

Lecture: - 4

Centres of Origin

Centres of Origin:-

The concept of centres of origin was given by Vavilov based on his studies of a vast collection of plants at the institute of plant industry, Leningrad. It is of 2 types.

- **Primary centres of origin:-**Crop plants evolved from wild species in the areas showing greater diversity. Later, crops moved to the other areas primarily due to the activities of the man.
- **Secondary centres of origin:-**certain crop species show considerable diversity of forms although they did not originate there. Such areas are known as secondary centres of origin of these species.

Law of Homologous Series in variation:-

- Vavilov postulated this law of homologues series and this law states that characters found in one species also occur in other related species.
- In wheat diploid (2x), tetraploid (4x) and hexaploid (6x) wheats show a series of identical contrasting characters. Similarly, genes secale duplicates the variation found in Triticum.
- Thus a character absent in a species, but found in a related species, is likely to be found in the collections of that species from the centre of its origin.

❖ Main centres of origin proposed by Vavilov:-

1. **Chinese centre:-**This centre consists of the mountainous regions of the Central and Western China and the adjacent low lands. It is the largest and oldest independent centre of origin. A total of 136 endemic plants are listed, among which are a few important crops such as,
 - ✓ It is the primary centre of origin: Soybean, Radish. Colocasia antiquorum, Panicum, Miliaceum and some other species of millets, buckwheat, opium poppy. Several species of Brassica and Allium, Brinjal, some species of Cucurbita, pears, peaches, apricot, plums, orange, Chinese tea.
 - ✓ It is the Secondary centre of origin for maize, Rajsmash, Cowpea, turnip, sesame.

2. **Hindustan centre:-**This centre includes Assam and Burma (now called Myanmar), Malaya Archipelago, Java and Sumatra one hundred and seventeen plants are considered to the endemic.
 - ✓ It is the primary centre of origin for Rice, Arhar, Chickpea, Mungbean, Brinjal, Turnip Cucumis sativus, Lettuce, certain species dioscorea, Raphanus indicus, Saccharum officinarum several species of cotton (particularly *Gossypium arboreum*), Hemp, Black pepper (*Piper nigrum*) indigo, mango, orange, sour lime and Some other citrus species, coconut, banana and turmeric.
3. **Central Asiatic centre:-**This region includes north west India (Punjab, Northwest frontier province and Kashmir), Afghanistan, Tadjikistan and Uzbekistan (USSR) and Tian-Shan (China). Forty three plants are tested. It is also known as the Afghanistan centre of origin. The crops originated in this centre.
 - ✓ The crops originated in this centre (Primary centre of origin) are, wheat club wheat (*Triticum compactum*), Pea, Broad bean, Linseed, Safflower cotton, Musk melon, carrot, pear, almond, Grapes, apple, Spinach, apricot.
 - ✓ It is secondary centre of origin of rye.
4. **Near Eastern centre:-**This is also known as the Asia Minor centre or Persian centre of origin. This region includes the interior of Asia Minor, all of Transcancasia, Iran and high lands of Turkmenistan (USSR). Eighty-three species are included in this region.
 - ✓ The crop species that originated in this region (primary centre of origin) include nine species of Triticum, rye, alfalfa, Persian clover, carrot, cabbage, oats, lettuce, fig, pomegranate, apple several species of pyrus, prunus, grape, almonds, chestnut.
 - ✓ It is the secondary centre of origin of rape, black mustard, turnip and apricot.
5. **Mediterranean centre:-**This region includes the borders of the Mediterranean sea. Eighty four plants are known to have originated here including many valuable cereals, legumes and cultivated vegetables.
 - ✓ The species that originated in this centre (primary centre of origin) are: Durum wheat (*T. durum*), emmer wheat (*T. dicoccum*) and other Triticum species, several species of Avena, Barley, Lentil, several species of Lathyrus, pea, broad bean, Lupines,

Chickpea, clovers, several species of Brassica, Onion garlic, Lettuce, Antichoke, Asparagus, Lavender and Peppermint.

6. **Abyssinian Centre:-**It comprises Abyssinia (now Ethiopia) Eritrea and parts of Somalia. Thirty eight species are native to this region.

- ✓ It is the primary centre of origin for *Hordeum vulgare* (Barley), *Triticum durum*, *T. turgidum* *T. dicoccum*, *Sorghum bicolor*, Bajra, gram lentil, *Dolichos lab lab*, Linseed, Safflower, sesame, castor, coffee, onion, okra. It is the secondary centre of origin for broad bean. (*Vicia faba*).

7. **South Mexican and Central American centre:-**This includes the region of southern parts of Mexico, Guatmela, Honduras and costa rica.

- ✓ The plants originated as primary centre here maize, Rajmash (*Phaseolus vulgaris*), Lima bean (*P. lunatus*), melons, pumpkin, sweet potato, Arrow root, chillies, cotton, (*G. hirsutum* and *G. purpureascens*), papaya (*carica papaya*), guava and avacado.

8. **South American centre:-**This centre includes the high mountainous region of Peru, Bolivia, Ecuador, Colambia, Parts of Chile and Brazil and whole of Paraguay.

- ✓ This centre is the primary centre of origin for many species like potato, maize, lima bean, pea nut, pine apple (*Ananas comora*), pumpkin (*Cubbita maxima*), Egyptian cotton (*G. barbadense*), tomatoes, guava, tobacco, quinine tree, cassava (*Manihot utilissima*) and rubber.

Centres of diversity:-These centres of diversities may not be the centres of origin of the species concerned, but they are the areas of the maximum diversity of these species.

4.1.1 **Micro centres:-** Within the large centres of diversity, small are may exhibit much greater diversity than the centre as a whole. These areas are known as "Micro centres". The crop evolution appears to proceed at a more rapid rate in such micro centres.

4.1.2 **Agroecological groups:-**Vavilov called this small areas varietal richness within the basic centre of diversity as " agro-ecological groups". Harlan identified three such micro centres in Turkey. Harlan advocates an intensive survey of micro centre populations.