination
- blood in urine
- interstitial cystitis[24]

Key Constituents:

Flavonoids: luteolin, apigenin, baicalein, hispidulin, plantaginin, scutellarin, luteolin 7-glucoside, hispidulin 7-glucuronide, luteolin 7-diglucoside, apigenin 7-glucoside, nepetin 7-glucoside, luteolin 6-hydroxy 4′-methoxy 7-galactoside, homoplantaginin, aucubin

Alkaloids: allantoin[25], indicain, plantagonin

Terpenoids: loliolide, ursolic acid, oleanolic acid, sitosterol acid and 18β-glycyrrhetinic

Caffeic acid derivatives: plantamajoside and acteoside

Iridoid glycosides: aucubin, as well as others in other parts of the plant

Fatty acids: arachidic acid and behenic acid, others in seeds

Vitamins: ascorbic acid and β-carotene and other carotenoids[26]

Pharmacology:

Antibacterial: Both the whole plant extract and the polysaccharides have been found effective against many strains of both gram-positive and gram-negative bacteria including: *Helicobacter pylori, Escherichia coli, Candida albicans, Bacillus cereus, Bacillus subtilis, Staphylococcus epidermidis, Staphylococcus aureus, Pseudomonas aeruginosa, Klebsiella pneumonia, Salmonella enteritidis, and Proteus mirabilis.*

Anticancer: Plantain has been found to inhibit the growth of cancer cells in vitro and in mice. The flavonoids flavone and luteolin are thought to be the active constituents against cancer cells. Inhibition of tumor growth has been found to be dose-dependent.

Antidiarrheal: The antidiarrheal effects of plantain have been attributed to the tannins, flavonoids, and alkaloids. Alcohol extracts have been found more effective than water extracts.

Antiinflammatory: The antiinflammatory activity of plantain has been attributed to the iridoid glycosides and flavonoids and has been found to inhibit LOX, COX, and proinflammatory cytokines such as IL-1 and TNF-α.

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[24] Bancroft, 2020.
[25] Bancroft, 2020.
[26] Adom, M. B., Taher, M., Mutalabisin, M. F., Amri, M. S., Abdul Kudos, M. B., Wan Sulaiman, M. W. A., Sengupta, P., & Susanti, D. (2017). Chemical constituents and medical benefits of Plantago major. *Biomedicine & Pharmacotherapy*, *96*, 348–360. https://doi.org/10.1016/j.biopha.2017.09.152

Antiulcer: Both in vitro and in animal studies, plantain has been found to reduce calcium oxalate formation. Its activity against *H. pylori* may also be of note here as it is one of the main causes of GI ulcers.

Antiviral: Caffeic acid and chlorogenic acid have been found to have the strongest antiviral effects. Chlorogenic acid has been found to be active against HSV-1, HSV-2, ADV-3, ADV-8 and ADV-11. Caffeic acid has been found to be active against HSV-1, HSV-2 and ADV-3. Ferulic acid and p-coumaric acid were not found to be as antiviral as caffeic and chlorogenic acid.[27]

Hypoglycemic: Plantain increased glucose tolerance in diabetic rats.[28]

Wound healing: Alcohol extracts were found more effective at healing wounds than water-based extracts due to higher polyphenol content. In addition flavonoids were found to contribute to the wound healing due to their antioxidant properties. Polysaccharides are also responsible.[29]

Potential Uses Extrapolated from Pharmacology:

- antimicrobial
- anticancer
- blood sugar balance

Clinical Research:

- A gel of plantain and aloe vera was found more effective than placebo in reducing foot ulcers in diabetic patients.[30]
- A plantain extract combined with baking soda was found to be less effective than simple baking soda in treating chemotherapy-induced oral mucositis. The method of extraction was not specified.[31] In another study, however, plantain syrup was found to be significantly more effective than placebo in terms of both pain and severity of the mucositis.[32]

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[27] Adom et. al., 2017.
[28] M.A. Abdulghani, et al., Potential antidiabetic activity of Plantago major leaves extract in streptozocin-induced diabetic rats, Res. J. Pharm. Biol. Chem. Sci. (2015) 1–7.
[29] Adom et. al., 2017.
[30] Najafian, Y., Khorasani, Z. M., Najafi, M. N., Hamedi, S. S., Mahjour, M., & Feyzabadi, Z. (2019). Efficacy of Aloe vera/ Plantago Major Gel in Diabetic Foot Ulcer: A Randomized Double-Blind Clinical Trial. *Current Drug Discovery Technologies*, *16*(2), 223–231. https://doi.org/10.2174/1570163815666180115093007
[31] Cabrera-Jaime, S., Martínez, C., Ferro-García, T., Giner-Boya, P., Icart-Isern, T., Estrada-Masllorens, J. M., & Fernández-Ortega, P. (2018). Efficacy of Plantago major, chlorhexidine 0.12% and sodium bicarbonate 5% solution in the treatment of oral mucositis in cancer patients with solid tumour: A feasibility randomised triple-blind phase III clinical trial. *European Journal of Oncology Nursing: The Official Journal of European Oncology Nursing Society*, *32*, 40–47. httKalobaTUSS®, a paediatric cough syrup based on acacia honey and on Malva sylvestris extract, Inula helenium extract, Plantago major extract, and Helichrysum stoechasps://doi.org/10.1016/j.ejon.2017.11.006
[32] Soltani, G. M., Hemati, S., Sarvizadeh, M., Kamalinejad, M., Tafazoli, V., & Latifi, S. A. (2020). Efficacy of the plantago major L. syrup on radiation induced oral mucositis in head and neck cancer patients: A

- Plantain was found more effective than placebo at resolving pressure ulcers, and no side effects were found.[33]
- Plantain syrup decreased duration and severity of severe menstrual bleeding when administered during the first five days of menstruation for three cycles.[34]
- KalobaTUSS®, a paediatric cough syrup that includes plantain extract along with acacia honey and *Malva sylvestris, Inula helenium and Helichrysum stoechas* extracts was found significantly more effective than placebo at reducing severity and duration of coughing in children, and was well tolerated.[35]

Safety:

Safety class 1, Interaction class A.

Administered orally, doses up to 4g/kg were found safe in rats. No adverse effects have been documented.[36] While there is no traditional use or clinical data in pregnancy and lactation, plantain is a food-like plant and has no actions or energetics that would be of concern in either case.

Preparation and Dosage:

- infusion: 2t/c, up to 4 cups/day
    - tea is a great way to administer herbs to the gut because you get good contact with the epithelial tissue
- tincture fresh, 35% alc, 2-3mL up to 4x/day
- Various topicals (poultice, salves, juice, infused oil, wash)[37]

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randomized, double blind, placebo-controlled clinical trial. *Complementary Therapies in Medicine*, *51*, 102397. https://doi.org/10.1016/j.ctim.2020.102397

[33] Ghiasian, M., Niroomandi, Z., Dastan, D., Poorolajal, J., Zare, F., & Ataei, S. (2021). Clinical and phytochemical studies of Plantago major in pressure ulcer treatment: A randomized controlled trial. *Complementary Therapies in Clinical Practice*, *43*, 101325. https://doi.org/10.1016/j.ctcp.2021.101325

[34] Khodabakhsh, M., Mahmoudinia, M., Mousavi Bazaz, M., Hamedi, S. S., Hoseini, S. S., Feyzabadi, Z., Shokri, S., & Ayati, S. (2020). The effect of plantain syrup on heavy menstrual bleeding: A randomized triple blind clinical trial. *Phytotherapy Research: PTR*, *34*(1), 118–125. https://doi.org/10.1002/ptr.6502

[35] Carnevali, I., La Paglia, R., Pauletto, L., Raso, F., Testa, M., Mannucci, C., Sorbara, E. E., & Calapai, G. (2021). Efficacy and safety of the syrup "KalobaTUSS®" as a treatment for cough in children: A randomized, double blind, placebo-controlled clinical trial. *BMC Pediatrics*, *21*, 29. https://doi.org/10.1186/s12887-020-02490-2

[36] Gardner, 2013.

[37] Bancroft, 2020.