Indian J. Pl. Genet. Resources 9(2): 201-218, 1996

ALLIUM BIODIVERSITY AND ITS TRADITIONAL PROPHYLACTIC SIGNIFICANCE IN INDIAN SUB-CONTINENT

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Allium, a well known vast genus, constitutes not only man's palatables but also signifies its ethnomedicinal potential worldwide in the traditional effective therapy against various ailments. This genus has been the subject of taxonomic renovation among the Botanists for a long and consequently it has to traverse its positional distance from Liliaceae to Alliaceae. Some species of the genus are originated outside the Vavilovian centres but most of these are confined to temperate world. Three new species viz., *A. caesium* Shrenk, A. *fasciculatum* Rendle and *A. prattii* Wight are being reported in addition to the previous reviews on *Alliums* in Hindustani Centre of biodiversity. The present review deals with taxonomic status, distribution, domestication, diversity of different *Allium* species in Indian sub-continent and their affinities and medicinal significance in Indian traditional medicine system.

Key words : *Allium* species, biodiversity, ethnomedicinal potential

The best known diagonostic characteristics of *Allium*, in general, are their smell and taste. The *Alliums* mainly have underground bulbous structure and are low growing annuals, biennials and perennials. Important vegetative parts of these plants are leaves and rhizome, more specifically bulbs. The leaves emerge from the underground portion of stem and also sometimes have sheathing bases, thus are known as pseudo-stems. Except single spathe which encloses the young inflorescence, no leaf is found on the flower stalk. Flowers are arranged in an umbel-like inflorescence. Each flower consists of six perianths arranged in two whorls of three each. Flower colour ranges from white, rose, violet, blue to yellow and hence these coloured *Alliums* are also grown for their ornamental value and showy appearance (Davies, 1992).

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TAXONOMIC STATUS OF *ALLIUMS*

Henelt (1990) reviewed the taxonomic status of *Alliums* considering the earlier descriptive details by Jones and Mann (1963), and the revised contextual taxonomic state of *Alliums* is - Monocotyledones, Liliiflorae (super order), Asparagales, Alliaceae, Alliae (tribe) and genus *Allium*. He further divided the genus into five subgenera and within subgenus level, different sections have been categorized; single or several species may comprise an individual section such as *A. cepa* and *A. fistulosum* have been grouped under *Cepa* section of *Rhizirideum* subgenus while *A. ampeloprasum* and *A. sativum* were placed under *Allium* section of subgenus *Allium*. Earlier, the genus *Allium* was classified under the family Liliaceae and was followed for a long; later on it was placed under the family Amarylidaceae, by some phytologists, but it was given a separate position in the family Alliaceae by Purseglove (1972).

DISTRIBUTION OF *ALLIUMS* IN THE WORLD

Approximately one thousand wild species of *Allium* have been noticed throughout the world, distributed in different megacentres of biological diversity particularly in the northern temperate regions (Buijsen, 1990). Vavilov (1931) initially revised it from seven to eight but at a later stage, he recognized ten gene centres. Based on the fact that some species still originating outside the Vavilov's recommended centres, Zhukovsky (1965) compounded a view with 12 megacentres of origin throughout the world stretching vast areas of land. He himself further made some modifications of megacentres boundaries (still the precision of exact boundary limitations is not complete), however, Zhukovsky (1965, 1970) propounded 12 megacentres widely based on the Vavilov's earlier diversity distribution studies. Prominent centres of diversity of *Alliums* are East-Asian Centre (Chinese-Japanese region), Hindustani Centre (Indian Sub-continent), South-West Asian Centre (Central Asian Region), Near-East Centre, Mediterranean Centre, European- Siberian Centre (Fig. 1). Thus, it is believed that most of the *Alliums* cultivated in South-East Asian region are the introduced variants either from Chinese-Japanese region or from Central Asian region. The probability of its introduction also from European region can not be ruled out (Buijsen, 1990).

Alliums are distributed widely throughout the temperate, warm temperate and in some zones of northern hemisphere. In Eurasia, the species diversity ranges from Turkey eastwards to the mountains of Central Asia through northern Iran, Afghanistan, Tajikstan, the Tien Shan mountains of Kirgiziya and North-East China, also the mountains of Mongolia and southern Siberia. Depending upon ecological and general climatic variation, different important species are cultivated and domesticated in different regions of the world. The first domestication of *A. cepa* is considered to be in the mountaineous region

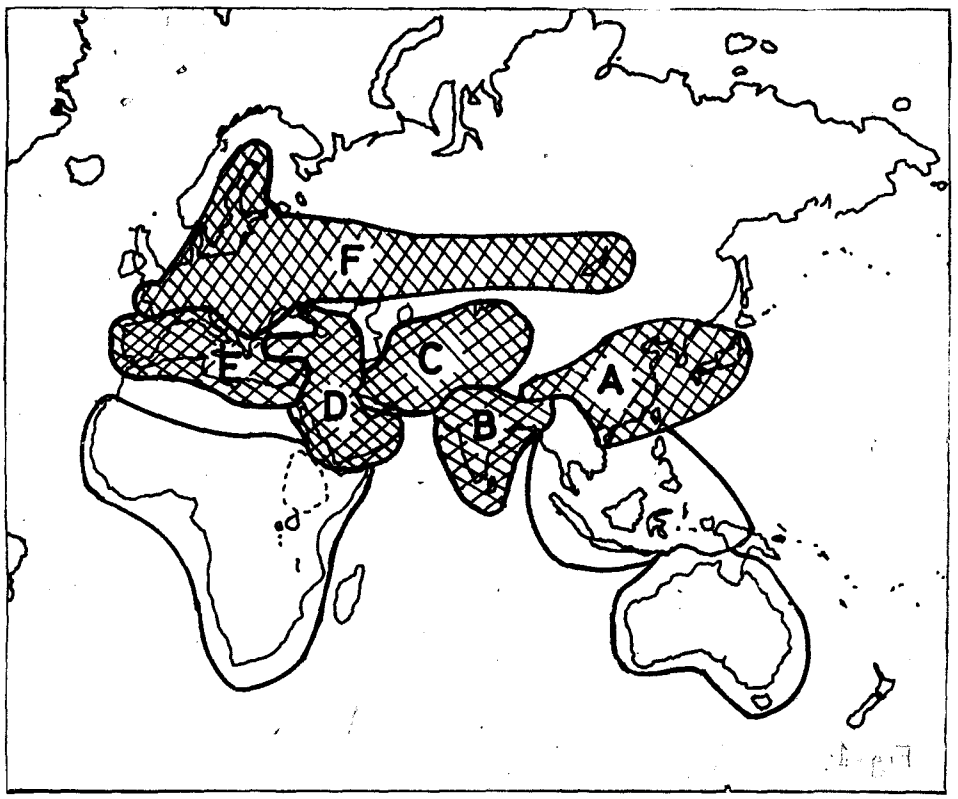

Fig. 1. Allium biodiversity distribution in prominent world megacentres of origin of phytodiversity. A — Chinese-Japanese Region, B — Hindustani Region, C — Central Asian Region, D — Near Eastern Region, E — Mediterranean Region, F — European-Siberian Region

of Turkmenia, Uzbekistan, Tajikstan, North Iran, Afghanistan and Western Himalayan region. More than 600 *Allium* species have been reported from temperate zone; wild species are concentrated in northern hemisphere in different centres of diversity.

ALLIUMS IN INDIA

Though 40 species (Wlth. India, 1985) were reported in India, the distribution of wild species still need proper elucidation. Most of the *Alliums* in India are distributed in temperate and alpine zones of Himalaya (Kachroo, 1977). In Hindustani centre (Indian sub-continent), only *A. ampeloprasum* has been quoted to be present by Zeven and de Wet (1982) and reported by Koul

and Gojil (1970) from Kashmir. However, Hooker (1894) described four *Allium* species, *A. ascalonicum, A. ampeloprasum, A. cepa* and *A. sativum* most common in use and cultivation. Both the reports by Hooker (1894) and Zeven and de Wet (1982) were quite incomplete probably due to lack of adequate exploratory studies on *Allium* biodiversity in India and that is why the possibility of inclusion of other naturally occurring wild species in Indian gene centre was absent in their previous citations. A more comprehensive information in this regard has been provided by Chandel and Pandey (1992) and they have enlisted 27 wild species of *Alliums* in India distributed in different temperate regions of the country. In the present review, three more species have been added to the previous information on *Allium* biodiversity in Indian gene centre. These are *A. caesium*, Shrenk, *A. fasciculatum* Rendle and *A. prattii* Wright which have overlapping distribution in Indian Himalayas adjoining western Nepal and Tibet. Out of these 30 species, only four or five species are cultivated and used as different recipes in food, vegetables, condiments, pickling, salad, medicine and also decorated ornamentally in gardens. Most of the species in wild state are found in the domain of Himalayan region (Fig. 2a, 2b, 2c and 3).

Description of the new additions

(i) *A caesium* Schrenk : It is common to Lahaul area in Himachal Pradesh and has its marked distinction by its dark blue flowers. Flowering stem is comparatively longer than the leaves which are 1-2 mm broad; inflorescence umbel 3-4 cm.

(ii) *A. fasciculatum* Rendle : The scented herb, comprising white or pale-green flowers with umbel inflorescence is found in borderland area of Indian Himalaya adjoining western Nepal and Tibet.

(iii) *A. prattii* Wright: The plants have pink coloured flowers, narrow elliptic paired leaves and many flowered umbel inflorescence. Flowering stems are longer than the leaves, fibrous sheath surrounds the base of the stem

Affinities within some notable *Alliums*

Alliums cepa being cultivated for a long, is related to *A. pskemense* and *A. vavilovi* which grew wild in central Asia especially northwest India, Afghanistan, Uzbekistan and west Tien Shan (Vavilov, 1949). Other related wild species is *A. oschaninii* (syn. *A. cepa* var. *sylvestris*) from Pamirs, Alai and Tien Shan. Wendelbo (1971) and Mc Collum (1974) suggested that these species are wild relatives of *A. cepa*. Secondary centre of origin of *A. cepa* is considered to be the mediterranean region but said to be originated in Persia. Romans introduced onion into western and northern Europe around 300 A.D.

A. sativum has been considered to be a native of China. Some workers consider *A. longicuspis* as the wild parental stock of garlic. *A. sativum* is thought

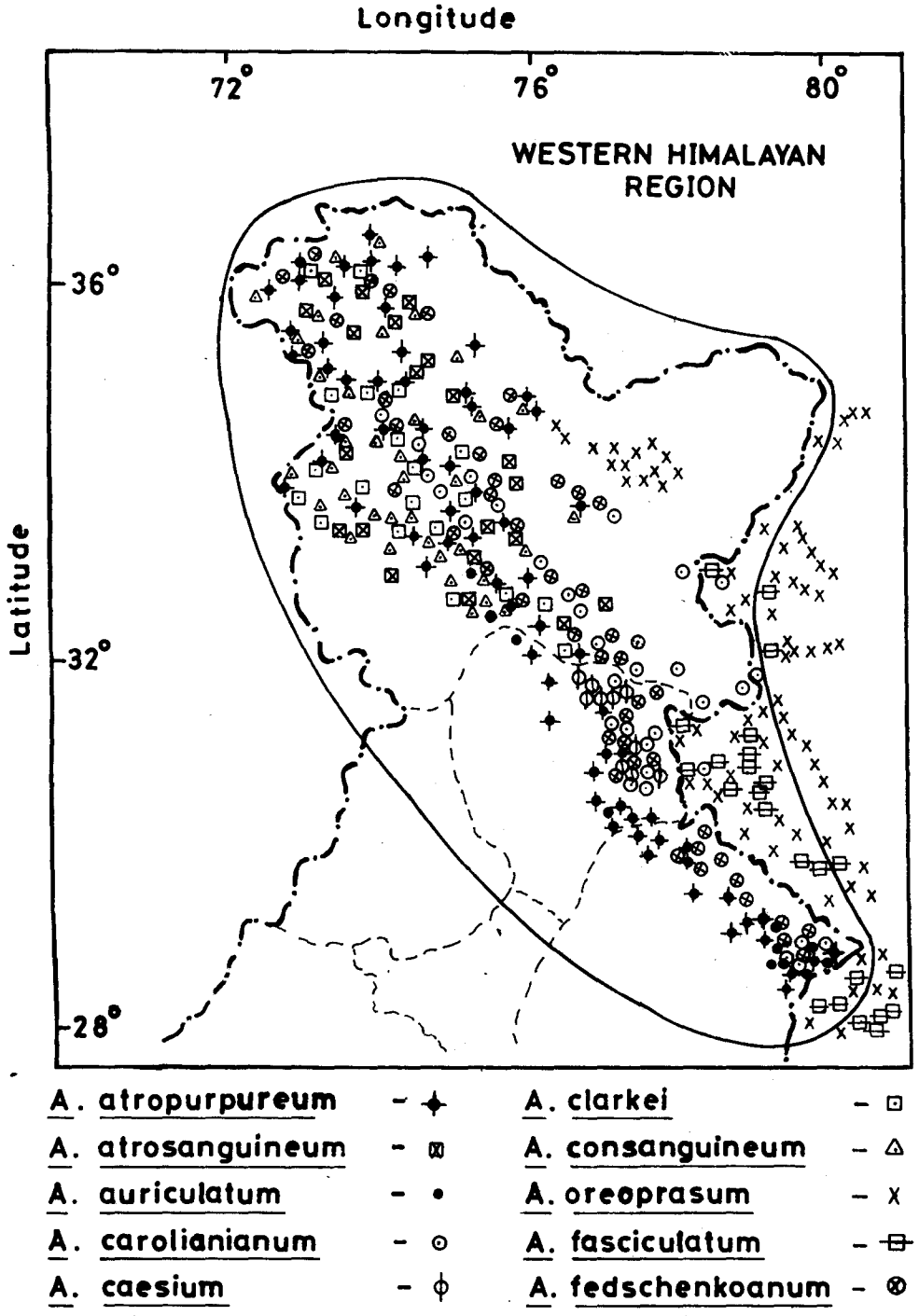

Fig. 2a. Occurence of *Allium* biodiversity in Western Himalayan region in Indian gene centre

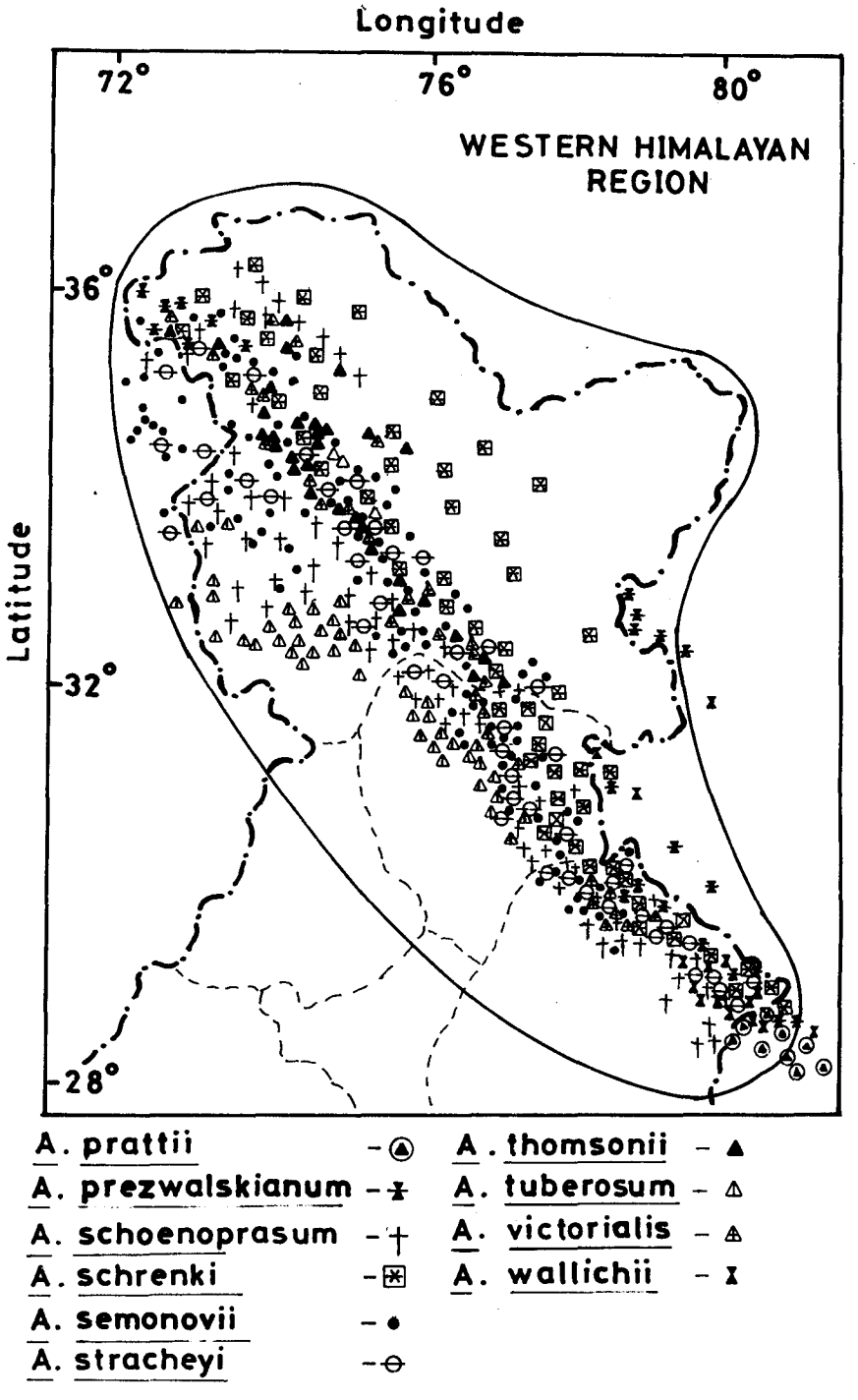

Fig. 2b. Western Himalayan region continued

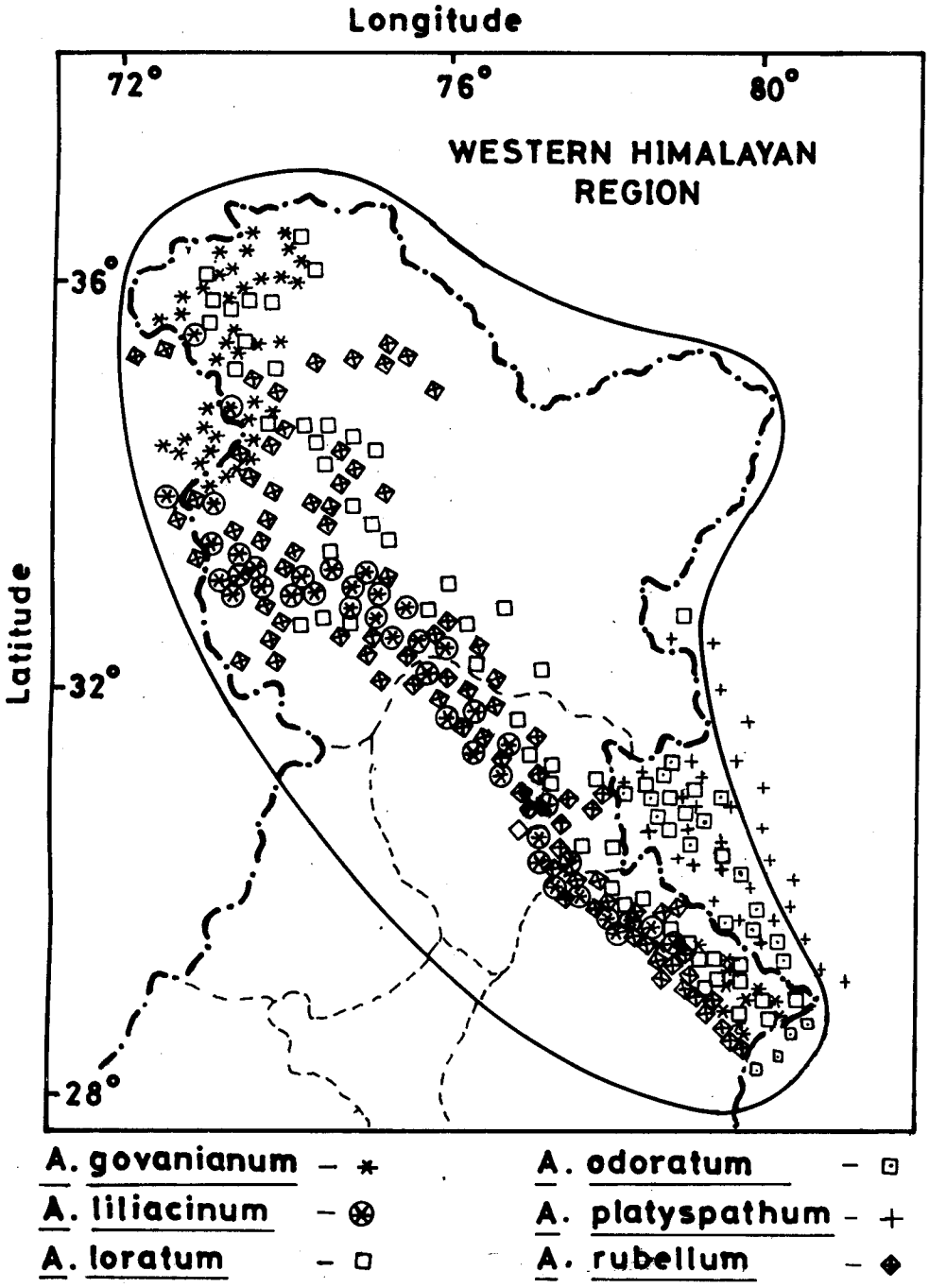

Fig. 2c. Western Himalayan region continued

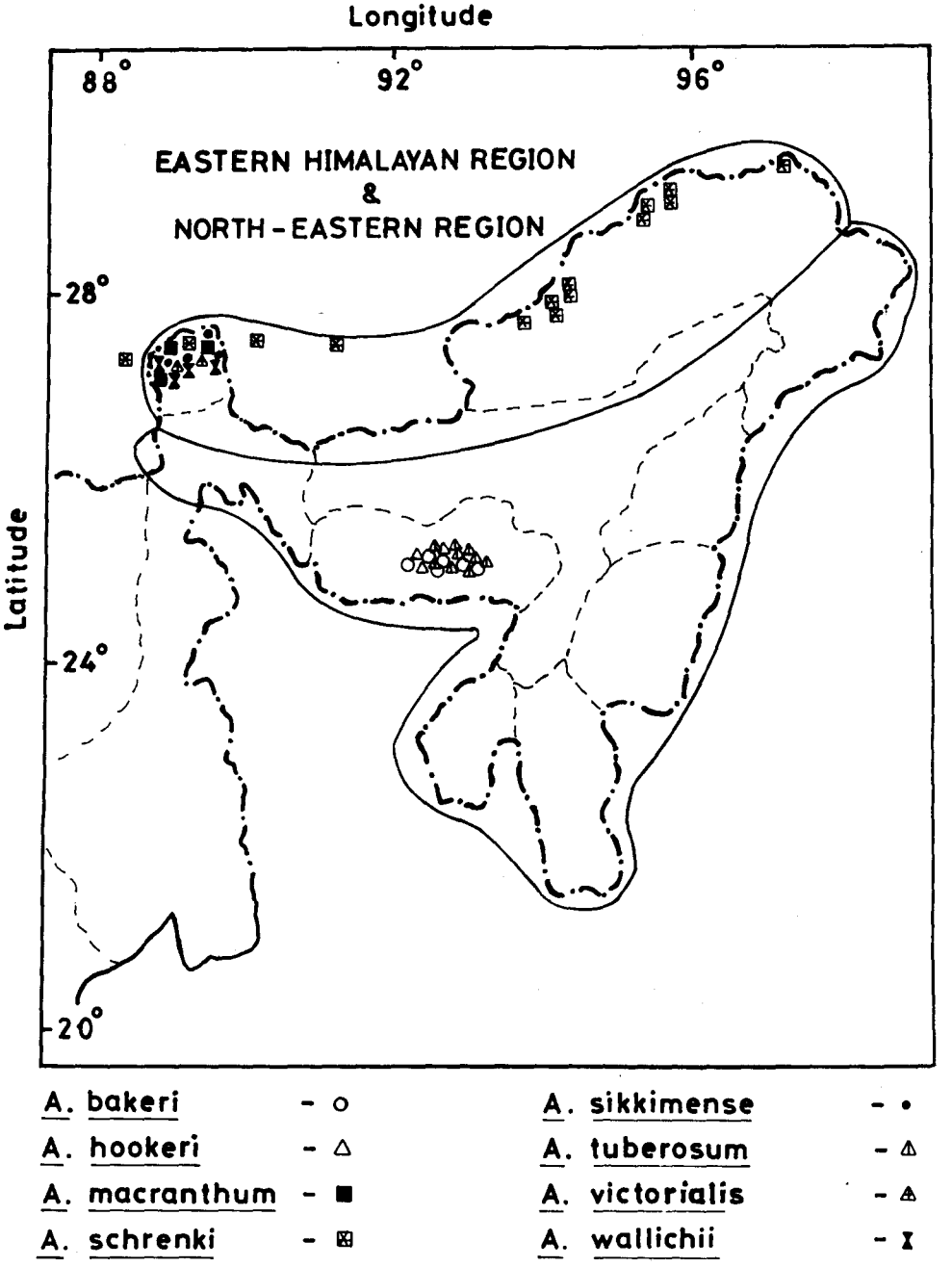

Fig. 3. Occurence of *Allium* biodiversity in Eastern Himalayan region in Indian gene centre

to be originated in Central Asia, while the secondary centre have been recognised in the Mediterranean region. The wild and cultivated forms of *A. ampeloprasum* (levent garlic) are highly variable and it is considered related to *A. sativum, A porrum, A. kurrat* and *A. scorodoprasum.* Levent garlic is an ancient crop mentioned in the Bible and most probably domesticated in the Mediterranean region. *A. porrum* (leek) is a cultivated form *A. ampeloprasum.* Few nomenclaturists consider both these species as one and synonyms. Because of a close relation of *A. kurrat* to *A. ampeloprasum,* it has been mistakenly included as a variety (var. *kurrat*) either of *A. ampeloprasum* or *A. porrum. A. kurrat* is known from the times of Pharaohs and grown mainly in Arabia and Egypt. The centre of origin of *A. ascalonicum* (Shallot) has been probably recognized in West Asia. The earlier history indicates that the crop is related to *A. cepa*. The presence of *A. macleani* stretches in the areas from Iran to Afghanistan. According to Tutin (1976), the species *A. scorodoprasum* (giant garlic) comprised four subspecies viz., *A. scorodoprasum rotundum, A. scorodoprasum waldsteinii, A. scorodoprasum jajlae* and *A. scorodoprasum scorodoprasum,* probably the later sub-species was derived from sub-species *rotundum.* At present *A. tuberosum* (syn. *A. odoratum*) has been reported wild from East Mongolia to Japan, Philippines and through Thailand to Northern India; the primary centre of origin is unknown. It is thought to have been originated in China. Its tetraploid may derive from an amphiploidization of hybrid of two diploid species or autotetraploidization of a diploid species. Egyptian onion or tree onion (*A. proliferum*) was previously described as a variety of onion as *A. cepa* var. *proliferum* and *A. fistulosum* but later, on the basis of a comprehensive C-banding study, it was declared as a true hybrid of both of these species (Fiskenjo, 1975; Vosa, 1976). *A. fistulosum* (Welsh onion, stone leek, spring onion) probably originated in north-west China has been recognized to show a close affinity with *A. altaicum* from North Mongolia while the former is reported to be first cultivated in North China. And *A. microbulbum* is said to be a hybrid of *A. fistulosum* and *A. altaicum.* Cultivation of Welsh onion dates back to 200 BC in China and reached to Japan around 500 AD, now it is spread throughout the South-East Asia. *A. chinense* is native to central and eastern China and mainly cultivated in China and Japan. Because of a very polymorphous nature of *A. schoenoprasum,* its intra-generic relationship with other species is not well documented.

Most of the species have been introduced from Near-East, Central Asia and East Asia, usually the basic haploid state of x = 8 have been reported in most of the *Alliums.* But an interesting state of haploidy have been noticed in the subgenus *Amerallium* comprising around 27 species. The species in this group have the basic chromosome number x = 7 not as like others x = 8, also these species have some anatomical differences such as the position of vessels and lacticifers in the leaves (Hanelt, 1995). These mediterranean group

of *Alliums* are distributed well in America, temperate areas of west and central Europe and extending to Himalayas and south-west China.

GLOBAL ECONOMIC STATUS OF ALLIUMS

Alliums have their historical occupation in the feeding habit and out of a vast *Allium* variants, only few species could obtain their place in the man's history of plant domestication and cultivation. Onion had very old cultivation practice and still capturing an excellent market in the world next to cabbage and tomatoes, thus, it has third position in terms of global production (FAO, 1991), with 2 million tonnes annual International trade amounting 400 million US dollar. In India, onion production is reported to be around 3,59,0000 tonnes. In comparison to onion, shallot is less important economically. These are only produced in small scale in home gardens. Their importance are mainly confined to the humid tropical areas because of disease and pest resistance to grow in a particular environment (Currah and Proctor, 1990). According to Eurostat (1990), these are mainly produced in France covering 2500 ha area under cultivation giving 39000 tonnes of production. Especially in the developed countries. *A. sativum* is second widely consumed *Allium*. The world production of garlic is about 2.9 million tonnes. Californian climate is the most suitable for garlic cultivation and production that yields highest quality of garlic. The most suitable chain of climate is mild winter with little rain followed by dry summer (FAO, 1991). India is considered fourth out of 10 leading countries for garlic production. India's production is 217000 m tonnes with 60000 ha in comparison to world's garlic production of 2962000 m tonnes with 421000 ha area. European Economic Community (EEC) member countries preferably produce leeks, an important European *Allium* crop, producing about 7 million tonnes per year that is rating 25 per cent of onion production. Of the member countries, France is the highest producer of leeks (Eurostat, 1990). Kurrat which is closely related to leek, is grown for fresh leaves in east mediterranean region, more precisely in Egypt (Meer and Hanelt, 1990). Japanese bunching onion and Chinese chives are crops of commercial importance in East Asia, notably Japan, Korea and China. Annual production of Japanese bunching onion in Japan is about 600000 tonnes almost half of the country's onion production and the cost of bulb onion is half to that of bunching onion. South Korea produces about 430000 tonnes of Japanese bunching onion annually (Rabinowitch and Brewster, 1990 a, b). Chinese chives are preferably grown as garden plant and flavouring herb and, particularly domesticated in Denmark, New Zealand and Germany. The production of chinese chives is comparatively less, amounting only 66000 tonnes.

Flavour biochemistry of Alliums

In general, the compounds present in *Alliums* are mainly sulphur containing biomolecules which impart a peculiar remarkable smell and pungency. Possible detailed studies on the nature of flavour and other biochemical properties have been investigated in the last decade by few workers (Block, 1985; Fenwick and Hanley, 1985 a, b; Lancaster and Boland, 1990). As the sulphur is a well known mineral ingredient in the sapidity of *Allium* tissues, it remains bound with non-protein amino acids which further constitute the precursor of volatile compounds. Though precursors have no smell and non-volatile amino acids with a basic skeleton-S-Alk (en) yl cysteine sulphoxides

Cysteine sulphoxide group

R may be CH_3 (methyl), CH_3-CH_2-CH_2 (propyl), CH_3-CH≡CH (1-propenyl) and CH_2= CH-CH (2-propenyl). S-alk (en)yl-L-Cysteine sulphoxide lyase (enzyme alliinase) controls the reactions of flavour precursors on damaging fresh tissues yielding sulphenic acids (R-S-OH), ammonia and pyruvic acid (Block, 1985) in the presence of pyridoxal phosphate. Onwards, the highly reactive sulphenic acid undergoes further reactions and the resultant composition gives a volatile and pungent smelling products. These reactions depend upon and varies with species and other environmental conditions. Because of this reason, the boiled onion never imparts proper flavour, boiling treatment destroys the enzyme. In the case of garlic, allinase catalyze the formation of allicin which provides a peculiar garlic smell.

Chemical composition in Alliums

Besides different volatile flavour constituents in different *Allium*, in general, carbohydrates make up about 5-12 per cent, and much of the dry matter is stored particularly in the form of fructans (a long chain polymer of frutose) in the vacuoles (Hendry, 1993), 1-2 percent protein and 0.2 per cent fat. Besides other amino acids, proteins in *Allium* have glutamic acid (a basic amino acid of nitrogen source) as one of the main constituent. Flavonols, anthraquinones, saponins, sterols, prostaglandins are also found in *Allium* (Fenwick and Hanley 1985 a, 1990 a, b). In onions, iron, vitamin A, B and C are also present. Mono, di- and tri- sulphides and sulphinates contribute essentially to the lachrymatory factor in some of the species of *Allium* (Block, 1985). *Allium* also contain salicylic acid, albumin, mucilage and other organic sulphides. Depending upon the species variation, the constituents are variable so, their fragrance, flavour and taste also varies.

Prophylactic significance of some well known *Alliums*

The number of Alliums studied for their ethnomedicinal potential is very less, almost negligible when we view their vast diversity in the world. Hence, the efforts have been made to those *Allium* species which have folklore and traditional medicinal efficacies.

(i) ***Allium cepa*** (Vernacular name : Sanskrit - Nripakanda, Palandu, Raktakanda, Durgandha, Hindi - Piyaz, English - Onion)

In ayurvedic school of medicinal description, *A. cepa* has sweet, smooth, heavy and oily characteristics and is a good ethnomedicine to relieve wind disorders (Vāāt vikār). On different body systems, its actions are briefly summarized as follows.

Nervous system — It is useful in many nervous disorders such as rheumatism and its associated secondary problems and aches. Mixed with mustard oil in equal parts, it is beneficial against rheumatic pains.

Digestive system — It is used to cure dyspepsia, constipation, piles, jaundice and prolapsus ani. Raw onion gives an unpleasant odour to breath but it has an antiseptic effect to entire alimentary canal.

Blood vascular system — Heart weakness can be alleviated by a regular limited use of *A. cepa;* also, it cures other inflammatory diseases of the system.

Respiratory system — It's usage corrects phlegm disorders such cough, coryza and expelling sputum when the state of phlegm in the body is disturbed severely due to imbalanced metabolism. its continuous use for a limited period brings the effect of expectorant.

Urinary system — Because of its diuretic property, it is useful in the treatment of strangury.

Reproductive system — In man, its usage removes weakness of sperm and semen, thus wards off impotence; in woman, it corrects dysmenorrhoea.

Skin — In pruritis and other infectious diseases, its massage is useful to get relief from itching.

Side effects and remedy

It may be unsuitable to brain and its functioning and cause adverse effects if consumed in excess. To ward off its side effects, pomegranate should be used that has been found to mitigate the dysfunction due to excessive intake. Normally, the dose is 10-30 ml bulb extract or 1-3 g seed powder.

General medicinal actions and uses

Onion is considered very important medicinally by local people, healers, Vaidyas, Hakims who stemmed up a local health traditions and now have

attained a broad recogniation, in fever, dropsy, catarrh and chronic bronchitis-Onion bulbs are useful against colic and scurvy when mixed with common salt. To mitigate heat sensation, it is used as poultice to boils, bruises and wounds. Bulb juice is used against convulsions, headache, epileptic and hysterial fits: It is sniffed in epistaxis, applied its extract mixed with honey to eyes in dimness of vision also, given as an antidote to tobacco poisoning in rural areas. In phthisis, onions are eaten to mitigate the disorder. When used mixed with ginger, it is useful in sore throat; when cooked with vineger, it is beneficial against jaundice, splenic enlargement and dyspepsia. Local medicinemen advise a remarkable effect against malarial fever if eaten two times a day with black pepper. Onions are considered good for growth of children when eaten with jaggery. Decoction of onions has been considered much effective against the cases of strangury and extreme heaty sensation. A mixed preparation made of roasted onions, cumin, sugarcandy, cow's ghee (milk fat), is an effective demulcent in the treatment of piles. In ear pain, lukewarm extract is used as a drop.

(ii) ***Allium sativum*** (Vernacular name : Sanskrit — Rason, Rasonam, Mlechhagandha, Ugragandha, Yaveneshta, Bhutanga, Hindi — Lahsun, English — Garlic)

From the Ayurvedic standpoint, it alleviates phlegm (Kaph) disorders due to its pungent and bitter properties. Oiliness and lubricity provide this herb a curable capacity against wind (Vāāt) disorders, so it is used as a good homely treatment for the ailments due to phelgm and wind disorders (Kaph-Vāāt vikār).

Nervous system — It is an effective and homely nervine tonic for strengthening nervules and alleviates other related nervous disorders. In local health care, it is prominently recommended against paralytic affections and mental weakness. It also activates the nerves connecting eyes and supposed to be a good sight improver.

Digestive system — Because of its hot and bitter properties, it is stimulative, digestive. It corrects constipation, relieves pain; expels worms and stimulates liver. Also, the annorexia and dyspesia may be alleviated by its usage.

Blood vascular system — Continuous prophylaxis of *A. sativum* activates and strengthens heart functions and removes inflammatory disorders of heart. It is helpful in controlling bradycardiac and tachy-cardiac heart rhythms and keeping the normal heart beat.

Respiratory system — In general, it alleviates phlegm disorders and cleans the foul smell of sputum. Useful in impoverishing bronchial affections and strengthens aleveoli by killing the germs and nullifying infections thus, it is highly protective and curing against tuberculosis and chronic fever.

Urinary system — It regulates urine formation and maintains its regular flow because of its diuretic property.

Reproductive system — Due to its viscous, oily and lubercity properties, it is considered one of the best ethnomedicine for the production of healthy semen and sperms. In females, it regulates menstrual cycle and cures dysmenorrhoea and menopause.

Skin — Since sulphur is present in its sap, the herb is reckoned to be very useful against infectious skin and leprotic patches.

Side effects and remedy

No side effects, till now, have been reported if used under dosage prescription intake of bulb 3-6 gms and oil 2-3 drops. However, it should be safely used by the persons with regular bile complaints and should not be taken by pregnant women. To ward off its side effects, coriander seeds (*Coriandrum sativum*) should be consumed till the effect is mitigated.

General medicinal actions and uses

A. sativum, for its activating properties and prophylactic importance, is generally used against general debility. It is considered to enhance body stamina and empowers livliness and also has sweat producing and perspiratory effects. The garlic therapy cleans bowels, thus, mitigates the hidden feverish feeling in the body and maintains body temperature. It alleviates the bacterial indexes and restores the clinical state of the patients. In bile (pitta) complaints, it should be used with sugar; in phelgm (Kaphˆ) disorders, with honey and in wind (Vāāt) disorder with milk fat. During therapy, wine, acid substances and meat are favourable, all the same, excessive water intake and milk are unfavorable. Also, anger and tension should be avoided.

When the bursted cloves are rubbed on the affected skin, it produces redness followed by burning sensation. It is used locally as counter-irritant in painful affections like rheumatism, pleurisy, neuralgia and hepatitis. Its stimulancy on respiratory and digestive systems is brought out by its excretion by bronchial and intestinal mucosal membranes after its absorption. It enhances the purgative property of Senna (*Cassia lanceolata*) and **Harra** (*Terminalia chebula*), also used in combination with ginger (*Zingiber officinalis*) and variously with *Vitex negundo, Piper longum* for different ailments like typhoid, pneumonia , pulmonary phthisis and tubercular affections. In *Unani* system of medicine, *A. sativum* is used also to improve memory, colic, internal ulcers of the lungs and paralytic affections.

A sativum is also used as resolvent in wound cleaning tinctures. It corrects deafness, pain and purulent discharge in ear. Chakradatta, an Indian medicine

man of traditional Ayurvedic school of medicine, recommended the decoction of *A. sativum* prepared in milk, as very useful against hysteria, flatulence, sciatica and heart diseases.

Some Indian medicaments are Rason Vati, Rason Pinda, Rasonstak, Lahsunadya Ghrita, Rason Sura, Garlic Oil, Lasona, Garlic pearls, Garlic Liniment, Compound Decoction and Powder, while some popular exotic medicaments are Extractum Allii Sativi Liquidrum, Syrupus Allii Sativi, Tincture Allii Sativi.

Most of the species of *Allium* have been scared from detailed therapeutical and clinical trials in both the old and new worlds for their medicinal efficacy in local health traditions. The reason for this pharmacognosical neglect may probably be the centuries old usage of mainly two species i.e., *A cepa* and *A. sativum* as a part of man's food. As the time passed, man started domestication and cultivation of few more species viz., *A. ampeloprasum, A. ascalonicum, A. macleani, A. leptophyllum, A. schoenoprasum* species for making an ingredient of his food but still the medicinal potential regarding these species is not pertinent in the literature.

A. ampeloprasum (syn. *A. porrum*), sweet leek is mainly cultivated in Kashmir. The bulbs of the plant are used to hasten the suppuration of boils. The alcoholic extract of *A. ascalonicum* (Shallot) bulb is considered as an anticoagulant and causes liquification of coagulated blood and lowers the level of serum-cholesterol in blood. Locally, the bulbs are used for its aphrodisiac property and used in the treatment of ear-ache. The bulbs of *A. schoenoprasum* are considered to possess cardiac depressive constituents (CDRI, 1971). *A. leptophyllum* (Himalayan onion) bulbs have been considered to possess sudorific property. *A. macleani* is considered as demulcent and given to alleviate general debility, nervous exhaustion and seminal weakness. Other cultivated species such as *A. fistulosum* and *A. victorialis* constitute man's food either as carminative or for making palatable diets.

Possible future biotechnological advances in *Allium* research

Because Alliums possess human food value and ethnomedicinal significance, first, the whole *Allium* biodiversity present in the world should systematically be categorized and updated on the basis of present stringent taxonomical measures and then these species should be mapped using different physiological and molecular techniques such as isozymes, RFLP and RAPD. Thus, the refined information obtained will not only provide a broad concept on *Allium's* synteny but also will be useful to engineer different crops which are pathologically or physiologically sensitive to present changing global environment. These measures may also lead to secure diversity of the genus for future sustainable use.

It is axiomatic that one can not assess and understand the potency and significance of germplasm and its genetic utility in the field. In 1948, Harlan collected a wheat PI 178383 from remote parts of Eastern Turkey. This strain of wheat was having almost disqualifying attributes like tallness, thinness, stemmed, excessive lodging, susceptible to leaf rust, lacking winter hardiness, difficult to vernalize and poor baking quality in comparision to normal routinely used wheat, thus, anyone hardly paid any attention to it. But after a period of time, this miserable PI 178383 proved to be resistant enough to four races of stripe rust, thirty five races of common bunt, ten races of dwarf bunt and very good tolerance to flag smut and snow mould (Harlan, 1975). Then, this accession of wheat was used in all wheat breeding programmes which saved millions of dollars. So, wild, scared weed forms and ancestral plant diversity related to present day crops more specifically *Alliums* in the present context must be given proper attention which may prove a good genepool for future.

ACKNOWLEDGEMENTS

The authors are thankful to Dr. K.P.S. Chandel, Director, NBPGR, New Delhi 110 012 for providing encouragement and facilities.

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