

A. Proposal

Inclusion of *Adonis vernalis* in Appendix II in accordance with Article II 2(a)
Potted live plants to be excluded.

B. Proponent

Germany

C. Supporting Statement1. Taxonomy

- | | | |
|-------|--------------------------------------|--|
| 1.1 | Class | Magnoliatae |
| 1.2 | Order | Ranunculales |
| 1.3 | Family | Ranunculaceae |
| 1.4 | Species | <i>Adonis vernalis</i> L. 1753 |
| 1.5 | Synonyms | <i>Adonis apennina</i> L.; <i>Adonis davurica</i> RCHB.; <i>Adonis helleborus</i> CRANTZ; <i>Adonanthe vernalis</i> (L.) SPACH |
| 1.6.1 | Common names | |
| | <i>Czech</i> | Hlaváček jarní |
| | <i>Dutch</i> | Duivelsoog, Voorjaars-Adonis |
| | <i>English</i> | False Hellebore, Spring Adonis, Yellow Adonis, Yellow Pheasant's-eye, Ox-eye |
| | <i>French</i> | Adonis du printemps, Grand oeil de boeuf |
| | <i>German</i> | Frühlings-Adonisröschen, Frühlings-Teufelsauge, Falsche Nieswurz |
| | <i>Hungarian</i> | Tavaszi hérics |
| | <i>Italian</i> | Adonide gialla, Occhio del diavolo |
| | <i>Norwegian</i> | Våradonis |
| | <i>Polish</i> | Milek wiosenny |
| | <i>Russian</i> | Goricwiet vesinnij |
| | <i>Slovak</i> | Hlavá ik jarný |
| | <i>Spanish</i> | Adonis vernal, Adonis de primavera, Flor de Adonis, Ojo de perdiz; Eliboro falso |
| | <i>Swedish</i> | Våradonis |
| 1.6.2 | Trade names and pharmaceutical names | |
| | <i>Latin</i> | Adonidis herba, Herba Adonidis, Herba Adonidis vernalis |
| | <i>Czech</i> | Nat hlavacku jarniho |
| | <i>English</i> | Herb of Lynchis, Herb of Spring Adonis |
| | <i>French</i> | Herb d'Adonide, Adonis |
| | <i>German</i> | Adoniskraut, Adonis-vernalis-Kraut, Frühlings-Adonisröschenkraut |
| | <i>Spanish</i> | Yerba de Adonis, Ojo de Perdiz |

2. Biological Parameters

2.1 Distribution

Adonis vernalis is a pontic element (WALTER & STRAKA 1970). Its main distribution area ranges from the eastern part of middle Europe through east and southeast Europe, western Siberia to eastern Siberia reaching the Jenissei region (fig.1; HULTÉN & FRIES 1986; AKEROYD 1993; BOBROV 1937). In middle and southwest Europe the area is disjunct with some isolated growth places in mainly azonal habitats scattered from southeast Sweden to southeast Spain (JALAS & SUOMINEN 1989).

In its main range, *A. vernalis* grows in (planar) colline to montane altitudes, at elevations from sea level to 500m, e.g. in Italy between 50-300m (STEINBERG 1982), in the Ukraine at altitudes of 150-480m (MELNIK 1998), in Romania at 50-600m (SARBU 1997) and in the Valais (Switzerland) at 400-600m (BRAUN- -BLANQUET 1961). To the southwest and southeast, the species reaches higher altitudes: in Bulgaria up to 1,100m, in the Causses (Cevennes, France) up to 850-1,100m, whereas in Spain it is found exclusively between 600 and 1600m.

2.2 Habitat availability

A. vernalis is an element of different primary or secondary subcontinental to continental grassland communities. These plant communities are dominated by slow-growing, perennial, herbaceous plants

and semishrubs. *A. vernalis* is also capable of growing in open stands of wood, light woods as well as in pine and steppe-forests. It prefers summer-warm, sunny places or at most semi-shaded ones, where the soil can warm up easily enabling the plant to emerge early in spring. According to MELNIK (1998), *A. vernalis* stands are normally found on well-drained but sufficiently moistured soils, on loose loam soils, loess soils or black-earth soils.

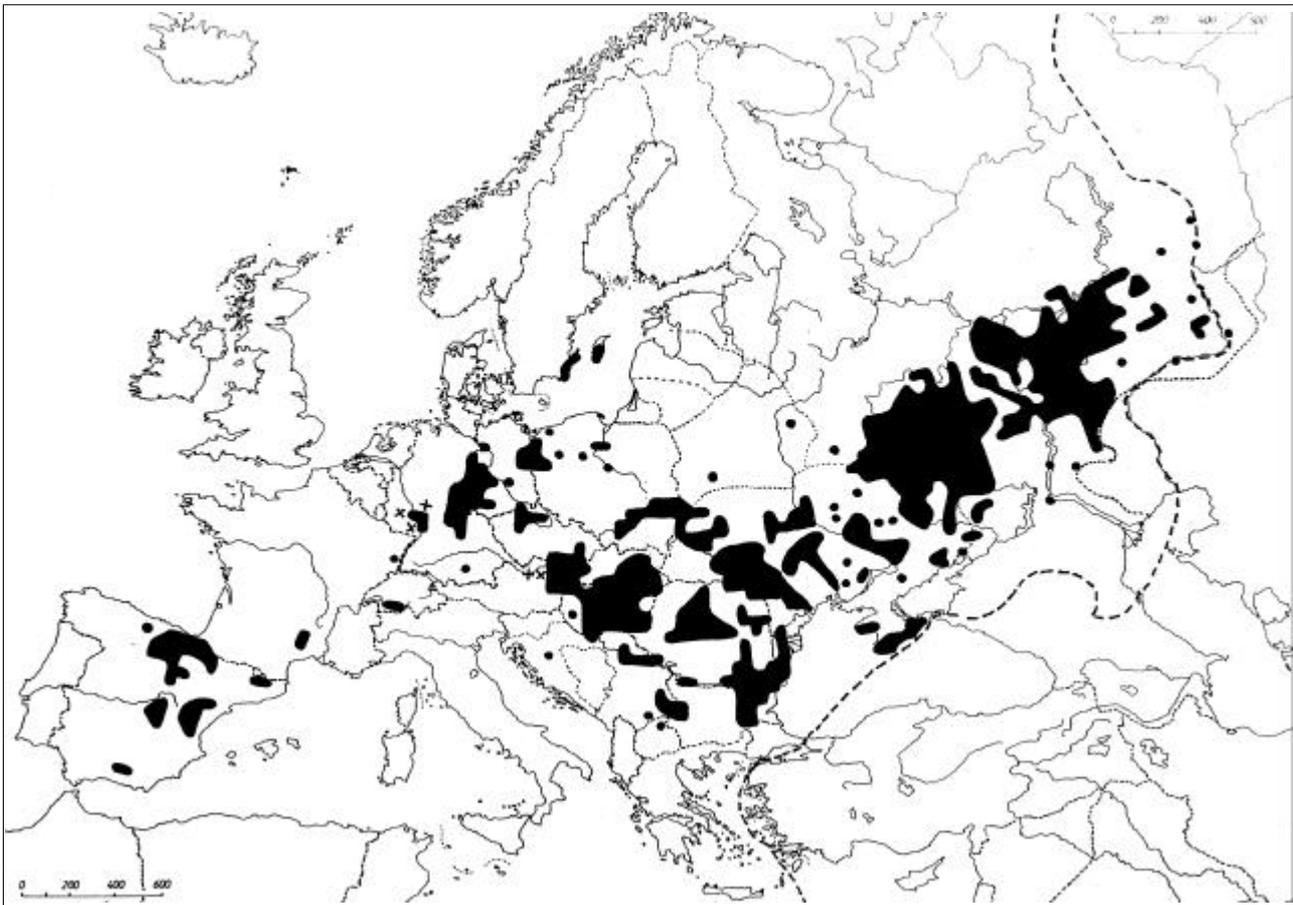


Figure 1. Distribution map of *Adonis vernalis* in Europe.- : native occurrence; _ : probably extinct; + : extinct

The species' habitat requirements are best met in the three main biotope-types in which *A. vernalis* is generally found within its distributional range:

(i) Primary grassland communities in the Eurasian steppe zone in east Europe and Asia. This zone is characterized by dry, continental climate, cold winters, hot summers, and average annual precipitation of less than 500 mm (KREEB 1983). Here, *A. vernalis* grows in the forest-steppe and meadow-steppe preferably on calcareous black-earth soils, the so-called chernozem.

(ii) Semi-natural and secondary steppe communities in the Pannonic and Danubian region of middle and southeast Europe (southern and eastern Romania, northern Bulgaria, Hungarian Plain, Czech Republic, Slovakia, Croatia, and eastern Austria).

(iii) Extrazonal steppe communities and secondary grassland communities on dry sites in middle Europe. Natural steppe grasslands only occur in areas with dry continental climate, cold winters, hot summers, and average annual precipitation less than 500 mm and are most extensively developed in the former USSR (IUCN 1991). Semi-natural dry grasslands, maintained above all by grazing, are now most widespread in the Pannonic regions and central Europe. Both natural and semi-natural grasslands in central and eastern Europe are under threat in most parts of their distributional range.

Table 1. Range states of <i>Adonis vernalis</i> (grey = main supplying countries)	
Country	Specification
North Europe	
Sweden	two Baltic Sea islands in the southeast of the country
Middle Europe	
Austria	Pannonic regions, Niederösterreich, Burgenland
Czech Republic	thermophilous areas at northern Vltava, middle to lower Elbe and Pannonic region in the country's southeast
Germany	main localities in eastern Germany and isolated patches along Rhine and Main river
Hungary	almost all over the country, mainly northern central mountain chain and Transdanubian region plus some isolated localities
Netherlands	recorded once in 1849 in the eastern part of the country
Poland	main area in uplands in the southeast, in the northwest a few isolated patches, i.a. along Odra and Wisna
Slovakia	Pannonic regions and in fragments at lower altitudes of the Carpathians
Switzerland	few localities confined to the Valais
Southwest Europe	
France	few isolated localities in the Alsace and in the Cevennes
Spain	northern, central, eastern mountains 600-1600m a.s.l., Sierra Nevada
Southeast Europe	
Bulgaria	common in north and northeastern parts of the country; other sporadic occurrences near Black Sea, Danube plain region, Balkan foothills, Thracian plain
Croatia	few localities around Zagreb
Italy	three recorded populations in the northeast are probably extinct
Romania	widespread, except in mountain areas; mainly in hilly Transsilvania and in the Moldava
Yugoslavia	in Serbia restricted to Danube plain in the north of the country, in addition few isolated patches in the southeast and in Macedonia
East Europe & Asia	
Belarus	few records from southern Belarus
Kazakhstan	few doubtful records from the north of the Caspian sea
Russian Federation	roughly between 50-56 N bordered by Oka river in the west and Jenissei in the east
Ukraine	widespread and locally common

Among the continuing threats to natural and semi-natural grassland communities on dry sites and their characteristic plant species composition are over-grazing, trampling by animals, soil erosion, pollution from agrochemicals and nitrogen, woodland encroachment and afforestation.

In **Bulgaria**, the grasslands decreased by about 30% up to the 1950's (IUCN 1991). In **Hungary**, about 13% of the total area was covered by grasslands in 1990 (IUCN 1991). By that time, about 20% of the total grassland area had been lost since 1950. In **Romania**, areas of steppe and improved grasslands have steadily decreased. Also in the **Ukraine**, **Belarus** and the western part of **Russia**, natural grasslands are under continuous threat.

2.3 Population status and trends

Adonis vernalis is considered to be a threatened species and is included in most red data books of its range countries (table 2; see chapter 2.7 for threat reasons). In the synoptical red list for central Europe the species is assessed as *Vulnerable* by SCHNITTLER & GÜNTHER (1999).

If available, estimates of the biomass (i.e. the extrapolated total quantity of plant material of a particular species found on a defined area per year), the annual exploitable resources as well as the status and trends of populations of *A. vernalis* in the main supplying countries are given in the following:

Bulgaria: More than 200 populations of *A. vernalis* cover an area of about 500ha (MLADENOVA & EVSTATIEVA 1997). The largest areas where *A. vernalis* occurs are located in the northeast and in the west of the country, in the regions of Dobrich (70ha), Varna (60ha), Shumen (60ha), Targoviste (25ha), and Pernik in Golo Burdo mountain (40ha). The annual biomass of these districts may be expressed by the following quantities (in brackets: annual biomass per hectare): 5,000kg (71kg) in Dobrich, 4,500kg (75kg) in Varna, 2,000kg (33kg) in Shumen, 1,000kg (40kg) in Targoviste, and 3,000kg (75kg) in Pernik. The maximum annual exploitable dry biomass of Adonis herb is fixed to about 40% or less of the biomass resources since 1992: Dobrich 2,000kg, Varna 1,500kg, Shumen 600kg, Targoviste 500kg, and Pernik 700kg (MLADENOVA & EVSTATIEVA 1997). The average annual biomass yield per hectare of the dried herb amounts to 61kg/ha. The total biomass of the most important sourcing regions in Bulgaria amounts to 15,500kg per year, of which a maximum of one third equal to 5,300kg is allowed to be exploited since 1992. In addition, there are a few localities with scattered growth places of *A. vernalis* where collection is also allowed. However, between 1980 and 1990, 6-20t of Adonis herb were collected annually, implying that in some years the collection exceeded the annual biomass. In 1989, for example, 17t were collected (MLADENOVA & EVSTATIEVA 1997). In that year, in Shumen, Dobrich and Varna the total annual biomass was exploited, and in Pernik the collected quantity of 4t even exceeded the annual biomass by 1t. This unsustainable practice lead to declining populations of *A. vernalis* and resulted in the necessity to include Adonis herb in the quota-system established in 1992 (see 4.2.3).

Hungary: There are no exact figures neither on the total nor on regional annual biomass resources or on the population status of *A. vernalis* in Hungary. However, in the 1970's the herb and roots of this species were collected in huge quantities. The unsustainable and uncontrolled exploitation resulted in a drastic decline of the populations (NÉMETH & HÉJJA 1998) and lead to total ban on wild harvesting in 1982.

Romania: The main procurement region is the district of Cluj in Transsilvania. Further important collecting areas are the districts of Hunedoara south of the Apuseni mountains and Tulcea along the Black Sea coast. Apart from general statements, neither exact figures for the total annual biomass nor of the annually collected quantities of Adonis herb in Romania are available. The Commission for the Conservation of Nature of the Romanian Academy of Science estimated the annual biomass of dry Adonis herb in 1997 to be 5.25t in the Cluj district and 6.8t in Tulcea (PLAFAR, in litt., 21.1.1998). The latter is based on an evaluation of the annual exploitable biomass of medicinal plants in the Tulcea region done in the late 1970's (BOJOR & al. 1979). According to a trader's information, in the area of Cluj about 20t Adonis herb were collected in former years which is much more than the extrapolated biomass resources. Meanwhile the collection of *A. vernalis* is subject to licensing (see 4.2.3).

Russia: The basic raw stock and major procurement regions are situated in the chernozem centre of Russia, the Ural region, the Altay kray, and in Siberia (GORBUNOV 1999). It is difficult to estimate the total annually exploitable biomass of Adonis herb in Russia. The available figures are not precise and about 20 years old (TOLMACHEV 1983). He distinguished only four different and very broad categories: (1) less than 0.1t, (2) 0.1-1t, (3) 1-10t, and (4) 10-35t. Accordingly, in the chernozem centre of Russia, the annual harvestable biomass of Adonis herb was estimated to be 1-10t in the surroundings of Belgorod and Voronezh, 0.1-1t in the regions of Kursk, Penza and Saratov. Further, in the areas of Kubyshev, Ulyanovsk and Kazan also quantities of 1-10t were able to be harvested each year (TOLMACHEV 1983). In Bashkortostan (= Baskirija; Preuralie) and in the Ural region the annual harvestable resources were assessed as either 10-35t each (Kurgan oblast, Jekaterinburg oblast) and in the Chelyabinsk (= Cel'abinsk) oblast to 1-10t. The latter quantity also applied to the Altaj kray. Considerable resources were found in the easternmost part of the range of *A. vernalis*. In the Novosibirsk oblast, southeast of Novosibirsk and in the Kemerovo oblast, southwest of Kemerovo the density of *A. vernalis* populations was high and 10-35t of dry Adonis herb were harvestable per year in each region. Yields of 300-400kg/ha were quite normal in this area, sometimes even exceeding 400kg/ha (TOLMACHEV 1983). South of this area, near Barnaul, an additional amount of about 1-10t

was possible to be collected. In all, under optimal conditions on typical chernozem soils, *A. vernalis* is reported to yield 600-800 kg of raw plant material per hectare in the wild, decreasing to 45-110 kg/ha on wet forest soils (TOLMACHEV 1983; GORBUNOV 1999). Summing up these figures, the annually exploitable biomass could be roughly estimated to be 100-200t about 20 years ago.

Table 2. Red list assessment of <i>Adonis vernalis</i> in its range states (grey = main supply countries)		
Continent/Country	IUCN Red List Category	Source
North Europe		
Sweden	V	ARONSSON (1999)
Middle Europe		
Austria	V	NIKLFIELD & al. (1986)
Czech Republic	E	ANON. (1992)
Germany	V*	KORNECK & al. (1996)
Hungary	R	RAKONCZAY (1990)
Netherlands	Ex	WEEDA & al. (1990)
Poland	-	ZARZYCKI & al. (1992), INGELÖG & al. (1993)
Slovakia	V	MAGLOCKY & FERÁKOVA (1993)
Switzerland	V	LANDOLT (1991)
Southwest Europe		
France	-	GAVAZZI (1995)
Spain	-	-
Southeast Europe		
Bulgaria	-	VELCHEV & al. (1984)
Croatia	E	SUGAR (1994)
Italy	Ex	CONTI & al. (1992)
Romania	V	DIHORU & DIHORU (1994)
East Europe & Asia		
Belarus	Ex	PODOLYAKO, in litt. to German CITES SA, 30.8.1999
Kazakhstan	listed	GORBUNOV (in litt. to TRAFFIC EUROPE, 21.1.1998)
Russian Federation	V**	TAKHTAJAN (1975)
Ukraine	E	TAKHTAJAN (1975)
* According to KORNECK & al. (1996) <i>A. vernalis</i> is classified as "3 = gefährdet".		
** TAKHTAJAN (1975) distinguished three threat categories 1, 2, and 3. They are replaced by 1=E, 2=R, and 3=V according to a conversion proposed by MELNIK (in litt.).		

Owing to long-term exploitation and agricultural development the range of *A. vernalis* in Russia was and still is constantly shrinking resulting in more and more fragmented populations (GORBUNOV 1999). Consequently, according to GORBUNOV's investigations, exploitation should be banned in many parts of the country, and only allowed in few regions of the Russian chernozem centre, the Ural region and in Siberia. Therefore, although the total annual biomass in Russia is still estimated to be 500-1,000t, the annual biomass resources of *Adonis* herb are not more than 200t of which only 50t are possible

to be exploited each year. However, the annual demand for Adonis herb is higher and reaches 180t (GORBUNOV 1999). Moreover, in one area, the Republic of Bashkortostan not less than 58t of Adonis herb were procured annually between 1988 and 1996 (GORBUNOV 1998, in litt. to TRAFFIC Europe-Russia).

Ukraine: According to MELNIK (1998), the annual biomass of dry Adonis herb was estimated at 50t in the Ukraine and the Moldova region in the 1960's. *A. vernalis* showed the highest density in the mountains of the Crimean peninsula (10-35t; TOLMACHEV 1983). Here, *A. vernalis* is still found with a density of 4-11 individuals per m² (MELNIK 1998), equal to a yield of about 160-440kg/ha. Other areas with a high potential of dried Adonis herb were located in the northern part of the steppe zone and in the south of the forest-steppe in the northeast of the country (MELNIK 1998). In the steppe zone, the areas with the highest annual biomass resources were according to TOLMACHEV (1983) the surroundings of Dnipropetrovsk and Zaporizhzhya regions (1-10t), Kirovohrad (0.1-1t), Mykolayiv (0.1-1t), Donetsk (0.1-1t), and Odessa (0.1-1t). In particular in the surroundings of Dolinskaja southeast of Kirovohrad, MELNIK (1998) observed *A. vernalis* populations still covering an area of about 5km² with an average density of 5-10 individuals per m². In this case, the annual biomass amounts to 200-400kg/ha. In the south of the forest-steppe, the region around Ternopol harboured about 1-10t of dry Adonis herb, and the surroundings of Lviv, Ivano-Frankivsk, and Khmelnytsky 0.1-1t each (TOLMACHEV 1983). Drastically declining populations of *A. vernalis* lead very early to decreasing resources of Adonis herb in the Ukraine. Thus, collecting of the drug in the wild for commercial purposes was already stopped in the beginning of the 1970's, and in the Crimean peninsula in 1977. MELNIK (1998) states that today the biomass reserve of Adonis herb in the forest-steppe and in the Crimean peninsula is 0.1-10t, and only up to 0.1t in the steppe regions.

These assessments of the main procuring regions of Adonis herb show that its collection has been unsustainable in the past in all countries involved. With the exception of Bulgaria this is valid until today.

In general, to ensure a sustainable collection of Adonis herb, the annual harvest should not be allowed to exceed 1/5 to 1/4 of the biomass resources per year. This is based on the fact that one population should only be allowed to be exploited every four years (MLADENOVA & EVSTATIEVA 1997). Additionally, regional differences in the frequency of the species have to be taken into consideration when fixing the annually exploitable quantities.

2.4 Population trends

See chapter 2.3.

2.5 Geographic trends

As explained in chapter 2.2, the natural and semi-natural steppe and grassland ecosystems of central and eastern Europe experienced a strong decline in the past decades. In general, *A. vernalis* has a wide range of distribution but mainly occurs in isolated, fragmented populations today. Such kind of populations are generally prone to higher risks of local extinction when the physical conditions on site are altered unfavourably. This is in particular true for those species which propagate mainly vegetatively as *A. vernalis* does and which are restricted to threatened biotopes. Hence it is safe to conclude that its distributional range declines and becomes more fragmented due to the observed and well documented losses of available habitats.

2.6 Role of the species in its ecosystem

Adonis vernalis is a perennial, herbaceous plant, showing a short, stout, and brownish-black rootstock and forming clumps with flowering and non-flowering shoots. Stems are erect, 10-45 cm high, and single or sometimes with few appressed branches. The proterogynous flowers open during sunshine and attract different insects with their silkily shining petals and their UV-free lines. The plants are pollinated by pollen-collecting bees, pollen-eating flies and beetles (KUGLER 1970).

The many one-seeded fruits are indehiscent and spirally arranged along a central axis. The fruits show an oil body, thus attracting ants which disperse them. This kind of dispersal is of great importance as *A. vernalis* is an element of dense grassy places in which the seeds often have difficulties to reach open soil surface. In spite of this, regeneration by seeds does not take place each year: (i) The seeds lose their viability very quickly, and no seed reserve is built up in the soil; (ii) The germination rate is very low; (iii) Many seedlings die off due to soil desiccation in summer and frost in winter; (iv) An individual plant does not flower before its third or fourth year. Hence, fertile reproduction only takes place if seeds are abundant and the weather is rainy and cool in July to August, enabling the seeds to germinate immediately after ripening. Thus, vegetative growth is far more important than generative reproduction and happens by rhizomes producing new shoots each year. The rhizome's ability to branch

enables the plant to produce more shoots. This may result in large and old clumps. However, rhizome growth is not unlimited as in general the distal end of the rhizome dies off and the proximal end continues to grow (MELNIK 1998).

The main role of *A. vernalis* in the ecosystems may be seen in offering food to insects, pollen to bees, flies and beetles and oil bodies to ants.

2.7 Threats

The reasons for *A. vernalis* being threatened are manifold. Some reasons are within the biology and ecology of the plant, as the germination rates of the seeds are low, the plant is slow growing and regenerates only slowly after damaging or harvesting (see chapter 2.6). The species is further threatened by detrimental harvesting techniques. Harvesting each year weakens the plants, leading to a decreasing production of shoots and flowers. Harvesting before ripening of seeds destroys the chance to regenerate from seeds (NÉMETH & HÉJJA 1998). Other detrimental harvesting techniques include cutting the stems next to the base or pulling them out, thus destroying the vegetative buds or damaging the rhizome. Overexploitation of *A. vernalis* has been documented in all main source countries of Adonis herb. For example, GORBUNOV (1998, in litt. to TRAFFIC Europe-Russia; 1999) observed in Russia that the extensive long-time harvest of *A. vernalis* plants, e.g. in the chernozem centre had exhausted its commercial stock in that region. The unsustainable collecting practice in Bulgaria lead to declining populations of *A. vernalis* which resulted in the necessity to include *A. vernalis* in the quota-system established in 1992 (MLADENOVA & EVSTATIEVA 1997). In Hungary, the uncontrolled exploitation of quantities of roots and herb lead to a drastic decline of the *Adonis* populations (NÉMETH & HÉJJA 1998) followed by a total ban on harvesting in the wild in 1982. Drastically declining populations of *A. vernalis* in the Ukraine resulted very early in decreasing resources of Adonis herb (MELNIK 1998). For details see 2.3.

As *A. vernalis* grows in the lowlands where good conditions for agriculture exist, the plant is affected by breaking for fields and melioration of the land. This is particular true for the Ukraine and Russia, where *A. vernalis* grows on black-earth soils (chernozem) which are rich in humus and of high fertility. Intensive agriculture reduces the number of *A. vernalis* as the species is sensitive to herbicides, fertilisers and other chemicals as well as to disturbance of soil and to tillage. In Bulgaria, intensive tourism, above all in the Black Sea area, is an additional threatening factor for the populations of *A. vernalis* (MLADENOVA & EVSTATIEVA 1997).

Habitat changes and losses are also important threat reasons. Large parts of the European steppes are now under cultivation, destroyed by ploughing, reseeding and the over-application of fertilizer since the end of World War II. Remaining species-rich calcareous and dry grasslands are now particularly at risk, either from destruction by ploughing, overgrazing or, where grazing patterns have changed, encroachment by scrub and trees or even afforestation (DAVIS & al. 1994).

Furthermore, large scale reprivatisation of the lands takes place, in particular in eastern Europe and the former USSR. There are no governmental instruments to control trade in medicinal plants any longer (LANGE 1998).

The range of *A. vernalis* is not continuous but subdivided into numerous isolated patches, even within its main range in east Europe and Siberia. This is due to the intensive agricultural practices and unsustainable usage of the *Adonis* plants (GORBUNOV 1999). These isolated patches often harbour genetically distinct sub-populations, which will lead to genetic erosion once they go extinct.

3. Utilization and Trade

3.1 National utilization

The species is used as an ornamental, as a dye and, above all, for medicinal purposes in phytotherapy, homeopathy as well as in folk medicine. As an ornamental, *A. vernalis* is planted in rock and steppe gardens (JELITTO 1958). In Russia, the roots are source of a yellow dye (BOBROV 1937).

For medicinal purposes, mainly the aerial plant parts (stems, leaves, flowers, and fruits) of *A. vernalis* are used. The plant material is either used dried as in phytotherapy or fresh as in homeopathy. In the latter case, sometimes the whole plant including root is used. In Russian folk medicine the aerial parts as well as the rootstock are used against a variety of illnesses (BOBROV 1937; MADDAUS 1938).

As cultivation for commercial medicinal purposes has not been successfully established until now, almost **all plant material in trade is sourced from wild stock**.

3.2 Legal international trade

Adonis herb mainly originates from eastern European countries. Main supplying countries have been in the past or still are Bulgaria, Hungary, Romania, Ukraine, and Russia, with Germany and France being the main importing countries.

The trade structure changed drastically in all former state-controlled countries of the Eastern Bloc since the fall of the communism. Since the beginning of the 1990's the state-controlled system of herb trade broke down and new private companies started (BERNÁTH 1996; LANGE 1998). The former legal structures did no longer apply, leading to unregulated exploitation and uncontrolled export of the plants concerned. As the main range states of *A. vernalis* and the main source countries of the herb are eastern European countries these changes affected and still affect its trade.

During the last 20-30 years the source countries of Adonis herb for international trade changed considerably. In the 1970's the main source country was Hungary, but when the species became protected in 1982 the possibility to purchase the herb in Hungary ceased. It is not known whether material coming from Ukraine played an important role in international trade at that time as collection was stopped very early in the 1970's. In the 1980's, mainly Bulgaria and Romania offered it to the market. During the 1990's the exports of Adonis herb from Bulgaria decreased sharply. This was a result of the ordinances issued in 1992 making collection of and trade in Adonis herb subject to licensing. The quantities allowed to trade were so low and spread over the country that traders did not apply for the quotas as the profitability was low and foreign companies would not purchase such small quantities. Currently, it seems that mainly the Romanian populations are exploited for export. Additional Adonis herb is exported from Russia, but quantities involved are not known.

Exact trade figures of Adonis herb are not available as this commodity is not monitored separately in the customs codes, the basis of foreign trade statistics of the relevant countries. The information provided here is based on interviews with relevant traders and companies. It is most probable that the actual trade figures are higher since (i) not all of them provided trade figures, (ii) the changes in the trade structure in the source countries lead to many young companies trading in medicinal and aromatic plants.

Bulgaria: According to MLADENOVA & EVSTATIEVA (1997) 5-10t had been exported until 1990, and in 1992 still 7t. Since then the export has sharply decreased; there was no export in 1993; in 1994 1,300kg were exported, and in 1995 again no export. In 1996 and 1997 900kg were exported. Main destination countries were Germany and, to a lesser extent, France.

Hungary: Before *A. vernalis* became protected in 1982, Adonis herb had been exported in huge quantities. The main destination country was Germany. Since 1982, no export of Adonis herb is known (NÉMETH & HÉJJA 1998).

Romania: Until 1991, every two years 30-40t were exported to European countries of which about 10-20t were destined to Germany and 5-6t to France. Trade figures for the 1990's are difficult to obtain as new firms became involved in this trade. The quantities exported from the former state-owned export-bureau to European countries amounted to 11.5t in 1992, 1t in 1993, 0.85t in 1994, 1.65t in 1995, 2.5t in 1996, and 15.5t in 1997. The share of the exports to Germany was 11t in 1992, 1.2t in 1995 and 5.5t in 1997.

Russia: According to GORBUNOV (1999) Adonis herb is exported but no exact figures are known.

Ukraine: According to MELNIK (1998), Adonis herb is neither exported nor imported currently.

Germany: In the 1970's 30-40t of Adonis herb were imported. Until the end of the 1980's the annual import decreased, but was still 15-20t. Since 1990 the annual import is presumed to be at least 10t per year as the annual demand is estimated to be 10t. In 1995 at least 13t were imported. In general, Adonis herb is unregularly exported from Germany to other European countries, North and South America, but no exact figures have been available.

For a long time Germany was the main destination country of Adonis herb. Most of the material was processed in Germany, but parts were re-exported to other European countries and overseas, e.g. Brazil. In the 1990's, more and more material was exported from the source countries directly to other European countries, above all to France. It is difficult to estimate whether this change is only a result of the Second and Third amendment of the German BArtSchV of 1994 prohibiting the import of Adonis herb from the former state-controlled countries and of 1997 relaxing the restrictions and thus allowing the import of this commodity via European Union member states (see 4.1.1). The actual demand of Adonis herb in France or other European countries is not known.

Conclusion: When comparing the export figures of Adonis herb for each source country with the import figures of Germany, the main destination of this commodity, considerable differences become apparent. This is particularly true for the years since 1990. Although the annual demand in Germany is estimated to be 10t, there are no equivalent export figures from the supplying countries Bulgaria, Romania, Ukraine, and Russia. There are two possible explanations for this: Either the export volumes from Bulgaria and Romania are higher than those communicated by the traders, or there is a considerable export from the Ukraine or Russia to Germany for which data are lacking.

3.3 Illegal trade

No information received from range states upon consultation

3.4 Actual or potential trade impacts

See chapter 2.3

3.5 Cultivation

Until now, commercial cultivation is only in place for ornamental and for homeopathic purposes. Demand is not high in both sectors, propagation is often done vegetatively. Some homeopathic companies in Germany practise their own cultivation. This enables them to meet their low demand of some kilograms of fresh plant material per year. One company producing 50kg of mother tincture stated to need 10kg of fresh plant material. This quantity would be obtained by harvesting about 100 cultivated specimens (SCHMID & DUBA, pers. comm.). In praxis the number of cultivated plants has to be higher as it is not possible to harvest each shoot of all clumps. Only one German company is known to offer fresh Adonis herb for sale in small quantities.

All the many attempts to achieve large-scale cultivation of *A. vernalis* for medicinal purposes failed until now and it seems that cultivation in an agricultural system is uneconomic (NÉMETH & HÉJJA 1998; MELNIK 1998). The reasons are manyfold, among others: (i) germination is unreliable, uneven and slow, germination capacity is low (20-50%); (ii) seed viability decreases very quickly; (iii) seeds are expensive and difficult to obtain; (iv) development in general is very slow, the plants need at least 4-5 years to mature; full-bloom apparently does not take place before the third or fourth year; (v) a lot of hand work is necessary and leads to increased cultivation costs; (vi) propagation by plant division is unpracticable for large-scale cultivation of *A. vernalis* in the phytomedicinal sector (BRICKELL 1994; BOWN 1995; MLADENOVA & EVSTATIEVA 1997; NÉMETH & HÉJJA 1998; MELNIK 1998).

4. Conservation and Management

4.1 Legal status

4.1.1 National

Bulgaria: Wild-harvesting and trade in medicinal and aromatic plants are governed by the Nature Protection Law of 1967, the ordinance of 1989 pursuant to this law, and several legal restrictions, ordinances and their amendments since 1989, in particular issued for threatened species of commercial interests (LANGE 1998).

Germany: At federal level, the protection of wild flora is governed by the *Federal Nature Conservation Act* (Bundesnaturschutzgesetz, BNatSchG) of 1976, newly published in 1998 considering the amendments. Pursuant to this law, the *Federal Ordinance on the Conservation of Species* (Bundesartenschutzverordnung, BArtSchV) which came into force on 1.1.1987 listed the species which are subject to special protection and regulated the trade and possession of these species. *A. vernalis* is included in Annex 1 of the BArtSchV. National import permits were required which were not granted for commercial activities with wild taken plants. Until 1994, imports of *A. vernalis* from the state-controlled countries (Albania, Bulgaria, Poland, Romania, Czechoslovakia, Hungary, and the USSR) were exempted from these restrictions. On 20.7.1994 the Second Amendment of the BArtSchV entered into force which waived these exemptions. Consequently, trade in wild material of *A. vernalis* for commercial purposes became strictly prohibited in Germany. Since 14.6.1997, the entry into force of the Third Amendment of the BArtSchV, trade restrictions were no longer applicable to imports from or exports to European Community member states. Consequently, it was, for example, possible to import Adonis herb from Romania to Germany via France.

On 9.5.1998, the Second Amendment of the BNatSchG entered into force. Aims and objectives of the current German regulations are to protect all native wild populations of *A. vernalis* in Germany. Since then, national import permits were generally replaced by prohibitions on possession and on marketing (commercial activities). For living plants imported into the Community in Germany a customs paper is required that confirms the plants were introduced into the Community. Dried plants of *A. vernalis* do

not require this document.

Hungary: Since 1982, *A. vernalis* is fully protected according to the Order of the President of the National Authority for Environmental Protection and Nature Conservation (1982.III.15), prohibiting its collection (NÉMETH & HÉJJA 1998). According to the new Nature Conservation Law of June 1996, which came into force on 1.1.1997 (1996. LIII. Act), it is prohibited to endanger, destroy or damage specimens of protected plant species like *A. vernalis* or their habitats (KLEMM 1997).

Romania: A new Environmental Protection Law was promulgated on 30.12.1995. The law establishes the principle that the conservation of biological diversity and rare or endangered species shall take priority over other interests. It is a framework law which requires technical regulations on matters related to the conservation of ecosystems and biodiversity (KLEMM 1997). Therefore, pursuant to this law, a regulation on the harvest, trade and export of medicinal and aromatic plants, including *A. vernalis*, was adopted on 14.3.1997.

Russia: According to the Environmental Protection Law of 19.12.1991, rare or endangered species shall be subject to special protection. This applies to all species included in the Red Data Book of the Russian Federation. These species are protected against any economic exploitation and any activities leading to a reduction in the number of individuals or to the deterioration of their habitats. *A. vernalis* is listed in the 1975 Red Data Book of the USSR (TAKHTAJAN 1975), but neither in the 1978 edition (BORODIN & al. 1978) nor in the 1984 edition. Only the latter one has implications on law in Russia (VAISMAN, pers. comm.).

In **Austria** *A. vernalis* is limited to the Länder Niederösterreich and Burgenland. The species is fully protected in these regional entities (JANCHEN 1977). In the **Czech Republic**, *A. vernalis* is included in the list of particularly protected plant species as endangered (Annex II of the Regulation of the Ministry of Environment, CR No. 395/1992). According to the Czech National Council Act No. 114/92 of 19.2.1992, which came into force on 1.7.1992, the underground and above-ground parts and all stages of *A. vernalis* as well as its biotopes are protected. Consequently, it is prohibited to collect, pick, dig up, damage, destroy, or disturb in any other way the development of the plants. In **France**, *A. vernalis* is subject to the decree of 20.1.1982 (JO of 13.5.1982), modified by the decree of 5.9.1982 (JO of 14.12.1982), and of 31.8.1995 (JO of 17.10.1995), which partly protects the species throughout the French territory. This decree is one of the implementing regulations to the Nature Protection Law of 10.7.1976, which was amended by the Law to Strengthen Environmental Protection of 2.2.1995, and incorporated in the Rural Code II entitled "Nature Protection" (GOI & al. 1997; KLEMM 1997). According to CONTI & al. (1992) there are no protection measurements in **Italy**, as the species is extinct in this country. In **Spain** habitat and species conservation legislation is based on Ley 4/1989 of 27.5.1989, Conservation of Natural Areas and Wild Flora and Fauna. It specifies different kinds of protection depending on which Annex (I-IV) the species is listed in. This law establishes also the provision for regional catalogues of threatened species (BLANCO & BREAUX 1997; KLEMM 1997; LANGE 1998). *A. vernalis* is only subject to the regional legislation of Cataluña (Decreto 328/1992 of 14.12.1992). As the species is listed in Annex III, it is prohibited to destroy, damage, pick or trade the specimens or to destroy its habitats in Cataluña. The EC Habitats, Fauna and Flora Directive has been transposed into Spanish law by a Royal Decree 1997/1995 of 7.12.1995 (KLEMM 1997). With regard to the species listed in Annex V, like *A. vernalis*, the decree requires the Autonomous Communities to fulfil the provisions laid down in Art. 14 of the Directive (see legislation at EU-level). Until now, no implementation into regional legislation is known. In **Switzerland**, *A. vernalis* is fully protected according to the Federal Nature and Landscape Protection Law of 1.7.1966 and its implementing regulation, the Nature and Landscape Protection Ordinance of 16.1.1991 (WERNER 1994; LAUBER & WAGNER 1996; KLEMM 1997). *A. vernalis* is subject to the cantonal legislation of the Valais, the only canton where the species is found in Switzerland (WERNER 1994). The decrees of 3.4.1936 and of 4.1.1963 prohibit any collecting, pulling up, offering for sale, selling, and purchasing of wild *A. vernalis* specimens.

4.1.2 International

Global:

Adonis vernalis is not subject to any international species conservation legislation.

Europe:

Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention): For those plant species specified in Appendix I there is an obligation on each contracting party to undertake appropriate and necessary legislative and administrative measures for effective conservation of these species and their habitats (LANGE 1998). Currently, *A. vernalis* is not listed in this appendix. However,

the species is subject to the Recommendation no. 49 of the Standing Committee which was adopted on 26.1.1996. This recommendation concerns the protection of those wild plant species which are subject to exploitation and commerce. *Adonis vernalis* is listed in this recommendation. Accordingly, the contracting parties are recommended (i) to undertake surveillance of the conservation status of *A. vernalis* and whether the species is threatened by exploitation or commerce, and (ii) if necessary, to take measures to ensure that the taking of specimens of *A. vernalis* in the wild is sustainable. This recommendation is not legally binding but is supposed to be applied by the governments of each contracting party in good will. Since the contracting parties have to report on compliance only in 1999, the impact of this recommendation is not known (FERNANDEZ-GALIANO in litt. to TRAFFIC EUROPE, 3.3.1998).

The legislative instruments regulating the trade in wild fauna and flora at EU-level are the recent **Council Regulation (EC) No. 338/97**, adopted on 9.12.1996, **Commission Regulation (EC) No. 938/97**, adopted 26.5.1997, and **(EC) No. 2307/97** of 18.11.1997, adopted on 27.11.1997. These regulations not only fully implement the provisions of CITES within the Union, but also include a number of stricter measures than does CITES. This includes Annex D, the so-called "Monitoring Index" which lists non-CITES plant species which are imported into the EU in such numbers as to warrant monitoring. *A. vernalis* is listed in Annex D. Consequently, this species requires an import notification when imported in the EU.

Within the EU, the **Council Directive 92/43 (EEC)** of 21.5.1992, the so-called Habitats Directive, amended by Council Directive 97/62 of 27.10.1997, is in force. It aims at promoting the conservation of natural habitats and of wild fauna and flora within the EU, and requires member states to take different protection measures depending on the Annex in which a given species is listed (KLEMM 1997; LANGE 1998). *A. vernalis* is listed in Annex V. The annex lists species whose taking in the wild may be subject to management measures, but there is no specification in the text of the directive as to which management measures should apply (LANGE 1998).

4.2 Species management

4.2.1 Population monitoring

No information available.

4.2.2 Habitat conservation

As pointed out in chapter 2.2, the typical natural and semi-natural steppe and dry grasslands of central and eastern Europe are vanishing and protection of these ecosystems in the range countries of *A. vernalis* is often insufficient. Only a number of areas with populations of *A. vernalis* are protected through habitat protection. In **Bulgaria**, the species grows in the National Parks ("Naroden park") "Choumensko Plato" and "Roussenski Lom". The "Choumensko Plato" (IUCN management category IV; IUCN 1992) is located in the eastern part of the Danube plain, covers 3,930ha and is protected since 1980 (PEEV & al. 1995). The "Roussenski Lom" (IUCN management category III; IUCN 1992), situated south of Ruse, covering an area of 3,259ha became protected in 1970. Nature reserves harbouring sites of *A. vernalis* are "Dervicha" (11ha; since 1948; IUCN management category I), "Kalfata" (47ha; since 1968; IUCN management category I), "Ostrița" (135ha; since 1943; IUCN management category I), and "Petleyana" (4ha; since 1960; IUCN category I). These "Rezervats" are strictly protected areas and economic exploitation is prohibited. In **Romania**, *A. vernalis* occurs for example in the Steppe Nature Reserves of Fintinita-Murfatlar (POLUNIN & WALTERS 1985) in the Dobrogea where an area of 641ha is protected since 1962 (MOHAN & al. 1993). Furthermore, the species is found in a protected area near Suceava in the northeast of Romania, in the Finatele Bosanci-Ponoare founded in 1932 and covering an area of 24.5ha (MOHAN & al. 1993). In **Russia**, *A. vernalis* is already protected by some state nature reserves (zapovedniks), e.g. the Centraino-Chernozemnyi zapovednik (GORBUNOV, in litt. to TRAFFIC EUROPE, 21.1.1998). In the **Ukraine**, the species is protected in a variety of reserves (MELNIK 1998). It grows in the state nature reserves of the Ukrainian Steppe (Ukrainskiy Stepnoy; 1,634ha; since 1961; IUCN management category I; IUCN 1992), in which it occurs in each of its three branches (Michajlivska Tsilina, Sumy region; Kamjany Mogily, Zaporizhzhya region; Khomutovskij steppe, Doneck region). In the Crimea, *A. vernalis* is found in the state nature reserves of Yaltinskiy, which is under protection since 1973, and covers an area of 14,591ha in the south of the peninsula (IUCN management category I; IUCN 1992), and of Karadagskiy (1,370ha; since 1979; IUCN management category I; IUCN 1992) in the southeast of the peninsula, and in the state hunting reserve (zakazniki) Krymskoye, an area of 42,957ha, protected since 1957 (IUCN management category IV; IUCN 1992). Additionally, *A. vernalis* is found in the regional landscape park Svaty Gory (Doneck region), and in several reserves in the Poltava region (Novosanzharskiy, Karlivski Stepi, Klimivskij, Drabinivski Schily, Skorobir, Glyboczanskiy, Stinka; MELNIK

1998). In the **Czech Republic**, *A. vernalis* grows mostly in protected landscape areas (Český kras, České středohoří, Pálava), nature reserves and nature monuments.

4.2.3 Management measures

Bulgaria: In 1991, the Ministry of Environment issued an ordinance which regulates the wild-harvest as well as trade and export of several threatened plant species making them subject to restrictions and prohibitions (MLADENOVA 1995). It aims at protecting both the species concerned and their natural habitats, to re-establish wild populations, and to encourage cultivation of some species. Accordingly, restrictions or prohibitions on collection, purchase, trade, and processing of specimens of the listed species obtained from natural populations for industrial or commercial purposes are in force (LANGE & MLADENOVA 1997; LANGE 1998). *A. vernalis* has been subject to restrictions since 1992 making collection subject to prior authorisation. For this purpose, a quota-system has been set up: Each spring since 1992 quantities, plant parts allowed for collection in each district as well as the share allowed for the domestic versus export market, were published in the Official Gazette of the Ministry of Environment and Waters. Table 3 shows the quantities of Adonis herb which have been allowed to be collected in the period 1992-1998. The volumes allowed to be gathered and exported vary considerably from year to year according to region, including annual periodic bans on the exploitation of regional populations.

Table 3. Quotas for the maximum quantities to be collected by regions for the herb of <i>Adonis vernalis</i> in the years 1992-1998. The volumes are given in kilogram of dried herb. - Source: MLADENOVA & EVSTATIEVA (1997)							
District	1992	1993	1994	1995	1996	1997	1998
Varna	1.1	1	500	500	-	700	-
Veliko Tırnovo	-	-	-	-	50	50	20
Vratza	-	-	-	-	-	-	-
Gabrovo	-	-	-	-	50	50	-
Dobrich (Tolbuhin)	2.1	1	500	500	-	-	-
Kustendil	-	-	100	-	-	-	-
Lovech	-	-	-	-	100	-	-
Montana	-	-	-	-	100	100	400
Pernik	-	-	500	500	500	600	700
Pleven	-	-	-	-	50	-	-
Razgrad	500	500	100	-	500	500	-
Ruse	-	-	-	-	200	200	500
Silistra	-	-	-	-	200	-	-
Targoviste	300	1	500	1	500	500	-
Shumen	1	1	500	1	500	500	-
Jambol	-	-	-	-	-	-	100
Total [kg]	5	4.5	2.7	3.5	2.75	3.2	1.72
Internal market only	-	500	-	-	500	500	220

France: According to the decrees of 20.1.1982 (JO of 13.5.1982) and its modifications of 1982 and 1995 (see 4.1.1) it is prohibited to destruct specimens of *A. vernalis* throughout the national territory. Their collection, harvesting, utilisation, transport, and transfer are subject to authorisation from the Ministry of Environment, which takes advice from a Standing Committee of the National Council for Nature Protection (LANGE 1998). Since 1.5.1988, each specimen of *A. vernalis* intended for offer to sale or to consumption has to be labelled. Each label which is equivalent to a licence must state the identity of the vendor, his identification number, the scientific name of the species, and the quantity of this species included in the batch. Additionally, each label has to be numbered, and this number must enter the register together with details of the specimen's origin, destination, quantities etc. (KLEMM 1997).

Hungary: Permission for collection, possession, sale, purchase, exchange, export, import, and transit of *A. vernalis* may be authorised only by the Directorate of Nature Conservation. A permit is also required for the introduction, reintroduction, plantation, and cultivation of specimens of *A. vernalis*, as

well as for selection experiments relating to its individuals, their utilisation for biotechnological purposes and artificial exchanges of genes between populations. A permit is also mandatory for collections of organs of propagation and for their deposit in existing gene banks or collections.

Romania: The collection and export of medicinal and aromatic plants, including *A. vernalis*, are subject to annual licensing since 1997 issued by the regional authorities of the Ministry of Waters, Forests and Environmental Protection, Directorate of Strategies and Regulations for Environmental Protection. The regional subcommissions of the Commission for the Protection of Natural Monuments of the Romanian Academy of Science evaluate the biomass resources of each herb. On the basis of data of the traders' current stock and the amount of herbs granted in the current year, quantities allowed to be collected and exported are determined for each trader separately. Within the borders of protected areas, the collection of medicinal and aromatic plants is generally forbidden.

Russia: The need of a system for licensing purchase and collection of Adonis herb was recognized in the former USSR, but was never established (MELNIK 1998). According to the instructions of the Health Ministry of the former USSR, every 10m² one well developed clumb of *A. vernalis* had to be left to ensure seed production, and in each collecting area harvest was only allowed every four years.

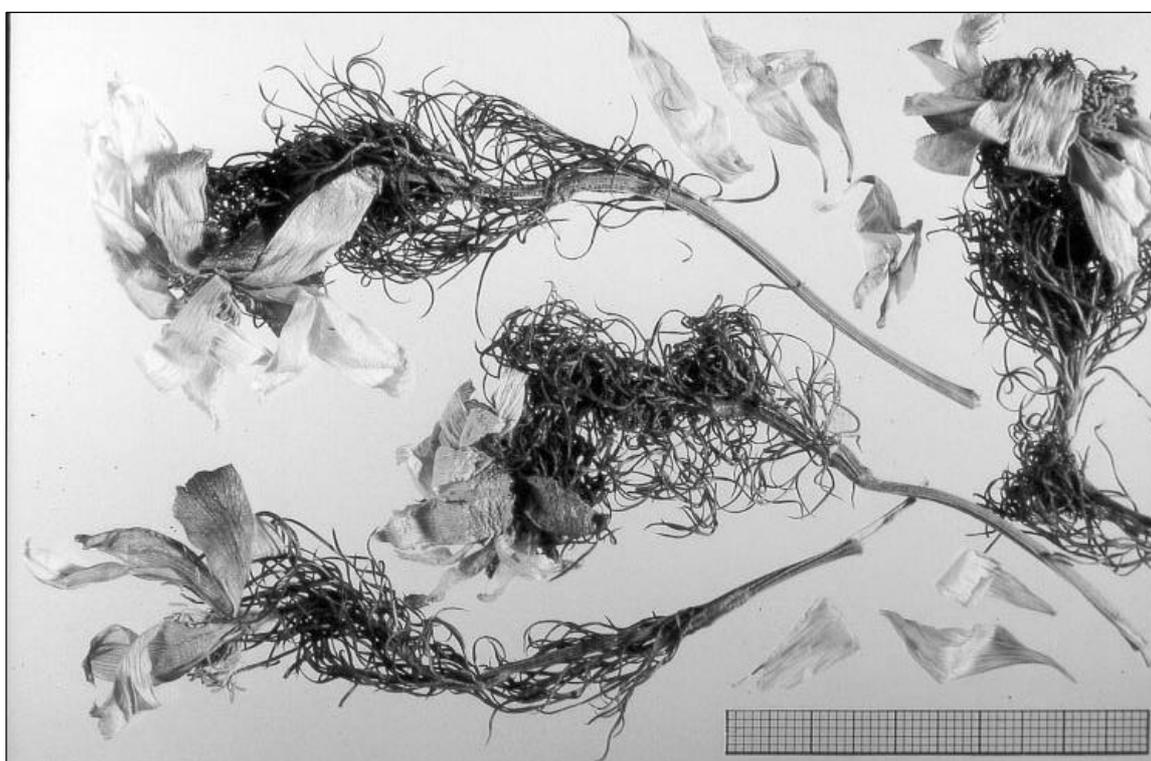


Figure 2. Crude drug of Adonis herb with flowers. - Photo: U. EULER.

5. Information on Similar Species

Commodities of *Adonis vernalis* in international trade are mostly the crude drug in whole or cut conditions (fig. 2). Identification sheets for inclusion in the Identification Handbook are currently under preparation by the German CITES Scientific Authority.

Adulterations of Adonis herb with the herb of perennial *Adonis* are likely to happen because (1) several perennial *Adonis* species share their area with *A. vernalis* and often grow in similar habitats, (2) most of the perennial taxa look very similar. The most important species in this context are *A. volgensis*, *A. sibirica* and *A. villosus*.

A. volgensis co-occurs with *A. vernalis* widely in Siberia, Russia, the Ukraine, the eastern part of Romania and Bulgaria, and in a few growth places in central Romania and Hungary. *A. sibirica* is growing in the easternmost European and the Siberian part of the range of *A. vernalis*, and *A. villosus* ranges in the southeastern part of the *A. vernalis* area.

In general, adulterations with these species are difficult to detect as distinction is difficult above all in dried condition. Like *A. vernalis*, all four species mentioned are characterized by sessile, 2-3-pinnatisect leaves. *A. sibiricus* shows glabrous stems and leaves and, which is more important, glabrous sepals, and those of *A. villosus* and *A. vernalis* are all densely hairy (BOBROV 1937). Diagnostic features of *A. volgensis* and *A. vernalis* are the leaf lobes and the form of the fruit's beak. Whereas *A. vernalis* has glabrous, narrowly linear leaf lobes and fruits with hamately recurved beak, the leaf lobes of *A. volgensis* are broader and pubescent and the beak of the fruits is appressed (figure 3).

6. Other Comments

An earlier draft of the supporting statement was sent out to all range states (table 1) for consultation and review in August 1999. Comments were received from the authorities of Belarus, Croatia, Czech Republic, Hungary, Russian Federation, Slovakia, Sweden, and Switzerland.

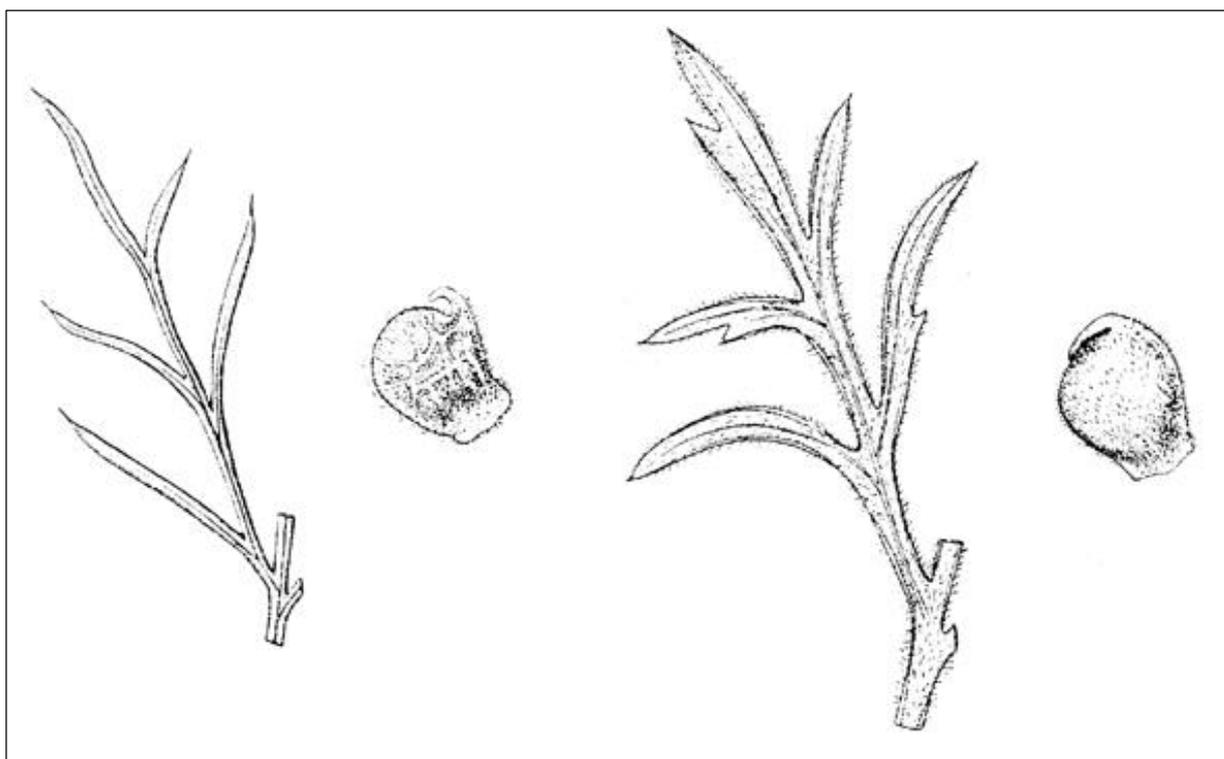


Figure 3. Leaflets and fruits of *Adonis vernalis* (a) and *A. volgensis* (b). Source: BOBROV (1937).

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