**BACKGROUND**

Eucommia (duzhong) refers to the bark of an unusual tree, commonly called the hardy rubber tree, that originated in central China. It is now grown as an ornamental and shade tree (reaching up to 60 feet) everywhere that a temperate climate permits its growth. The tree is Eucommia ulmoides, and among its unique qualities is the fact that there is only this one species in the entire genus Eucommia, and only one genus in its plant family Eucommiaceae. Further, this is the only latex-bearing tree that naturally arose in the temperate climate zone.

The genus name Eucommia means “good gum,” referring to this rubber latex, and the species name, ulmoides, refers to the appearance of the leaves, being somewhat like those of the elm. The Chinese name for the herb is based on an old story; according to Li Shizhen (author of Bencao Gangmu, 1596): “At one time there was a man named Du Zhong who took this herb and became enlightened; therefore, it was named after him.”

The part of the plant commonly used in traditional Chinese medicine practice is the trunk bark, which is stripped off the tree in large segments. The bark is usually collected during a short interval of less than three months from April through June, when the level of active constituents is at its highest. It is then folded so that the inner surfaces are together, and left for a few days until the inner surfaces turn black. The bark is then dried in the sun, and the coarse outer bark is stripped off. For marketing purposes, the strips of bark are usually cracked at regular intervals to reveal the white threads of latex. When properly collected, the bark regenerates promptly and a new layer appears in about a month; steps are taken to avoid having the exposed segments dry out (1, 2). The trees must be at least 10 years old in order to get suitable bark material. Wild Eucommia trees are rare and now protected because of deforestation; those used for medicinal materials are cultivated.

The amount of latex in the bark is relatively small, about 4% by weight, and the tree can’t be tapped like the tropical rubber tree (Hevea brasiliensis) for a renewable supply. However, the leaves are a good source of latex, which has gotten some industrial use in China, such as for lining pipes. The primary constituents of the bark that are thought to contribute its medicinal values are numerous iridoid and lignan glycosides. The main constituent of interest in relation to the traditional use of eucommia is the iridoid glycoside aucubin, which has also been isolated from other Chinese herbs (it is present in highest concentration in planta-go). Derivatives of aucubin, including harpagide, ajugoside, repotoside, ulmoside, and geniposide, are also found in the eucommia bark and also in its leaves.
TRADITIONAL USES OF EUCOMMIA
Eucommia was mentioned in the Shennong Bencao Jing (3):

Eucommia is acrid and balanced. It mainly treats pain in the lower back and knees, supplements the center, boosts the essence qi, fortifies the sinews and bones, strengthens the will, and eliminates genital damp itch and dribbling urine after voiding. Protracted taking may make the body light and slow aging.

Historically, it has been commonly used for alleviating lower body pain and for weakness of the sinews and bones. This is a condition that arises with deficiency of the liver and kidney, with emphasis on kidney yang deficiency, producing weakness of the lower body with easy penetration of “wind” that causes pain. Perhaps one of the best known of such applications of eucommia is the arthralgia remedy Duhuo Jisheng Tang (Tu-huo and Loranthus Combination), which is indicated for patients with deficiency syndrome having pain in the lumbar region and knees, and who are having difficulty with leg movements. In an analysis of herb formulas used for arthralgia (4), eucommia was a frequently mentioned ingredient in formulas that addressed lower body pain. In an analysis of formulas for lumbago and sciatica (5), eucommia was noted to be one of the most commonly used herbs, often combined with achyranthes and rehmannia to nourish the kidney and liver. As a contributor to tonifying kidney yang, it is one of several tonics in Yougui Wan, the basic formula for nourishing the right kidney, the storehouse of yang. In modern texts, eucommia is described as sweet, acrid, and warm, rather than acrid and neutral.

In most traditional formulations, eucommia serves as a relatively minor ingredient in a large combination of herbs, rarely comprising even 10% of the weight of the formula (it is 7% of Duhuo Jisheng Tang and 9% of Yougui Wan). However there are a small number of lesser known formulas that have eucommia making up a somewhat larger proportion, such as (6):

**Guishen Wan**
- Rehmannia 23.0%
- Dioscorea 11.5%
- Cornus 11.5%
- Hoelen 11.5%
- Lycium 11.5%
- Eucommia 11.5%
- Cuscuta 11.5%
- Tang-kuei 8.0%

This formula is made as a pill, indicated for kidney deficiency syndrome with sore lumbar region, weak knees and ankles, and impotence.

**Danggui Dihuang Yin**
- Rehmannia 9-15 g
- Tang-kuei 6-9 g
- Dioscorea 6 g
- Eucommia 6 g
- Cornus 3 g
- Achyranthes 4.5 g
- Baked Licorice 2.4 g

This is made as a decoction (eucommia is 13-16% of the formula by weight), and is indicated for the same conditions as mentioned above, but is a “female” version of the formula (with more blood nourishing effects, mainly due to the tang-kuei), so it is indicated for scanty menses instead of impotence, and it also is used when there are additional signs of blood deficiency, such as dizziness and tinnitus.

EUCOMMIA COMARED TO AND USED WITH OTHER TONIC HERBS
Yang Yifang, in a book comparing herbs of similar nature (7), noted that of four kidney tonifying herbs, eucommia, dipsacus, cibotium, and loranthus:

All of these four herbs have the function of tonifying the kidney and liver, and strengthening the bones and tendons. They are used for treating syndromes of kidney and liver deficiency, in which patients suffer from a weak, stiff, and painful back and knees, and difficulty with walking for a long
distance or standing for a long time. These herbs can be used alone or together in these situations. Eucommia has the strongest action in tonifying the kidney of these four herbs. It also has a gentle action in regulating the qi and blood. It is often used for kidney deficiency with symptoms of lower back pain and weakness, such as seen in chronic nephritis, chronic strain of the back, and rheumatoid arthritis.

Jiao Shude (8) notes that eucommia is often combined with dipsacus for injuries, saying that “eucommia promotes union of separated sinews and bones, while dipsacus promotes knitting of torn sinews and broken bones; these two medicinals have a mutually complementary therapeutic effect.” Further, he points out that “eucommia enters the qi aspect of the kidney channel and tends to treat aching lumbus and knees; dipsacus enters the blood aspect of the kidney channel and tends to treat inhibition of the joints of the lumbus and knees with difficult moving.” Comparing eucommia to loranthus, he notes that they both treat lumbar pain, but that loranthus dispels wind-damp and boosts the blood vessels, and is thus most suited to cases of blood deficiency with invasion of wind-damp, while eucommia warms the qi and dries dampness, making it most suitable for deficiency of kidney qi and invasion of cold-damp. Finally, he notes that when eucommia is combined with cooked rehmannia, it “allows cooked rehmannia to supplement without causing stagnation.”

**MODERN USES OF EUCOMMIA**

More than 50 years ago, eucommia was shown to have hypotensive action in laboratory studies conducted in the Soviet Union and China, and there was already some initial clinical use of the herb for this purpose. In fact, a formula with eucommia and other hypotensive Chinese herbs was developed at that time: Tianma Gouteng Yin (Gastrodia and Uncaria Combination). It was described in New Approaches to Patterns and Treatments in Complex Diseases (a text relaying research conducted during the 1950s). This formula has since become well-known as a treatment for hypertension. Additional studies were undertaken since then, mainly in China, and the primary hypotensive constituent was identified as pinoresinol diglucoside, one of 27 lignans found in eucommia (9).

This component, also found in the Chinese herb forsythia, is present in eucommia bark in only small concentrations. However, it has a significant dilating effect on the blood vessels. The herb and its extracts are now commonly found in Chinese patent remedies for hypertension (10), but this component is not alcohol soluble and is not useful in tinctures. Compound Cortex Eucommia Tablets are sold as a hypertension remedy and the package lists eucommia as the prime ingredient (others mentioned on the label are uncaria, prunella, and scute, all of which are attributed antihypertensive properties). During an evaluation of potential anti-hypertensive Chinese herbs that could be clinically tested in the U.S., ITM developed a six herb formulation with the four herbs just mentioned (eucommia, uncaria, prunella, and scute) plus loranthus and tang-kuei.

Aucubin and the other iridoids of eucommia are likely responsible for the anti-inflammatory effect, which is attained by inhibiting the arachidonic acid pathway (11, 12). This may partly explain its use in treatment of arthri-
Rehmannia, which also contains iridoid glycosides (including aucubin) as major active components, is often used with eucommia in the formulas for arthralgia.

It has been found that eucommia leaves can substitute for the bark, and hence these are increasingly used in China in order to get a larger amount of the desired medicinal agents from the limited cultivated groves. Eucommia leaves have also been made into a health beverage (13).

**Some Modern Formulas with Eucommia as a Main Ingredient**

Eucommia 18 represents a broad-based treatment for yang deficiency.

**Eucommia 18**

**Ingredients**

- Eucommia duzhong
- Morinda bajitian
- Dipsacus xuduan
- Cistanche roucongrong
- Drynaria gusuibu
- Achyranthes niuxi
- Rehmannia shudi
- Cornus shanzhuyu
- Epimedium yinyanghuo
- Liquidambar lulutong
- Lycium fruit gouqizi
- Dioscorea shanyao
- Ginseng renshen
- Ligustrum nuzhenzi
- Tang-kuei danggui
- Atractlodes baizhu
- Astragalus huangqi
- Hoelen fuling

**General Activities**

- Tonify yang, strengthen bones, nourish blood

**Sample Indications**

- Yang deficiency syndromes, including low back ache, weakness of legs, chilly sensation, low sex drive, impaired immune functions, osteoporosis

Uncaria 6 includes Eucommia as one of the individual herb ingredients, revealing an antihypertensive action.

**Uncaria 6**

**Ingredients**

- Uncaria gouteng
- Prunella xikucao
- Scute hungqin
- Scute hungqin
- Eucommia duzhong
- Loranthus sangjisheng
- Tang-kuei danggui

**General Activities**

- Purge liver fire, nourish kidney and liver

**Sample Indications**

- Hypertension, tinnitus

Drynaria 12 focuses on tonifying the kidney yang and vitalizing blood circulation and was developed for the treatment of osteoarthritis and bone and tendon problems in general.

**Drynaria 12**

**Ingredients**

- Drynaria gusuibu
- Dipsacus xuduan
- Rehmannia dihuang
- Astragalus huangqi
- Millettia juxueteng
- Tang-kuei danggui
- Achyranthes niuxi
- Eucommia duzhong
- Deer Antler lurong
- Cnidium chuanxiong
- Pine node songjie
- Tu-huo duhuo

**General Activities**

- Tonify yang, vitalize blood, nourish blood, strengthen tendons and cartilage

**Sample Indications**

- Osteoarthritis, back pain with chill sensation, recovery from injury to lower back or limbs, sciatica, osteoporosis, femur head necrosis.
CONCERNS ABOUT ALLERGIC REACTION TO LATEX

Latex is a well-known contact allergen: repeated skin exposure to it can, in some individuals, induce an allergic sensitivity to further contact with it. Latex is widely used, with substantial repeated exposure to those working in the production industry and to those using the finished latex products, such as medical workers and others who frequently utilize latex gloves. The latex in the industry is from the ordinary rubber plant, but there could be cross-sensitivity to eucommia latex. Fortunately, contact dermatitis rarely results in high sensitivity to orally ingested materials. Indeed, many people who react to the Asteraceae plants (the largest flowering plant family, known for high frequency of causing contact dermatitis, mainly due to sesquiterpene lactones) are able to consume the herbs with these same ingredients without any adverse effects. At this time, there is no evidence that persons who have contact sensitivity to latex respond adversely to orally ingested eucommia or its products. However, allergy reactions to complex substances, such as resins, are known to occur rarely and there could also be rare hypersensitivity to latex in eucommia.

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