

Collection of crop genetic resources in Italy, 2004

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Summary

Collection of crop genetic resources in Italy, 2004

In September 2004, a collecting mission was carried out in Italy within the framework of an agreement between the Plant Genetics Institute (IGV), Bari, Italy, of the National Research Council (CNR) and the Crop Science Institute of Kassel University (Germany). The mission collected 116 accessions belonging to 24 species, mainly cereals, pulses and vegetable landraces. The areas receiving most attention were Carnia, Venetian lagoon, Po delta and Salento. Rare landraces were found out, such as 'mugnoli' (a botanical form of *Brassica oleracea* L. var. *italica* Plenck), whose cultivation in the Salento area pre-dates that of broccoli. For each collecting site, information on past and present agricultural state is given, together with an assessment of the degree of crop genetic erosion. Italian agricultural biodiversity has been lost in great part, but some remote and isolated zones are still an important refuge for crop genetic resources. Material is being deposited in the IGV genebank.

Key words: Agricultural biodiversity, genetic erosion, collecting, Carnia, Venetian lagoon

Résumé

Collecte de ressources génétiques de plantes cultivées en Italie en 2004

En septembre 2004, une mission de collecte a été organisée en Italie dans le cadre d'un accord entre l'Institut de phyto-génétique (IGV), Bari (Italie), du Conseil national de la recherche (CNR) et de l'Institut d'agronomie de l'Université de Kassel (Allemagne). La mission a permis de collecter 116 accessions appartenant à 24 espèces, essentiellement des variétés locales de céréales, de légumineuses et de légumes. Les régions les plus prospectées ont été la Carnie, la lagune de Venise, le delta du Pô et Salente. Des variétés locales rares ont été trouvées, telles que « mugnoli » (une forme botanique de *Brassica oleracea* L. var. *italica* Plenck), dont la culture dans la région de Salente est antérieure à celle du brocoli. Pour chaque site de collecte, des informations sur l'état actuel et passé de l'agriculture sont présentées, de même qu'une évaluation du degré d'érosion génétique des plantes cultivées. Une grande partie de la biodiversité agricole italienne a été perdue, mais certaines zones éloignées et isolées restent des refuges pour les ressources génétiques des plantes cultivées. Le matériel est actuellement déposé dans la banque de gènes de l'IGV.

Resumen

Recolección de recursos genéticos de cultivos en Italia en 2004

En septiembre de 2004 se llevó a cabo una misión de recolección en Italia, en el marco de un acuerdo entre el Instituto de Genética Vegetal (IGV) de Bari, Italia, el Consejo Nacional de Investigaciones (CNR) y el Instituto de Ciencias de Cultivos de la Universidad de Kassel (Alemania). La misión recogió 116 accesiones pertenecientes a 24 especies, principalmente variedades locales de cereales, legumbres y hortalizas. Las zonas que recibieron más atención fueron Carnia, la laguna de Venecia, el delta del Po y el Salento. Se encontraron variedades locales raras como el "mugnoli" (una forma botánica de *Brassica oleracea* L. var. *italica* Plenck), cuyo cultivo en el Salento es anterior al del brécol. Se suministra información relativa al estado antiguo y actual de la agricultura en cada sitio de recolección, junto con una evaluación del grado de erosión genética del cultivo. La biodiversidad agrícola de Italia se ha perdido en gran medida, pero algunas zonas remotas y aisladas son todavía un refugio importante de recursos genéticos de cultivos. El material está depositado en el banco de genes del IGV.

Introduction

Recent collecting missions in Italy showed that particular areas rich in crop genetic resources are still available (Hammer and Laghetti 2005; Laghetti *et al.* 2003a, 2003b, 2005a). For that reason, in September 2004, a further expedition was carried out to Italian sites previously uncovered (**Figure 1**). The mission was organized and conducted by scientists of the Plant Genetics Institute (IGV) of the National Research Council (CNR), Bari, Italy, and of the Crop Science Institute of Kassel University (Germany). The main targets of the 2004 expedition were to collect samples of autochthonous crop genetic resources, together with useful information (e.g. variation, degree of genetic erosion, ethnobotany, vernacular names) for genebank curators.

The collecting strategies followed were the same as those used during previous analogous missions (Hammer *et al.* 1991; Perrino *et al.* 1981).

Results and discussion

Altogether the collections comprise 116 accessions. A detailed list of the collected material is given in **Table 1**.

Carnia

Carnia is a mountainous area of the Friuli Venetia Giulia Region (NE Italy), preliminarily explored in 2001 by Laghetti *et al.* (2003b) to collect local plant germplasm. In that mission, the exploration team visited a few German-speaking villages, including Timau, Sappada and Sauris, which were founded by Austrian immigrants in the 13th century. Among them, Sauris (Zahre), was found to be of special interest, because of several indications of traditional agriculture (Hammer *et al.* 2007; Isabella *et al.* 2005). This small Italian Region is a land of differences, including 3 of the 5 European biogeographical regions. Crossroads for Latin, Slavic and German cultures, which met and clashed here for centuries, the entire region is an assortment of idioms and languages (Miceli *et al.* 2007). After the disastrous earthquake in 1976, a strong recovery of the economy reduced the role of agriculture, with a strong depopulation of unfavourable and mountainous areas. This in turn extended to crop genetic erosion, largely due to the loss of agropastoral habitats.

To complete the scientific programme initiated with the first mission in Carnia (Laghetti *et al.* 2003b), in 2004 the areas noted in **Figure 1** were covered, with special attention to 'Piano d'Arta', Ravascletto, Povolaro of Comegliàn and Pesàriis villages. In all, 93 accessions were collected, of which ca. 70 belong to the *Phaseolus* L. collection safeguarded within the new germplasm repository dedicated to autochthonous crop plants, at the Udine University Experimental Farm. For safety reason, a duplicate of this collection will be also managed by the IGV genebank in Bari. Two landraces of maize for *polenta* were collected in Povolaro of Comegliàn; the most common type has yellow grains (called in Friulian dialect 'sorc di Povolâr'), while a second type with red grains is less used. In this zone, five landraces of common bean ('borlotto di Povolaro', 'tegolino tardivo', 'tegolino precoce', 'rampin', 'centutt') were sampled; all the common beans from Carnia are characterized by a climbing growth habit. Two old varieties of parsley and of scallion (*Allium cepa* L. var. *aggregatum* G. Don, locally named 'ceva') were also gathered in this area. At Ravascletto, from some traditional home gardens, seed samples of chicory, common bean ('fagioli del Papa'), poppy (*Papaver somniferum* L.), carrot and parsley were collected. In Pesarina valley, three typical landraces of common bean, rocket and *Atriplex hortensis* L. were found and sampled. In Carnia and other areas of the region it is still usual to collect wild plants for cookery use, e.g. 'radic di mont' (*Cicerbita alpina* (L.) Wallr.) utilized in a typical recipe in vinegar with sugar. As the substantial amounts of *C. alpina* harvested and used by locals in some areas may jeopardize the natural populations of this plant, attempts to domesticate *C. alpina* are currently in progress.

To prepare the paper *Sauris (Zahre), a cultural and linguistic island in Carnia (Italy)* (Hammer *et al.* 2007), a further and more detailed visit was made to Sauris. During this work, alongside information collection, three further accessions of local plant germplasm were found: a rare weedy turnip (*Brassica rapa* subsp. *sylvestris*), possibly derived from a former landrace of primitive cultivated turnip; a very traditional landrace of flax (named 'hor') and an old variety of oat (called 'hòber'). Incidentally, we learned that turnip (*Brassica rapa* L. subsp. *rapa*) is the base of a Friulian typical recipe: turnip roots, after a few weeks of storage under acidic materials (dreg of grapes or fermenting maize kernels) are chopped and stewed for 'brovada'. The 'brovada e muset' prepared with turnips and boiled sausage is a peasant-style dish, unmodified over the years.

Increasing genetic erosion was also observed in Friulian landraces of apple, pear, plum, cherry and chestnut. This empirical impression was compared with the morpho-agronomic data reported in the illustrated book by Youssef *et al.* (2000).

Venetian lagoon

From ecological and social standpoints, the Venetian Lagoon is still a place of traditional integration between horticulture and fishing. Its flora, fauna and habitats have evolved within the largest 'humid area' of Italy (55000 ha), being moulded by tides, the interplay of sea currents and river currents, and all subjected to a strong anthropic influence. The result is an ecosystem where several animal and plant taxa live in water layers of different saltiness, in different microclimates and on temporary emerging banks called 'barene' and 'velme'.

In the Venetian lagoon, the collecting team was interested mainly in islands characterized by agricultural activity. A recent list with 28 taxa of cultivated plants on Torcello, Burano and Mazzorbo islands is reported by Caniglia (2002). Landraces were collected mostly on Sant'Erasmus (population 800; 3.26 km²), an island lying

north-east of Venice, including onion, squash, artichoke ('Violetto di Sant'Erasmus'), basil, eggplant (long fruit), borage and Jerusalem artichoke ('tartufo americano', 'tartufi matti'). The island was a port attached to Murano in the eighth century, but is now known for market gardening, and since the 1500s it has been regarded as the market garden of Venice, growing mainly wine grapes (producing a typical wine with a salty taste) and vegetables, like the famous 'Violetto di Sant'Erasmus', an artichoke landrace cultivated also on Vignole and Mazzorbo islands, and in the Lio Piccolo and Malamocco areas. In the past, its cultivation area (the northernmost for artichoke) was wider than today and included the whole lagoon. Other agricultural islands of the Venetian lagoon are Mazzorbo (0.52 km²), once an important trading centre but now known for its vineyards and orchards, and Vignole and Torcello (0.44 km²).

Another area explored, close to the Venetian lagoon, was the peninsula of 'Cavallino' (**Figure 1**). This particular habitat is characterized by a sedimentary and dolomitic soil, and is a renowned agricultural area, famous for several local farm products, including the traditional jujube-trees ('Giuggiolo del Cavallino') and the well known tomato 'Pomodoro del Cavallino', cultivated also on Sant'Erasmus and Vignole islands and in Treporti, Mesole and Lio Piccolo localities. This crop, 'Pomodoro del Cavallino', grown in this area for several centuries, became dominant in local agriculture from 1966 when, because of a flood, all fruit trees were killed. The many varieties of tomato cultivated here belong to two main types, one for fresh vegetable use and one for sauce. Today, the red bunch tomato (called 'ciliegino') is the most important type, while the production of the round green tomato type is decreasing. The production of tomato lasts all year round, and is now 90% grown in greenhouses. Its taste is different from that of industrial cultivars due to the salt soil of the fields where it is grown. During the mission, at 'Cà Pasquali' locality, an old tomato landrace named 'cuor di bue', with very big fruits (ca. 2 kg per fruit) was collected. Other landraces sampled in the Cavallino area were peppers ('peperone rosso' type Cuneo) and the 'cipolla bianca' onion (**Table 1**).

In **Table 2**, a list of landraces known from the Veneto region but not collected during the present mission is given. Seed samples of most of them will be shipped to Bari by local agricultural organizations cited in the Acknowledgements.

Interesting information about the cereals of the Venice area was obtained during a visit to the famous *Istituto di Genetica e Sperimentazione Agraria* "N. Strampelli" in Lonigo (see Bressan *et al.*, 2003).

The Po delta

This area is a Regional Park (**Figure 1**) preliminarily explored during a previous mission (Laghetti *et al.* 2003b) by an IGV-IPK team. Many organic farms are located here. Red chicory, also known as *radicchio* (*Cichorium intybus* L.), is being increasingly grown as a cash crop in Veneto, where landraces and varieties are widespread. Several varieties of 'radicchio rosso di Chioggia' (a *C. intybus* variety awaiting the IGP seal, EU Reg. 2081/92/EEC) with various degrees of earliness were collected here: 'Radicchio variegato di Castelfranco' (an IGP speckled variety), 'Radicchio rosso di Treviso precoce' (an IGP early red variety), 'Radicchio rosso di Treviso tardivo' (a late red variety, with IGP), 'Radicchio rosso di Verona', 'Radicchio bianco di Lusia' (a white variety), 'Radicchio bianco fior di Maserà', and 'Radicchio variegato bianco di Bassano' (used also for its young shoots). Details about radicchio types and diversity are available (Pimpini *et al.* 2003; Barcaccia *et al.* 2003).

In the area, many vegetables (e.g. onions, carrots, celeries, pumpkins) are grown on an industrial scale and very few landraces remain; in fact only five landraces of common bean, squash ('zucca marina di Chioggia'), onion ('cipolla bianca agostana di Chioggia') and maize ('marano' and 'biancoperla') were found and collected (**Table 1**). As usual, some other samples of landraces not ready at the time of mission will be shipped later to the IGV from the institutions and farmers cited in the 'acknowledgements' section (e.g. 'sedano verde', 'cicoria catalogna gigante', 'carota', 'barbabietola rossa', all from Chioggia, and 'riso del delta del Po').

Other areas

In Salento (southern Italy), a rare landrace of *Brassica oleracea* L. was found. It is called 'mugnoli' or 'mugnuli' and is cultivated traditionally in this part of the Apulia region. This crop is widely known in Salento but almost unknown in the rest of Apulia and, of course, in Italy. Mugnoli is a surviving landrace, more cultivated up to ten years ago, even if it is still very much appreciated by local people. Its cultivation in the area predates that of broccoli (*B. oleracea* L. var. *italica* Plenck). Mugnoli cultivation is carried out only for family consumption, and in few cases for the local market. Mugnoli is an old sprouting form of broccoli producing many small heads that

may be cut from the same plant from November to April. It might be considered as an early step in the evolution of broccoli. More details on Mugnoli are reported in Laghetti *et al.* 2005b.

In some fields, together with the cultivation of mugnoli, the rare growing of white mustard (*Sinapis alba* L. ssp. *alba*) as a leaf vegetable was observed, as already reported by Laghetti *et al.* (1993) for the Basilicata region. During the mission, in the ruins of the old part of Matera town (Basilicata), a primitive type of white mustard was sampled, possibly the last relics of a former landrace of this crop from this traditional cultivation area.

Conclusions

Italian agricultural biodiversity has been lost in great part, and remote and isolated zones have to be investigated. The mission showed that Italy, despite previous collecting expeditions, is still an important refuge for undiscovered crop genetic resources, so that the exploration of this area will be continued in the next years. In particular, the cultural and linguistic islands can conserve plant genetic resources for a longer time than other places, even if alongside the decline of the specific culture and language the traditional crops also lose their importance.

Further data and details about this collecting mission are reported in the exploration registers of IGV, Bari.

Availability of germplasm

The material collected is being deposited in the Bari genebank for further classification and characterization. After multiplication, the accessions will be ready for distribution to scientists.

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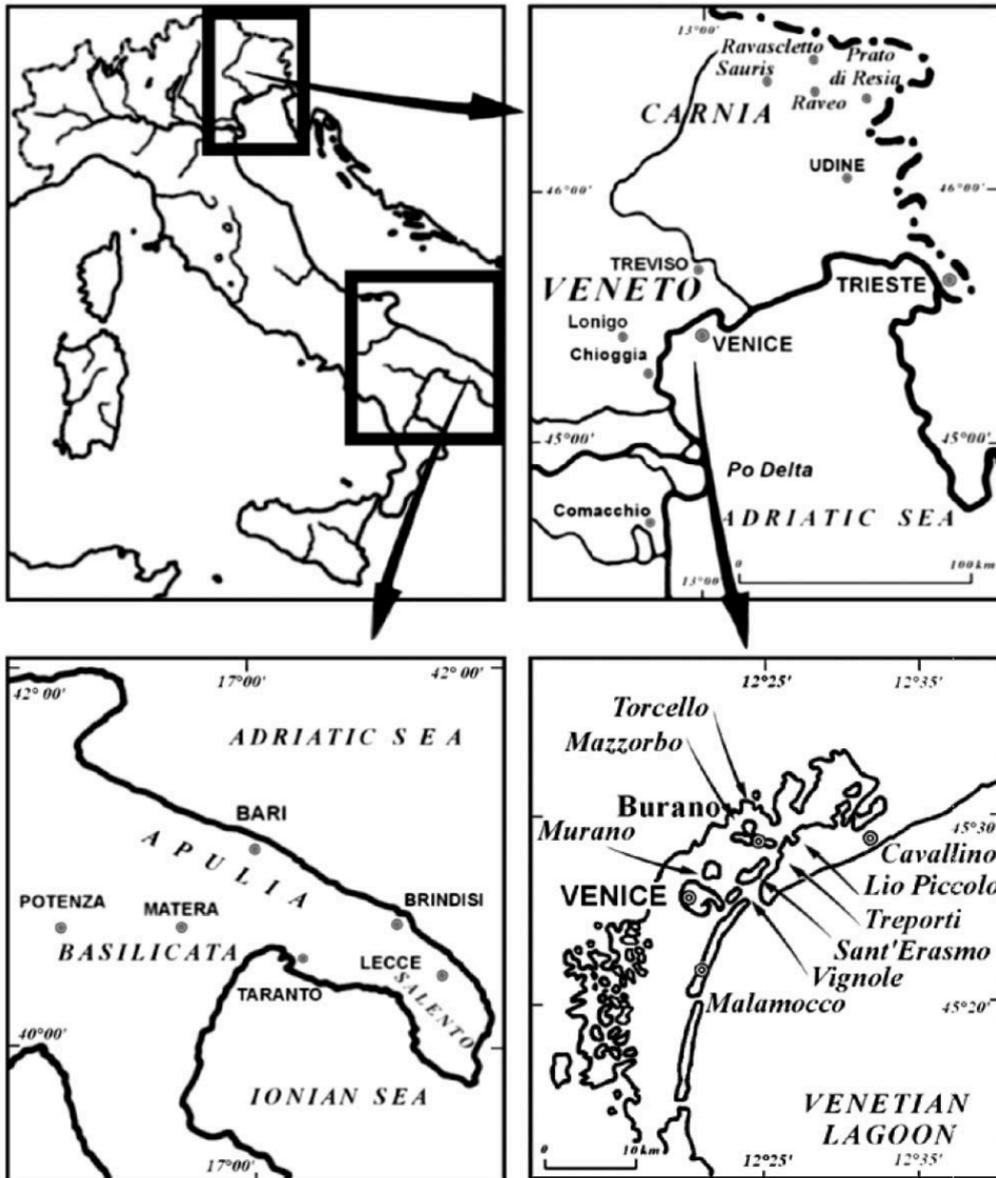


Figure 1. Areas and localities visited during the collecting mission.

Table 1. Accessions collected.

Species	Carnia	The Po delta	Venetian lagoon	other areas	Total
<i>Avena sativa</i>	1	–	–	–	1
<i>Zea mays</i>	2	2	–	–	4
Cereals	3	2	–	–	5
<i>Phaseolus vulgaris</i>	7 + 72 [§]	1	–	–	80
Pulses	79	1	–	–	80
<i>Allium cepa</i>	1	1	1	1	4
<i>Allium scorodoprasum</i>	–	–	–	1	1
<i>Atriplex hortensis</i>	1	–	–	–	1
<i>Brassica oleracea</i>	–	–	–	1	1
<i>Brassica rapa</i>	1	–	–	–	1
<i>Capsicum annuum</i>	–	–	–	1	1
<i>Cichorium intybus</i>	1	3	–	–	4
<i>Cucurbita maxima</i>	–	1	2	–	3
<i>Cynara cardunculus</i> var. <i>scolymus</i>	–	–	1	–	2
<i>Daucus carota</i>	1	–	–	–	2
<i>Diplotaxis tenuifolia</i>	1	–	–	–	1
<i>Eruca sativa</i>	1	–	–	–	1
<i>Linum usitatissimum</i>	1	–	–	–	1
<i>Lycopersicon esculentum</i>	–	–	–	2	2
<i>Ocimum basilicum</i>	–	–	1	–	1
<i>Petroselinum crispum</i>	2	–	–	–	2
<i>Solanum melongena</i>	–	–	1	–	1
Vegetables	10	5	6	6	27
<i>Borago officinalis</i>	–	–	1	–	1
<i>Helianthus tuberosus</i>	–	–	1	–	1
<i>Papaver somniferum</i>	1	–	–	–	1
<i>Sinapis alba</i>	–	–	–	1	1
Other species	1	–	2	1	4
Total	93	8	8	7	116

Notes: [§] a duplicate of the complete germplasm collection of this crop from Carnia (ca 70 accessions), prepared by the Agrarian Faculty of the Udine University, will be stored in the IGV genebank at Bari.

Table 2. Additional list of landraces known from the Veneto region.

Landraces (vernacular name)	Crop	Landraces (vernacular name)	Crop
aglio bianco polesano aglio del medio Adige	garlic	giuggiola dei colli Euganei	jujube-tree
asparago bianco del Sile asparago bianco di Bibione asparago bianco di Cimadolmo asparago di Arcole asparago di Bassano asparago di Giare asparago di Padova asparago di Palazzetto asparago di Rivoli asparago verde amaro montine	asparagus	kiwi di Treviso kiwi di Verona	kiwi
bietola di Bassano	beet	kodinzon mela del medio Adige mela di Monfumo mela di Verona	apple
bisi de Lumignan biso di Peseggia pisello di Borso del Grappa	pea	melone del delta polesano melone precoce veronese	melon
broccolo di Bassano broccolo fiolaro di Creazzo	broccoli	noce di Feltre noce dei grandi fiumi	walnut
castagne del baldo castagne e marroni dei colli Euganei marrone di San Mauro marrone di San Zeno marroni di Combai marroni di Monfenera marroni di Valrovina	chestnut	nettarina di Verona pesca bianca di Venezia pesca di Povegliano pesca di Verona	peach
ciliegia dei colli Asolani ciliegia delle colline veronesi ciliegie dei colli Euganei ciliegie di Marostica ciliegie durone di Cazzano durona del chiampo	cherry	patata americana di Anguillara e Stroppare patata americana di Zero Branco	sweet potato
cipolla rosa di Bassano	onion	patata cornetta patata del Montello patata del quartier del Piave patata di Chioggia patata di montagnana patata di Posina patata dorata dei terreni rossi del Guà patate di Rotzo	potato
crout - verde agre crouti delle Bregonze	head-cabbage	peperone di Zero Branco	pepper
cren	horseradish	pera del medio Adige pere del veneziano pere del veronese	pear
fagiolino meraviglia di Venezia fagiolo borlotto nano di Levada fagiolo di posina "scalda" fasola posenata	French bean	sedano di Rubbio	celery
fragola di Verona	strawberry	sedano-rapa di Ronco all'Adige	celeriac (<i>Apium graveolens</i> L. var. <i>rapaceum</i> (Miller) Gaudin)
		scarola o insalata d'inverno di Bassano	prickly lettuce
		susina gialla di Lio piccolo	plum