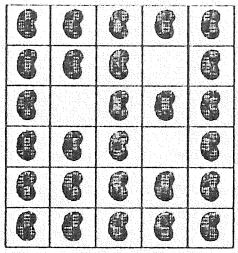
CGN

COLLECTION
ACTIVITIES

2



Collection of Beta, Lactuca and Allium in Turkey 15.07.90 to 31.08.90

CENTRE FOR GENETIC RESOURCES, THE NETHERLANDS (CGN/CPO)

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COLLECTION OF BETA, LACTUCA AND ALLIUM IN TURKEY.
15-7-90 to 31-8-90.

INTRODUCTION

In the context of the German-Dutch cooperation on crop genetic resources (*), the Centre for Genetic Recources of the Netherlands (CGN), after request of IBPGR, has accepted a global responsibility for the conservation of Beta. Since 1988 the CGN is active in collecting wild Beta germplasm in order to fill "geographic gaps" in its collection. For CGN it is usual to give expeditions a "multicrop-character", other species of interest for the institute's programmes are also collected when they occur on the same sites as the target species.
In 1990 two expeditions were implemented, one into the Caucasus region of the USSR and one into Turkey.
Both expeditions were collaborative projects between CGN and the national genebanks of the visited countries. In both cases a continuation of the collaboration for several years is proposed, not only concerning collection but also multiplication and evaluation.
The mission to Turkey was a joint project between CGN and the Plant Genetic Resources Research Institute (PGRRI). This institute, established in Menemen, province Izmir has a national responsability for collection and conservation of germplasm of a wide range of crops and related species. For PGRRI the expedition was part of the regular annual schedule of collection activities. The expedition was financed by the German-Dutch Board for Plant Genetic Resources, the PGRRI provided the planning of the journey and facilities like cars and drivers, seed cleaning etc..
Although this was not the first Beta expedition to the visited parts of Turkey there still seemed to be a justification for another mission.
In 1972 the same areas were visited by Williams and Ford-Lloyd, their collected seed samples were divided into two duplicates. One duplicate of each accession was stored in the PGRRI genebank, the other duplicate went to the University of Birmingham to be used for taxonomic research. Table 1 shows the discrepancy between the number of originally collected accessions and the number of accessions still present in 1991.

(*) The German-Dutch Beta genetic resources programme is a cooperative activity between the CGN and the Institut für Pflanzenbau und Pflanzenzüchtung der Bundesforschungsanstalt für Landwirtschaft (FAL) in Braunschweig-Völkenrode within the framework of the German-Dutch Board for Plant Genetic Resources.

Table 1: Summary of Beta accessions collected by Williams and Ford-Lloyd in 1972 and remaining no. of these accessions after 19 years.

	collected in 1972	Remaining in 1991 Birmingham(*)	Remaining in 1991 Menemen(*)
section Beta			
Beta vulgaris (cultivated)	88	71	53
Beta vulgaris ssp. maritima	35	9	1
Beta vulgaris ssp. adanensis	23	6	2
Beta vulgaris ssp. maritima var. trojana	16	1	-
section Corollinae			
Beta macrorhiza	16	3	1
Beta lomatogona	21	10	2
Beta trigyna	4	7 (?)	1
Beta corolliflora	1	-	-
Beta intermedia	1	2 (?)	-
Total	205	109	60

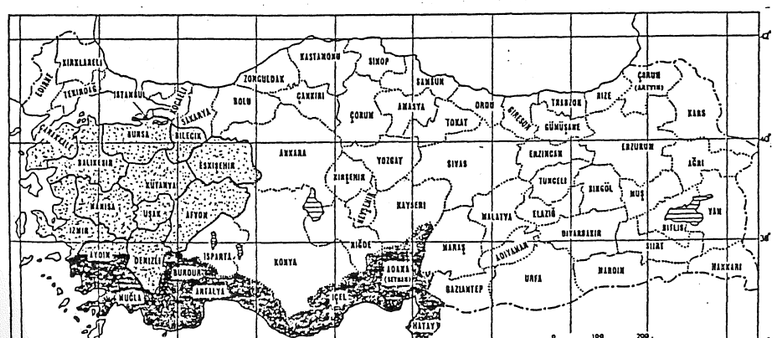
(*)source; International Database for Beta (IDBB).

Between 1969 and 1976, 398 populations of Beta belonging to section Corollinae were visited and sampled, or acquired from elsewhere by Buttler for taxonomic purposes. The seeds however were harvested on a too small number of individual plants per population. Hence, probably only a small proportion of the available genetic diversity was sampled.
Another motive for this repeated mission in the same area was the wish to collect more data related to plant habitat in order to enable studies on relations between plant characters (morphology, phenology, isozym patterns etc.) and ecogeographical characters.

TEAM, ROUTE AND METHODS.

The expedition was divided into two parts. During the first period (15/7 to 31/7) the team members were: for PGRRI, Miss A. Tan and R. Apti, and for CGN: J. van de Vooren. The second part (29/7 to 31/8) the members for PGRRI were: Miss A. Tan, R. Apti (1/8 to 3/8) and C. Sabanci (3/8 to 31/8) and for CGN E. de Meijer. During the first part the target-area was the southern Mediterranean area eastward to the Syrian border (South Anatolia). The second expedition team went along the western Mediterranean coastal area (West-Anatolia) and through the western provinces of Central Anatolia (figure 1).

Figure 1: Provinces visited during the first ( ) and second ( ) part of the expedition.



A lot of collection sites of Beta section Corollinae were mentioned by Buttler (1977). Additional information was provided by the IDBB as well as from notes recorded during previous PGRRI flora surveys. Many populations were discovered after consulting villagers by means of showing plant specimens. Rosette leafs of Beta species belonging to the section Corollinae are commonly collected and used as a vegetable, fairly often local people were able to indicate the sites where these plants occurred.
At every collection site notes were made about population characteristics, sample size, geographical location, and plant habitat. The format used to describe these characters is added in appendix 1.
Besides these notes in many cases herbarium specimen were collected, the herbarium specimen have been deposited at the herbarium of PGRRI.

DESCRIPTION OF TARGET AREAS

In Turkey three floristic regions with distinct climatic characters can be distinguished (descriptions derived from Öztürk et. al.(1983)). The majority of the provinces visited during this expedition belongs to the Mediterranean region. In this region the amount of precipitation is very limited in the summer which is very hot and dry while winters are mild. The natural vegetation in this region consists of pine forests at high altitudes and maquis vegetation below altitudes of about 800 m.
The northern parts of the provinces Balikesir, Bursa and Bilecik belong to the Euro-Siberian region with an oceanic type of climate, with rains more or less equally spread over the seasons. Both summer and winter in this region are quite mild. Near the coast the natural vegetation is dominated by deciduous forests, pine forests occur above 1000 m.
The provinces Eskisehir, Afyon, Burdur and the eastern parts of Kütahya and Usak are part of the Irano-Turanian region which is characterized by a continental climate with very cold winters and hot summers. The natural vegetation consist of steppe with mainly herbaceous species.

Figure 2: The floristic and climatic regions of Turkey

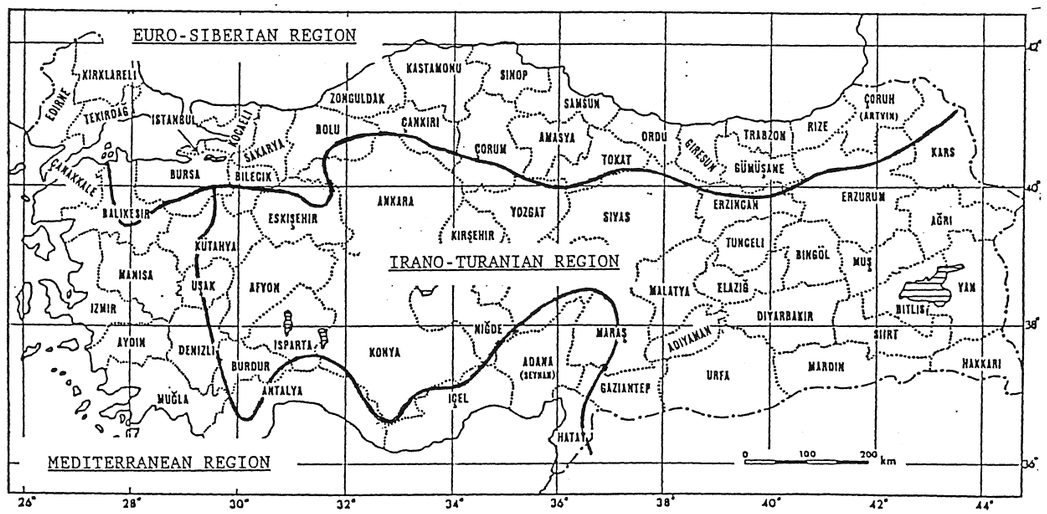


Table 2: Average rainfall (mm) and average temperature (oC) during the year for four weather stations (capital cities of provinces) representing the visited areas in the three floristic regions of Turkey.

	month	J	F	M	A	M	J	J	A	S	O	N	D
Mediterranean Region													
Izmir	rain	136	106	73	43	34	8	2	2	15	49	84	143
	temp	8.5	9.0	11.1	15.4	20.2	24.9	27.6	27.3	23.1	18.5	14.3	10.5
Adana	rain	109	93	66	52	44	25	4	4	15	39	68	120
	temp	9.2	10.2	12.9	16.9	21.2	25.1	27.6	28.1	25.2	20.8	15.7	11.1
Euro-Siberian Region													
Bursa	rain	91	74	71	60	44	27	12	18	37	52	78	111
	temp	5.3	5.9	8.0	12.6	17.3	21.6	24.2	23.9	19.7	15.5	11.4	7.5
Irano-Turanian Region													
Afyon	rain	43	38	45	42	55	38	19	7	21	35	28	43
	temp	0.3	1.5	4.8	10.4	15.1	18.9	22.0	22.1	17.4	12.2	7.1	2.5

The topography of the southern Mediterranean area (first part of the expedition, South- Anatolia) is very mountainous with summits upto 3000 m. Usually the mountains arise steeply from the sea, only on a few places coastal lowlands occur. The topography of the western Mediterranean area and the western provinces of Central Anatolia is more variable; low mountain range with summits upto 1500 m alternates with large plains of lower altitude, along the coast lowland areas with sedimentary soils occur.

DISTRIBUTION OF THE TARGET SPECIES, POPULATION AND HABITAT CHARACTERISTICS

Section Beta, Beta vulgaris L.:

A minority of the collected Beta vulgaris accessions belonged to the group of cultivated leaf beets B. vulgaris L. ssp. cicla (L.) Koch. These accessions were collected on farmfields and in vegetable gardens in the coastal lowland areas. It is not clear whether these populations must be considered as landraces or as modern cultivars.
The distribution of wild forms of B. vulgaris is limited to a narrow margin along the sea shore of not more than 5 km width. The majority of the populations occurred in natural pioneer vegetations of herbaceous plants on tide marks, maritime cliffs and sandy beaches at sea level, up to 15 m altitude. In a few cases parts of these populations behaved as annual weeds in nearby vegetable gardens. A minority of the populations was encountered inland some km's distant from the shore in ruderal fieldborder- and roadside vegetations at altitudes up to 140 m. Beta vulgaris accessions could be collected in all the visited coastal provinces although the species was certainly not very abundant. The soil type varied from pure sand to clay, sometimes it was highly organic because of masses of decomposing seaweed. In all cases the soil was slightly alkaline (pH 7.3 to 8.4). The salinity of the sites was very variable. The population size varied from 1 individual plant to at least 2000 plants, the population area from 1 m2 to 1 ha.

The phenotypic variability within and between populations was remarkable, between populations there were differences in life cycle duration (annual to perennial) and morphological characters like growth habit (prostrate to erect) and size and shape of fruits.
Because of the lack of tidal movements and the irregular shape of the Turkish coastline there seems to be an effective spatial isolation between the populations leading to the existence of endemic forms like ssp. adanensis Pamuk, and ssp. maritima (L.) Arcangeli var. trojana Pamuk, besides ssp. maritima. In most cases one of these subspecific names was assigned to the accessions.

Section Corollinae
The occurrence of this section was limited to inland mountainous areas. The majority of the accessions was collected in the western provinces of Central Anatolia.
Beta lomatogona Fischer & Meyer was the most abundant species of the section. Its presence was strongly related to the widespread dry cultivation of wheat. Under the traditional farming system in West-Central Anatolia each crop of wheat is alternated with one year of fallow during which the precipitation is saved for a next year crop of wheat. As the fields are very small there is a relatively large area occupied by fieldborders. These borders with their subtle balance of stability and disturbance form an ideal habitat for a wide range of perennial, ruderal herbs, of which B. lomatogona is one.
After the harvest the fieldborders are grazed by herds of cattle, which enables migration of the seeds from one field to the other.
Because the yield of wheatcrops is carried to central treshing places near the villages there are also very good possibilities for the migration of seeds into the villages. Very often plants could be observed on wheat field borders surrounding a village and on the graveyard and vegetable garden borders inside the village. These plants were always supposed to belong to the same population and their seeds were bulked in one sample. In some areas the traditional dry farming of wheat is locally and recently replaced by an irrigated cultivation of sugar beet, although B. lomatogona can still be observed here it is doubtfull whether it is really able to adapt to these new circumstances. Another threat for this species would certainly be a widespread increase in scale of the individual farm field area, for instance as a result of land consolidation programmes.
B. lomatogona populations were usually found on slightly alkaline clay soils (pH 7.4 to 7.9), at altitudes between 550 and 1325 m. The population size varied from 3 to more than 500 individual plants scattered over a population area from 10 m2 to more than 4 km2.
In the province of Eskisehir the species is very abundant, in some areas of this province there is almost a continuous distribution so a subdivision in separate populations is arbitrary. The phenotypic variability within and between populations seemed to be small, sometimes a difference in phenology could be observed, but this could always be attributed to a matter of water supply.

In the provinces Bilecik, Kütahya and Eskisehir populations of Beta intermedia Bunge were partly found on the same kind of sites and habitats as B. lomatogona and a few times the two species were observed together.
Besides this occurrence on dry wheat field borders B. intermedia was also found in quite dense vegetations of herbaceous and woody perennials, especially in hedges around perennial crops like pastures, alfalfa and orchards. The soil type was again slightly alkaline clay (pH 7.4 to 8.4)

the altitude differed from 550 to 1260 m. The population size varied from 1 to at least 500 individual plants. The population area varied from 1 m2 to about 1 ha.
The phenotypic variability of the species seemed to be of two kinds and obviously depended on the habitat. On the one hand populations growing on dry fieldborders resembled the "lomatogona-habit" which means a lot of single seeded fruits and only very few double or triple seeded fruits. On the other hand populations growing in fences and hedges in woody perennial vegetations resembled the "trigyna-habit", with a lot of triple seeded fruits and few single, double and four seeded fruits.

Beta corolliflora Zosimovic ex Buttler was a more rare species than the former two, it was only found in the provinces Bilecik and Eskisehir. The species occurred mainly in dense vegetations of herbaceous and woody perennials in hedges around perennial crops. In this type of habitat it was often found together with B. intermedia.
Few times populations were growing on dry wheat field borders. The soil type was slightly alkaline clay (pH 7.5 to 8.0), the altitude varied from 810 to 1280 m. The population size differed from 3 to 150 individual plants, the population area from 5 m2 to about 2500 m2.
The observed phenotypic variability was small.

Five populations of Beta trigyna Waldst. & Kit. could be discovered during this expedition, in the provinces Eskisehir and Bilecik. The populations occurred at an altitude between 860 and 1280 m in vegetations of woody and herbaceous perennials. At four sites the plants were growing in mixed populations with B. intermedia and/or B. corolliflora. In these cases seeds of all species were bulked in one sample. True B. trigyna type plants only occurred in small numbers in these mixed populations. In the field it was difficult to distinguish B. trigyna plants from the very similar and much more abundant plants of B. intermedia type.

Populations of L. serriola L. were very abundant in the visited parts of Turkey and could be collected at a lot of ruderal sites from sea level to at least 1100 m altitude. In a few cases mixed populations were found with plants of the normal erect and spiny habitus of L. serriola and other plants, more branched, procumbent and not spiny. Probably these last plants belong to L. saligna L.

Not identified populations of Allium spp. were mainly collected at two kinds of habitats; elevated parts of sandy beaches (not ruderal, sea level) and dry wheat field borders (B. lomatogona habitats) at altitudes above 500 m.

Table 3: Summary of collections.

Taxon	no. of accessions
Beta vulgaris ssp. cicla	7
Beta vulgaris ssp. maritima	18
Beta vulgaris ssp. maritima var. trojana	16
Beta vulgaris ssp. adanensis	6
Beta corolliflora	3
Beta intermedia	32
Beta lomatogona	55
Beta trigyna	1
mixed Beta samples;	
Beta corolliflora/intermedia/trigyna	1
Beta corolliflora/trigyna	1
Beta corolliflora/intermedia	3
Beta intermedia/trigyna	2
Beta lomatogona/intermedia	1
Lactuca serriola	15
Lactuca cf. saligna	3
Lactuca spp. (not identified)	3
Allium spp. (not identified)	11

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CLOSING REMARKS

After seed cleaning PGRRI will provide a summary of the amounts of seeds per accession. Small samples will first be multiplied before being subdivided. Accessions of Beta section Beta, and Lactuca and Allium accessions will probably be multiplied by CGN. The Dutch climatic circumstances are not very favourable for the multiplication of species belonging to Beta section Corollinae. Final decisions about the multiplication of these species have not been made yet.

Only a selection of the collected accessions of Beta section Corollinae will be stored by CGN. The selection will mainly be based on a maximal variation in (eco)geographic origin of the accessions and the population size.

As a recommendation for future expeditions of CGN in Turkey, especially with concern to section Corollinae species, it could be suggested to search for a smaller amount of populations, but each of them occurring in widely differing habitats and with a larger spatial separation.

Finally, after acomplishment of the collection missions it would be logical not only to conserve the accessions but also to characterize and analyse the genetic diversity captured. Since all species of the section Corollinae are hard-seeded and posessing a biennial or perennial life cycle, the maintenance of such material is very labor- and time- consuming and therefor expensive. If more would be known about the genetic variation between and within populations of Corollinae species and the magnitude of the geneflow within and between species of this section, collections could be formed on a more scientific basis. Clearly, this would benefit various genebanks since it would help to save the often limited funds and also improve the quality of the germplasm conservation programmes. Anticipating on this kind of follow up research a lot of attention must be dedicated to

the description of the habitats in an adequate and meaningful way.
Also the way of sampling could be adjusted to enable future research. For instance subsamples of seeds of individual plants could be kept separate to estimate within population variability afterwards, or to learn to understand the breeding behaviour within natural populations.

REFERENCES

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Buttler K.P. (1977). Revision von Beta Sektion Corollinae. Mitt. Bot. München 13. p. 255-336. 15.12.1977.

Öztürk M., K. Hinata, S. Tsunoda and C. Gomez-Campo (1983). A general account of the distribution of the cruciferous plants in Turkey. Ege University Faculty of Science Journal. Series B. Vol. VI, NR. 1.

APPENDIX 1a; Collection form, frontside

I.First priority descriptors

Expedition:_____

Collectors name(s):_____

Collection date :_____

Genus:_____ Species:_____

Subspecies:_____ SCNR:_____

Effective pop. size:_____ Sample size :_____ Pop. area: _____ (m^2)

Collection number:

Herbarium number:

Photo number:

Object:

Population type: [ ] W=wild L=landrace B=breeder's variety R=research material

Origin type: [ ] 1=wild 2=ruderal 3=farm field 4=farm store 5=backyard 6=local market 7=modern seed trade 8=institute/ breeding company

Local name (note ethnic group):_____

Variety name:_____

Cultivation data: Sowing date:_____ Harvest date:_____

End use:_____

Country: _____ District:_____

Location:_____

Latitude:_____ N Longitude:_____ E Altitude:_____

_____ S _____ W

Remarks:_____

_____

_____

(microclimate e.g. fog formation,late frosts etc.; pest and pathogens, growth habit, phenology, hybrid occurrence, disturbance factors like sheep grazing, wind or water erosion, primary geographic origin of landraces if relevant)

APPENDIX 1b; Collection form, backside

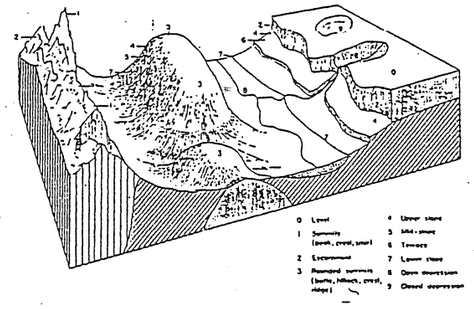
II.Facultative descriptors

Topography: [ ] 1=swamp 2=flood plain 3=plain level 4=undulating 5=hilly 6=hilly dissected 7=steeply dissected 8=mountainous 9=other (specifiy)

specify:_____

Collection site: [ ]

0=level 1=summits 2=escarpment 3=rounded summits 4=upper slope 5=mid slope 6=terrace 7=lower slope 8=open depression 9=closed depression



ASPECT:_____ Slope(degrees):_____ Soil pH:_____

Stoniness: [ ]

1=tillage uneffected 2=tillage affected 3=tillage difficult 4=tillage impossible 5=essentially paved

Soil texture: [ ]

1=sand 2=loam 3=clay,silt 4=highly organic

Soil colour: [ ]

1=black 2=brown 3=red 4=orange 5=yellow 6=grey 7=other(specify)

specify:_____

Soil nutrient content: [ ]

1=poor 2=medium 3=high

Salinity: [ ]

0=none 1=low 2=medium 3=high

Drainage: [ ]

1=imperfect 2=moderate 3=well drained 4=excessive

Site type:_____ Vegetation type:_____

(e.g.: roadside, orchard) (e.g.:grassland, woodland)

Associated wild species:_____

(related species first)

_____

_____

Population variability: [ ] (under homogeneous cultivation conditions) 1=uniform 2=low 3=medium 4=high

Cropping system:_____

_____

(associated crops, crop rotation systems etc.)

APPENDIX 2a; List of collected Beta accessions.

Coll.nr.	Botanical name	District	Location	Longi.	Lati.	Alti.
TSM 110890 0101	B.corolliflora	BILECIK	NAZIFPASA VILLAGE	02947E	04003N	1015
TSM 110890 0202	B.corolliflora	BILECIK	GUMUSDERE	02950E	04002N	860
TSM 110890 0401	B.corolliflora	BILECIK	PAZARYERI, E MARGIN	02954E	04000N	810
TSM 120890 0302	B.corolliflora	BILECIK	OLUKLU VILLAGE	03013E	03955N	960
TSM 120890 0401	B.corolliflora	BILECIK	GUNDUZBEY VILLAGE	03013E	03957N	1060
TSM 140890 0601	B.corolliflora	ESKISEHIR	YARIMCA VILLAGE, SCHOOLGARDEN	03038E	03954N	1200
TSM 160890 0301	B.corolliflora/intermedia/trigyna(*)	ESKISEHIR	KARACOBANPINARI, N ENTRANCE	03027E	03954N	1280
TSM 160890 0601	B.corolliflora/trigyna(*)	BILECIK	ORTACA, 2KM SW OF	03019E	03958N	980
TAM 040890 0101	B.intermedia	MANISA	DEMIRCI	02842E	03903N	920
TSM 110890 0401	B.intermedia	BILECIK	BILECIK TOWN, S MARGIN, ALONG ROAD 650	03000E	04009N	550
TSM 110890 0501	B.intermedia	BILECIK	BESEVLER	03016E	04016N	580
TSM 120890 0101	B.intermedia	BILECIK	POYRA, 1KM E OF, ALONG ROAD 200	03010E	03953N	890
TSM 120890 0201	B.intermedia	BILECIK	POYRA, 4KM N OF, ALONG FIELD ROAD	03011E	03954N	980
TSM 120890 0301	B.intermedia	BILECIK	OLUKLU VILLAGE	03013E	03955N	960
TSM 120890 0402	B.intermedia	BILECIK	GUNDUZBEY VILLAGE, 0.5KM N OF TR 51246	03013E	03957N	1070
TSM 120890 0601	B.intermedia/corolliflora(*)	BILECIK	FRANLAR VILLAGE	02958E	03958N	740
TSM 120890 0701	B.intermedia/corolliflora(*)	BILECIK	KARAKOY, ALONG RAILWAY, 2KM W OF BOZUYUK	03000E	03955N	660
TSM 120890 0801	B.intermedia	BILECIK	ESKISEHIR TO SOGUT, ENTRANCE OF ROAD 665	03017E	03951N	810
TSM 120890 0901	B.intermedia	BILECIK	OKLUBALI (FIELD RD, N SIDE)	03015E	03949N	770
TSM 140890 0501	B.intermedia/corolliflora(*)	ESKISEHIR	TANDIR VILL. RD JUNCTION, 1KM TO TANDIR	03041E	03955N	1250
TSM 140890 0602	B.intermedia/trigyna(*)	ESKISEHIR	YARIMCA VILLAGE, SCHOOLGARDEN	03038E	03954N	1200
TSM 150890 0201	B.intermedia	ESKISEHIR	ESKISEHIR CITY BORDER, 5KM OF	03032E	03944N	1000
TSM 150890 0201	B.intermedia	ESKISEHIR	YUKARI GAGLAR VILLAGE	03030E	03940N	975
TSM 150890 0401	B.intermedia	ESKISEHIR	AKPINAR, EAST ENTRANCE	03034E	03939N	960
TSM 150890 0501	B.intermedia	ESKISEHIR	DOGANKAYA VILLAGE	03037E	03938N	1060
TSM 150890 0801	B.intermedia	ESKISEHIR	KIRKA, 16KM NE OF	03035E	03922N	1000
TSM 150890 1101	B.intermedia	ESKISEHIR	SEYITGAZI, 15KM N OF	03039E	03931N	1020
TSM 160890 0101	B.intermedia/trigyna(*)	ESKISEHIR	KESKIN VILLAGE	03024E	03952N	860
TSM 160890 0201	B.intermedia	ESKISEHIR	EGRIOZ VILLAGE ENTRANCE	03025E	03953N	910
TSM 160890 0501	B.intermedia	BILECIK	ORTACA, 6KM NW OF	03022E	03959N	1020

TSM 160890 0701	B.intermedia	BILECIK	YESILYURT VILLAGE	03017E	03955N 1000
TSM 160890 0801	B.intermedia	ESKISEHIR	INODU, BETWEEN VILL. AND RAILWAY STATION	03009E	03950N 950
TSM 160890 0901	B.intermedia	ESKISEHIR	INODU, 1KM E OF	03010E	03949N 960
TSM 160890 1001	B.intermedia	ESKISEHIR	ESKISEHIR, 31KM SW OF, ALONG ROAD 230	03018E	03943N 1060
TSM 170890 0201	B.intermedia	ESKISEHIR	AKCAYIR VILLAGE, ALONG ROAD 230	03023E	03944N 910
TSM 170890 0301	B.intermedia	ESKISEHIR	ASAGI KARTAL VILLAGE	03018E	03943N 980
TSM 170890 0401	B.intermedia	ESKISEHIR	SOBRAN VILLAGE	03010E	03940N 960
TSM 170890 0501	B.intermedia	KUTAHYA	AKPINAR, EAST ENTRANCE	03008E	03934N 960
TSM 180890 0101	B.intermedia	KUTAHYA	SAHMELEK VILLAGE	02940E	03930N 1100
TSM 180890 0201	B.intermedia	KUTAHYA	YENIKOY	02921E	03936N 1070
TSM 180890 0301	B.intermedia	KUTAHYA	GUNLUCE VILLAGE	02918E	03926N 1110
TSM 190890 0202	B.intermedia	KUTAHYA	ALAYURT VILLAGE	03008E	03922N 940
TSM 190890 0301	B.intermedia	KUTAHYA	BELKAVAK VILLAGE	03013E	03918N 1080
TSM 190890 0401	B.intermedia	KUTAHYA	PORSUK	02958E	03919N 1010
TSM 190890 0501	B.intermedia	KUTAHYA	HISARCIK	02914E	03915N 810
TSM 200890 0301	B.intermedia	KUTAHYA	DUMLUPINAR	02958E	03851N 1260
TSM 140890 0401	B.intermedia	ESKISEHIR	DAGKUPLU N MARGIN, 3 SITES	03041E	03959N 730
TSM 130890 0101	B.lomatogona	BILECIK	ESKISEHIR TO KALKANLI ROAD JUNCTION	03045E	03939N 960
TSM 130890 0201	B.lomatogona	ESKISEHIR	AKSAKLI VILLAGE, 1KM N OF	03045E	03937N 970
TSM 130890 0301	B.lomatogona	ESKISEHIR	BUYUKDERE VILLAGE	03045E	03937N 970
TSM 130890 0401	B.lomatogona	ESKISEHIR	SIVRIHISAR, 10KM W OF, ALONG MAIN ROAD	03130E	03927N 950
TSM 130890 0501	B.lomatogona	ESKISEHIR	KAYMAZ, 5KM S OF	03110E	03930N 800
TSM 130890 0601	B.lomatogona	ESKISEHIR	CIFTELER, 2 TO 4KM N OF EXIT	03102E	03925N 750
TSM 140890 0101	B.lomatogona	ESKISEHIR	ESKISEHIR TO ANKARA, 2KM TO KANYA RD JUN	03054E	03936N 850
TSM 140890 0201	B.lomatogona	ESKISEHIR	MESUDIYE VILLAGE	03057E	03933N 810
TSM 140890 0301	B.lomatogona	ESKISEHIR	SARIKAVAK, FIELDS AROUND VILLAGE	03054E	03940N 900
TSM 150890 0101	B.lomatogona	ESKISEHIR	ESKISEHIR CITY BORDER, 5KM S OF	03032E	03944N 1000
TSM 150890 0301	B.lomatogona	ESKISEHIR	ASAGI GAGLAR VILLAGE	03027E	03934N 960
TSM 150890 0601	B.lomatogona	ESKISEHIR	KIRKA 1 TO 2KM S OF AND 1KM N OF KIRKA	03033E	03917N 1080
TSM 150890 0701	B.lomatogona	ESKISEHIR	KIRKA, 12 TO 15KM N OF	03032E	03922N 1000
TSM 150890 0901	B.lomatogona	ESKISEHIR	SARIBAYIR VILLAGE	03037E	03923N 1000
TSM 150890 1001	B.lomatogona	ESKISEHIR	SEYITGAZI, 2KM N OF	03047E	03927N 970
TSM 170890 0101	B.lomatogona/intermedia(*)	ESKISEHIR	ESENKAYA VILLAGE	03023E	03941N 870
TSM 190890 0101	B.lomatogona	KUTAHYA	AGACKOY	03004E	03923N 920
TSM 190890 0201	B.lomatogona	KUTAHYA	ALAYURT VILLAGE	03008E	03922N 940

TSM 200890 0101 B.lomatogona	KUTAHYA	KUTAHYA-AFYON-GOGURLER RD JUNC.,6KM N OF	03006E	03916N	1070
TSM 200890 0201 B.lomatogona	KUTAHYA	ALIBEYKOY	03011E	03905N	1040
TSM 200890 0401 B.lomatogona	USAK	GURE, 6KM W OF, ALONG ROAD 300	02908E	03840N	600
TSM 210890 0101 B.lomatogona	AFYON	UMRANIYE NERA BY RD JUNCT. ALONG RD 675	03110E	03911N	1000
TSM 210890 0201 B.lomatogona	AFYON	BEYOREN, 5KM S OF	03108E	03915N	930
TSM 210890 0301 B.lomatogona	AFYON	EMIRDAG ENTRANCE, 2KM N OF, ALONG RD 290	03110E	03901N	950
TSM 210890 0401 B.lomatogona	AFYON	AFYON CITY BOR., 2KM NE AFTER ENTRANCE	03035E	03843N	1000
TAV 220790 0101 B.lomatogona	ANTALYA	KORKUTALI, SOGUT-MANAY VILLAGE	02954E	03705N	1325
TAV 220790 0201 B.lomatogona	ANTALYA	KORKUTELI, BEGIS, SUSUZU	03014E	03659N	820
TAV 220790 0301 B.lomatogona	ANTALYA	KORKUTELI, IMECIK, SUSUZU	03015E	03655N	830
TAV 220790 0401 B.lomatogona	ANTALYA	KORKUTELI, AVDAN VILLAGE	03652E	03009N	1120
TAV 220790 0501 B.lomatogona	ANTALYA	ELMALI, GUKURELMA VILLAGE	02958E	03651N	1180
TAV 220790 0601 B.lomatogona	ANTALYA	ELMALI, GOLOVA	03003E	03648N	1080
TSM 220890 0101 B.lomatogona	AFYON	AKOREN VILLAGE	03032E	03858N	1120
TSM 220890 0201 B.lomatogona	AFYON	ORHANLI, 3KM N OF	03018E	03908N	1210
TSM 220890 0301 B.lomatogona	AFYON	OSMANKOY, VILLAGE AND SURR. FIELDS	03018E	03910N	1140
TSM 220890 0401 B.lomatogona	AFYON	ANITKAYA	03022E	03857N	1170
TSM 220890 0501 B.lomatogona	AFYON	KARASADIKLI VILLAGE	03011E	03832N	1060
TSM 220890 0601 B.lomatogona	AFYON	GURSU VILLAGE	03010E	03827N	1050
TAV 230790 0201 B.lomatogona	ANTALYA	AKSEKI	03148E	03703N	1100
TAV 230790 0301 B.lomatogona	ANTALYA	AKSEKI, IBREDI, 3KM S OF	03145E	03657N	960
TSM 230890 0101 B.lomatogona	AFYON	ALAMESCIT VILLAGE, ROAD JUNCTION	03012E	03820N	1100
TSM 230890 0201 B.lomatogona	AFYON	KIZILOREN, NEARBY VILLAGE ALONG RD 650	03011E	03815N	1140
TSM 230890 0301 B.lomatogona	DENIZLI	HODIM, 1KM N OF	02938E	03805N	860
TSM 230890 0401 B.lomatogona	DENIZLI	ICIKLI, 1KM W OF	02951E	03819N	870
TAV 240790 0101 B.lomatogona	ANTALYA	KEMER, OVACIK VILLAGE	03026E	03639N	1100
TSM 240890 0101 B.lomatogona	DENIZLI	SULLER VILLAGE, SURROUNDINGS	02930E	03808N	790
TAV 250790 0101 B.lomatogona	BURDUR	BUCAK, KUSBABA VILLAGE	03026E	03726N	920
TAV 250790 0201 B.lomatogona	BURDUR	BUCAK KEGELI KOYU			950
TSM 250890 0101 B.lomatogona	DENIZLI	TAVAS, S EXIT TO KALE	02904E	03733N	930
TAV 260790 0101 B.lomatogona	BURDUR	GATAGIL, MANDIRNA VILLAGE	03028E	03740N	1200
TAV 260790 0201 B.lomatogona	BURDUR	YESILOVA, KARAATLI VILLAGE	02948E	03731N	1150
TAV 260790 0301 B.lomatogona	BURDUR	KARAMANLI, BADENGLI VILLAGE	02958E	03724N	1090
TAV 260790 0401 B.lomatogona	BURDUR	KARAMANLI, MURSELLER VILLAGE	02956E	03727N	1100
TAV 260790 0501 B.lomatogona	BURDUR	GOLHISAR YURAKOY	02945E	03714N	1180

TSM 260890 0201 B.lomatogona	DENIZLI	GUNEY, N OF, 200M S OF PROVINCE BORDER	02905E	03813N	720
TSM 260890 0301 B.lomatogona	USAK	GULLU N ENTRANCE	02905E	03816N	700
TSM 160890 0401 B.trigyna	ESKISEHIR	ULUDERE VILLAGE	03019E	03956N	1040
TAV 170790 0201 B.vulgaris ssp.adanensis	HATAY	ISKENDERUN, SARKKONAK VILLAGE	03606E	03633N	0
TAV 180790 0401 B.vulgaris ssp.adanensis	HATAY	KIRIKHAN TOPBOGAZI VILLAGE	03619E	03635N	140
TAV 190790 0301 B.vulgaris ssp.adanensis	ADANA	KARATAS, GULKAYA VILLAGE	03516E	03635N	0
TAV 190790 0401 B.vulgaris ssp.adanensis	ADANA	KARATAS, YEMISLI VILLAGE	03527E	03641N	10
TAV 200790 0102 B.vulgaris ssp.adanensis	ICEL-KAZANLI	KAZANLI, W EXIT	03446E	03649N	5
TAV 200790 0201 B.vulgaris ssp.adanensis	ICEL	TARSUS, ALIFAKI VILLAGE	03501E	03654N	15
TAM 030890 0401 B.vulgaris ssp.cicla	IZMIR	FESMEALTI	02644E	03824N	1
TAV 180790 0201 B.vulgaris ssp.cicla	HATAY	REYHANLI	03639E	03616N	140
TAV 190790 0101 B.vulgaris ssp.cicla	ADANA	KARATAS	03628E	03639N	15
TAV 210790 0101 B.vulgaris ssp.cicla	ICEL	SILIFKA, ALTINKUM	03404E	03621N	3
TAV 210790 0401 B.vulgaris ssp.cicla	ICEL	SILIFKA, CELTIKAI VILLAGE	03357E	03620N	10
TAV 210790 0401 B.vulgaris ssp.cicla	ICEL	SILIFKA,?			20
TAV 280790 0102 B.vulgaris ssp.cicla	MUGLA	MILAS, GULLUK	02736E	03715N	0
TAM 030890 0101 B.vulgaris ssp.maritima	IZMIR	IZMIR NARLIDERE	02658E	03824N	1
TAM 030890 0201 B.vulgaris ssp.maritima	IZMIR	URLA ISKELESI	02647E	03822N	1
TAM 030890 0401 B.vulgaris ssp.maritima	IZMIR	SEFERHISAR-AKARCA	02649E	03810N	1
TSM 050890 0101 B.vulgaris ssp.maritima	IZMIR	FOCA, 1KM NW OF ALONG COAST	02645E	03840N	1
TSM 050890 0201 B.vulgaris ssp.maritima	IZMIR	YENIFOCA BEACH	02649E	03845N	1
TSM 050890 0301 B.vulgaris ssp.maritima	IZMIR	ALIAGA, 3KM N OF, BEACH	02659E	03848N	1
TSM 050890 0501 B.vulgaris ssp.maritima	IZMIR	CANDARLI	02657E	03856N	1
TSM 050890 0601 B.vulgaris ssp.maritima	BALIKESIR	AYVALIK, COAST 10KM OF	02643E	03915N	2
TSM 050890 0701 B.vulgaris ssp.maritima	BALIKESIR	AYVALIK ALIBEY	02642E	03920N	1
TSM 070890 0301 B.vulgaris ssp.maritima	CANAKKALE	TAVAKLI, ISKELE	02610E	03940N	5
TSM 090890 0101 B.vulgaris ssp.maritima	BURSA	MUDANYA, 3KM W OF	02852E	04822N	1
TAV 170790 0101 B.vulgaris ssp.maritima	HATAY	ISKENDERUN, HATUN VILLAGE, SEA SHORE	03610E	03635N	0
TAV 180790 0301 B.vulgaris ssp.maritima	HATAY	REYHANLI, KARASHLEY MANLI VILLAGE	03622E	03620N	140
TAV 200790 0101 B.vulgaris ssp.maritima	ICEL-KAZANLI	KAZANLI, W EXIT	03446E	03649N	5
TAV 270790 0101 B.vulgaris ssp.maritima	MUGLA	FETHIYE, GUNLUKBAZI	02907E	03638N	0
TAV 270790 0201 B.vulgaris ssp.maritima	MUGLA	DALAMAN	03046E	03639N	0
RAV 280790 0101 B.vulgaris ssp.maritima	MUGLA	MILAS, GULLUK	02736E	03715N	0
TAV 280790 0201 B.vulgaris ssp.maritima	MUGLA	BADRUN, GUMUSLUK	02718E	03705N	0
TAV 280790 0301 B.vulgaris ssp.maritima	AYDIN	DIDIM, AKKUM	02716E	03721N	0

TSM 060890 0101	B.vulgaris ssp.maritima var.trojana	CANAKKALE	GUZELYALI VILLAGE	02625E 04007N	2
TSM 060890 0301	B.vulgaris ssp.maritima var.trojana	CANAKKALE	GUZELYALI VILLAGE, 3KM S OF	02625E 04007N	2
TSM 060890 0401	B.vulgaris ssp.maritima var.trojana	CANAKKALE	KUMKALE VILLAGE	02613E 04001N	5
TSM 060890 0501	B.vulgaris ssp.maritima var.trojana	CANAKKALE	TRUVA	02615E 03957N	80
TSM 060890 0601	B.vulgaris ssp.maritima var.trojana	CANAKKALE	TRUVA, 3KM E OF SIPLAK VILLAGE	02616E 03958N	80
TSM 070890 0101	B.vulgaris ssp.maritima var.trojana	CANAKKALE	GEYIKLI, SURROUNDINGS	02613E 03947N	75
TSM 070890 0201	B.vulgaris ssp.maritima var.trojana	CANAKKALE	TAVAKLI, ISKELESI	02610E 03941N	15
TSM 080890 0101	B.vulgaris ssp.maritima var.trojana	CANAKKALE	KARACAOREN VILLAGE	02629E 04012N	1
TSM 080890 0201	B.vulgaris ssp.maritima var.trojana	CANAKKALE	OZBEK VILLAGE	02631E 04013N	2
TSM 080890 0301	B.vulgaris ssp.maritima var.trojana	CANAKKALE	CARDAK VILLAGE	02644E 04023N	2
TSM 080890 0401	B.vulgaris ssp.maritima var.trojana	CANAKKALE	SEVKETIYE, 1KM W OF	02652E 04024N	2
TSM 090890 0201	B.vulgaris ssp.maritima var.trojana	BURSA	ZEYTINBAGI (BEACH)	02847E 04023N	1
TSM 090890 0301	B.vulgaris ssp.maritima var.trojana	BURSA	GUZELYALI VILLAGE, 1KM E OF	02858E 04020N	2
TSM 100890 0301	B.vulgaris ssp.maritima var.trojana	BURSA	GEMLIK, BEACH 3KM N OF	02908E 04023N	2
TSM 100890 0301	B.vulgaris ssp.maritima var.trojana	BURSA	TUZLACIFLICI NEARBY, 2KM INLAND	02905E 04024N	5
TSM 100890 0401	B.vulgaris ssp.maritima var.trojana	BURSA	KURSUNLU, 1KM W OF	02901E 04020N	1

(*)Mixed populations,sampled together

Appendix 2b; List of collected Lactuca accessions.

Coll.nr.	Botanical name	District	Location	Longi. Lati.	Alti.
TAV 180790 0402	L.saligna	HATAY	KIRIKHAN TOPBGAZI	03619E 03635N	140
TSM 090890 0203	L.saligna	BURSA	ZEYTINBAGI (BEACH)	02847E 04023N	1
TAV 180790 0302	L.saligna	HATAY	KARASULEYMAN VILLAGE	03622E 03620N	140
TAV 180790 0101	L.serriola	HATAY	ANTAKYA TO REYHARLI 13 KM FROM ANTAKYA	03618E 03615N	100
TSM 050890 0801	L.serriola	BALIKESIR	AKCAY	02656E 03934N	2
TSM 100890 0201	L.serriola	BURSA	1KM E. OF KAPAKLI	02900E 04027N	2
TSM 120890 0303	L.serriola	BILECIK	OLUKLU VILLAGE	03013E 03955N	960
TSM 160890 0102	L.serriola	ESKISEHIR	KESKIN VILLAGE	03024E 03952N	860
TSM 120890 0501	L.serriola	BILECIK	W. MARGIN YENIKOY (EXIT TO BILECIK TOWN)	03003E 04007N	260
TSM 110890 0201	L.serriola	BILECIK	GUMUSDERE	02950E 04002N	880
TSM 090890 0202	L.serriola	BURSA	ZEYTINBAGI (BEACH)	02847E 04023N	1
TSM 050890 0802	L.serriola	BALIKESIR	AKCAY	02656E 03934N	2
TSM 170890 0202	L.serriola	ESKISEHIR	AKCAYIR VILLAGE ALONG ROAD 230	03023E 03944N	910
TSM 230890 0202	L.serriola	AFYON	NEAR KIZILOREN VILLAGE ALONG ROAD 650	03011E 03815N	1140
TAM 040890 0102	L.serriola	MANISA	DEMIRCI	02842E 03903N	920
TAM 040890 0201	L.serriola	IZMIR	BOZDAG VILLAGE, AARIC EXP. STATION	02802E 03819N	1100
TAV 260790 0302	L.serriola	BURDUR	KARAMANLI BADENILI VIL.	02958E 03724N	1090
TAV 230790 0202	L.serriola	ANTALYA	AKSEKI	03148E 03703N	1100
TAV 180790 0501	L.spp	HATAY	ERZIN (YESILKENT)	03612E 03657N	100
TAV 260790 0102	L.spp	BURDUR	CATAGIL (MANDIRNA) VIL.	03028E 03740N	1200
TAV 230790 0101	L.spp	ANTALYA	3KM N. OF MURTIAI VIL.	03147E 03651N	900

Appendix 2c; List of collected Allium accessions.

Coll.nr.	Botanical name	District	Location	Longi.	Lati.	Alti.
TAV 190790 0402	Allium spp.	ADANA	KARATAY YEMISLI VIL.	03527E	03641N	10
TAV 210790 0201	Allium spp.	ICEL	SILIFKE, TASNEV-DALYAN	03400E	03619N	0
TSM 060890 0201	Allium spp.	CANAKKALE	GUZOLYALI VIL.	02625E	04007N	3
TSM 080890 0501	Allium spp.	BALIKESIR	DENIZKENT	02730E	04016N	1
TSM 140890 0202	Allium spp.	ESKISEHIR	MESUDIYE VIL.	03057E	03933N	810
TSM 170890 0302	Allium spp.	ESKISEHIR	ASAGI KARTAL VIL.	03018E	03943N	980
TSM 200890 0202	Allium spp.	KUTAHYA	ALIBEYKOY	03011E	03905N	1040
TSM 210890 0202	Allium spp.	AFYON	5KM S. OF BEYOREN	03108E	03915N	930
TSM 220890 0202	Allium spp.	AFYON	3KM N. OF ORHANLI	03018E	03906N	1210
TSM 230890 0102	Allium spp.	AFYON	ALAMESCIT VIL. RD JUNCT.	03012E	03820N	1100
TSM 240890 0102	Allium spp.	DENIZLI	1KM S.E. OF SULLER VIL.	02930E	03808N	720
TSM 260890 0101	Allium spp	DENIZLI	E. ENTRANCE OF BULDAN	02853E	03801N	500