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Centres of plant diversity

The Centres of Plant Diversity (CPD) are aimed to identify those areas around the world, which, if conserved, would safeguard the greatest number of plant species. It also aimed to document the many benefits, economic and scientific, that the conservation of those areas would bring to society and to outline the potential value of each for sustainable development, as well as to outline a strategy for the conservation of the areas selected. The

CPD sites vary enormously in size, from extensive mountain systems, to island complexes and small forest areas. They are distributed around the globe, grouped into the following regions - Europe, Africa, South West Asia and the Middle East; Asia, Australasia and the Pacific; and the Americas.

Criteria

The criteria adopted for the selection of sites and vegetation types was based principally on a requirement that each must have one or both of the following two characteristics: ¹

- The area was evidently **species rich**, even though the number of species present may not be accurately known;
- The area was known to contain a large number of species **endemic** to it.

The following characteristics were also considered in the selection process involving extensive consultations with experts in all the major regions of the world:

- The site contained an important **gene pool** of plants of value to humans or that are potentially useful;
- The site contained a diverse range of **habitat** types;
- The site contained a significant proportion of species adapted to special edaphic conditions;

The site was threatened or under imminent threat of large-scale devastation.

Most mainland sites have in excess of 1000 vascular plant species, of which at least 10% are endemic, including some that are termed 'strict endemics'- those endemic to the site. Island sites typically have fewer species, but a higher percentage of these are endemic. To qualify, island sites must have flora that contained at least 50 endemic species or at least 10% of the flora must have been endemic at the time of the assessment. ¹

Types of centres of diversity of crops -

The centres of crop diversity are of three types viz:

1) Primary centres of diversity,

2) Secondary centres of diversity

3) Micro –Centres.

1. Primary Centres of Diversity:

Primary centres are regions of vast genetic diversity of crop plants. These are original homes of the crop plants which are generally uncultivated areas like, mountains , hills, river valleys, forests, etc. Main features of these centres are-

- : 1. They have wide genetic diversity.
2. Have large number of dominant genes.
3. Mostly have wild characters.
4. Exhibit less crossing over.
5. Natural selection operates.

2. Secondary Centres of Diversity:

Vavilov suggested that valued forms of crop plants are found far away from their primary area of origin, which he called secondary centres of origin or diversity. These are generally the cultivated areas and have following main features.

1. Have lesser genetic diversity than primary centres.
2. Have large number of recessive genes.
3. Mostly have desirable characters.
4. Exhibit more crossing over
5. Both natural and artificial selections operate.

3. Microcenters:

In some case, small areas within the centres of diversity exhibit tremendous genetic diversity of some crop plants. These areas are referred to as micro-centres. Microcenter is important sources for collecting valuable plant forms and also for the study of evolution of cultivated species. The main features of micro centres are-

1. They represent small areas within the centres of diversity.
2. Exhibit tremendous genetic diversity.
3. The rate of natural evolution is faster than larger areas
- . 4. They are important sites for the study of crop evolution

Vavilov centres of biodiversity

Center	Plants
1) South Mexican and Central American Center	<p>Includes southern sections of Mexico, Guatemala, Honduras and Costa Rica.</p> <ul style="list-style-type: none"> • Grains and Legumes: maize, common bean, lima bean, tepary bean, jack bean, grain amaranth • Melon Plants: malabar gourd, winter pumpkin, chayote • Fiber Plants: upland cotton, bourbon cotton, henequen (sisal) • Miscellaneous: sweetpotato, arrowroot, pepper, papaya, guava, cashew, wild black cherry, chochenial, cherry tomato, cacao.
2) South American Center	<p>62 plants listed; three subcenters</p> <p>2) <i>Peruvian, Ecuadorean, Bolivian Center:</i></p> <ul style="list-style-type: none"> • Root Tubers: Andean potato, Other endemic cultivated potato species. Fourteen or more species with chromosome numbers varying from 24 to 60, Edible nasturtium • Grains and Legumes: starchy maize, lima bean, common bean • Root Tubers: edible canna, potato • Vegetable Crops: pepino, tomato, ground cherry, pumpkin, pepper • Fiber Plants: Egyptian cotton • Fruit and Miscellaneous: cocoa, passion flower, guava, heilborn, quinine tree, tobacco, cherimoya <p>2A) <i>Chiloe Center</i> (Island near the coast of southern Chile)</p> <ul style="list-style-type: none"> • Common potato (48 chromosomes), Chilean strawberry <p>2B) <i>Brazilian-Paraguayan Center</i></p> <ul style="list-style-type: none"> • manioc, peanut, rubber tree, pineapple, Brazil nut, cashew, Erva-mate, purple granadilla.
3) Mediterranean Center	<p>Includes the borders of the Mediterranean Sea. 84 listed plants</p> <ul style="list-style-type: none"> • Cereals and Legumes: durum wheat, emmer, Polish wheat, spelt, Mediterranean oats, sand oats, canarygrass, grass pea, pea, lupine • Forage Plants: Egyptian clover, white clover, crimson clover, serradella • Oil and Fiber Plants: flax, rape, black mustard, olive • Vegetables: garden beet, cabbage, turnip, lettuce, asparagus, celery, chicory, parsnip, rhubarb, • Ethereal Oil and Spice Plants: caraway, anise, thyme, peppermint, sage, hop.
4) Middle East	<p>Includes interior of Asia Minor, all of Transcaucasia, Iran, and the highlands of Turkmenistan. 83 species</p> <ul style="list-style-type: none"> • Grains and Legumes: einkorn wheat, durum wheat, poulard wheat, common wheat, oriental wheat, Persian wheat, two-row barley, rye, Mediterranean oats, common oats, lentil, lupine

	<ul style="list-style-type: none"> • Forage Plants: alfalfa, Persian clover, fenugreek, vetch, hairy vetch • Fruits: fig, pomegranate, apple, pear, quince, cherry, hawthorn.
5) Ethiopia	<p>Includes Abyssinia, Eritrea, and part of Somaliland. 38 species listed; rich in wheat and barley.</p> <ul style="list-style-type: none"> • Grains and Legumes: Abyssinian hard wheat, poulard wheat, emmer, Polish wheat, barley, grain sorghum, pearl millet, African millet, cowpea, flax, teff • Miscellaneous: sesame, castor bean, garden cress, coffee, okra, myrrh, indigo.
6) Central Asiatic Center	<p>Includes Northwest India (Punjab, Northwest Frontier Provinces and Kashmir), Afghanistan, Tadjikistan, Uzbekistan, and western Tian-Shan. 43 plants</p> <ul style="list-style-type: none"> • Grains and Legumes: common wheat, club wheat, shot wheat, peas, lentil, horse bean, chickpea, mung bean, mustard, flax, sesame • Fiber Plants: hemp, cotton • Vegetables: onion, garlic, spinach, carrot • Fruits: pistacio, pear, almond, grape, apple.
7) Indian Center	<p>Two subcenters</p> <p>7) <i>Indo-Burma</i>: Main Center (India): Includes Assam and Burma, but not Northwest India, Punjab, nor Northwest Frontier Provinces, 117 plants</p> <ul style="list-style-type: none"> • Cereals and Legumes: rice, chickpea, pigeon pea, urd bean, mung bean, rice bean, cowpea, • Vegetables and Tubers: eggplant, cucumber, radish, taro, yam • Fruits: mango, orange, tangerine, citron, tamarind • Sugar, Oil, and Fiber Plants: sugar cane, coconut palm, sesame, safflower, tree cotton, oriental cotton, jute, crotalaria, kenaf • Spices, Stimulants, Dyes, and Miscellaneous: hemp, black pepper, gum arabic, sandalwood, indigo, cinnamon tree, croton, bamboo. <p>7A) <i>Siam-Malaya-Java</i>: statt Indo-Malayan Center: Includes Indo-China and the Malay Archipelago, 55 plants</p> <ul style="list-style-type: none"> • Cereals and Legumes: Job's tears, velvet bean • Fruits: pummelo, banana, breadfruit, mangosteen • Oil, Sugar, Spice, and Fiber Plants: candlenut, coconut palm, sugarcane, clove, nutmeg, black pepper, manila hemp.
8) Chinese Center	<p>A total of 136 endemic plants are listed in the largest independent center</p> <ul style="list-style-type: none"> • Cereals and Legumes: e.g. broomcorn millet, Italian millet, Japanese barnyard millet, Koaliang, buckwheat, hull-less barley, soybean, Adzuki bean, velvet bean • Roots, Tubers, and Vegetables: e.g. Chinese yam, radish, Chinese cabbage, onion, cucumber • Fruits and Nuts: e.g. pear, Chinese apple, peach, apricot, cherry, walnut, litchi • Sugar, Drug, and Fiber Plants: e.g. sugar cane, opium poppy, ginseng camphor, hemp.