SECTION D
PLANT VARIETY PROTECTION

The International Union for the Protection of New Varieties of Plants (UPOV), an intergovernmental organization based in Geneva, Switzerland, was established in 1961 by the International Convention for the Protection of New Varieties of Plants (the "UPOV Convention"). UPOV's mission is to provide and promote an effective system of plant variety protection, with the aim of encouraging the development of new varieties of plants for the benefit of society.

In order to obtain protection, a breeder must file an individual application with each authority entrusted with the granting of breeders' rights. A breeder's right is only granted where the variety is new, distinct, uniform, stable, and has a suitable denomination.

In the United States of America (US), there are two Acts for protecting new plant varieties: the Plant Patent Act (PPA) and the Plant Variety Protection Act (PVPA). According to the PPA, whoever invents or discovers and asexually reproduces any distinct and new variety of plant – including cultivated sports, mutants, hybrids and newly found seedlings other than a tuber-propagated plant (in practice, Irish potato and Jerusalem artichoke), or a plant found in an uncultivated state – may obtain a patent therefor. Under the PVPA, the US protects all sexually reproduced plant varieties and tuber-propagated plant varieties, excluding fungi and bacteria.

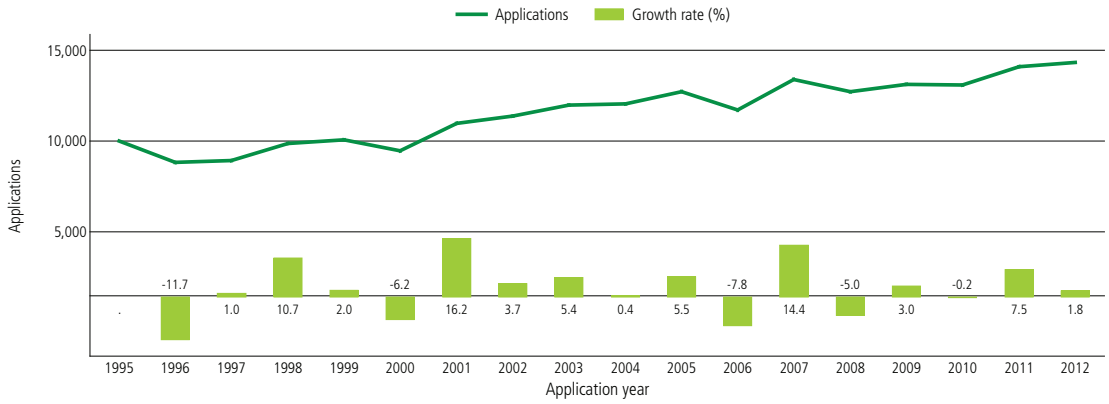
This section covers plant variety protection statistics relating to applications and grants, based on data collected from 66 offices. For plant variety data, this publication uses the term "office" to refer to reporting authorities, and "origin" to indicate the region/country of origin of applicants.

D.1

PLANT VARIETY APPLICATIONS AND GRANTS WORLDWIDE

Figure D.1.1 shows the total number of plant variety applications field worldwide between 1995 and 2012. World totals are WIPO estimates covering data for 66 offices – national and regional. Between 1995 and 2012, the estimated number of applications increased from approximately 10,000 to 14,300. This growth occurred in the face of substantial year-to-year fluctuations in application numbers. For example, applications worldwide grew at double-digit rates in 1998, 2001 and 2007. In contrast, both 1996 and 2006 saw a sharp decrease. Even though the number of plant variety applications reached a new record in 2012, the growth rate (+1.8%) for 2012 was modest compared to 2011 (+7.5%).

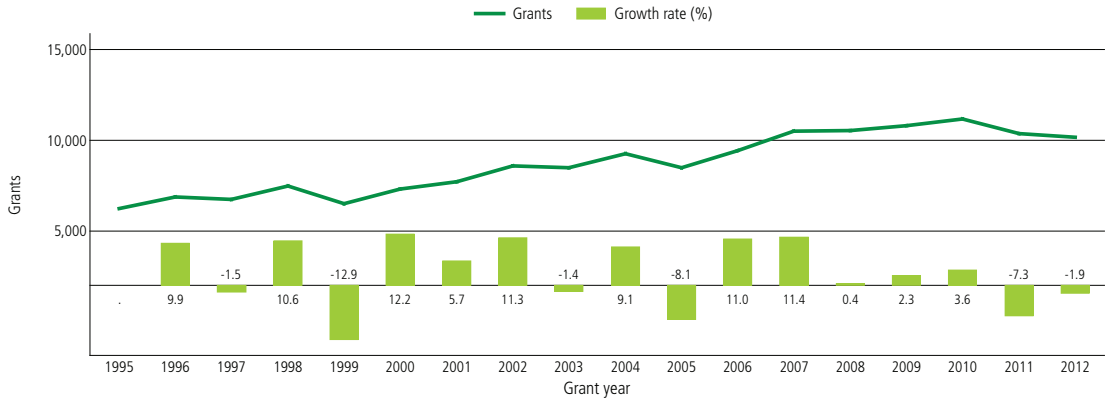
Figure D.1.1 Trend in plant variety applications worldwide



Note: World totals are WIPO estimates covering data for 66 offices.

Source: WIPO Statistics Database, October 2013

Figure D.1.2 Trend in plant variety grants worldwide



Note: World totals are WIPO estimates covering data for 66 offices.

Source: WIPO Statistics Database, October 2013

As is the case for applications, the number of plant variety grants has also followed an upward trend.[1] Grants worldwide increased from approximately 6,200 in 1995 to a peak of approximately 11,200 in 2010 (Figure D.1.2). Since 2010, the number of grants has exhibited a downward trend, with a 7.3% decrease in 2011, followed by a 1.9% decrease in 2012. This is in contrast to the trend observed for applications (Figure D.1.1). In 2012, the number of grants issued worldwide is estimated at approximately 10,200, which is 1,000 less than the 2010 peak.

1 For simplicity, this publication uses the term "grant" rather than the formal term "titles issued".

D.2

PLANT VARIETY APPLICATIONS AND GRANTS BY OFFICE

This subsection provides detailed data on plant variety applications and grants by national and regional offices.

D.2.1 Applications by office

The concentration of plant variety applications varies across the world's six regions. With a total of 6,485 applications, the offices in Europe were the largest recipients of plant variety applications, and accounted for 45.3% of the world total in 2012 (Table D.2.1.1). This, however, signifies a 2.5 percentage point decrease in their share of the world total when compared with figures for 2007. Between 2007 and 2012, Asia exhibited the largest shift, with its world share of applications increasing by 2.8 percentage points to reach 25.7%. Africa's yearly average growth of 3.9% resulted in a share of the world total equivalent to 4.0% in 2012, such that Africa surpassed Oceania in the number of applications received. The growth in the number of applications received by offices in Asia (+3.7%) was similar to that of Africa.

Africa's share of the world total, however, only moderately increased (+0.5 percentage points), due to a lower absolute number of applications received. The share of the world total for the remaining four regions was either stagnant or it decreased, with Oceania accounting for only 3.0% of the world total in 2012 when it recorded a 2.4% yearly average decrease in the number of applications received.

The average growth seen in Asia and North America was exclusively due to increases in the numbers of resident applications, as the numbers of non-resident applications for these two regions actually decreased. This can be seen by the increases in the share of resident applications i.e., from 76.6% to 80.4% in Asia, and from 39.4% to 43.2% in North America, between 2007 and 2012. Two of the world's six regions, namely Europe and Oceania, saw decreases in resident shares that declined by 7.9 and 3.8 percentage points, respectively.

Table D.2.1.1 Plant variety applications by region

Region	Number of applications		Resident share (%)		Share in world total (%)		Average growth (%)
	2007	2012	2007	2012	2007	2012	2007-12
Africa	468	567	37.0	42.3	3.5	4.0	3.9
Asia	3,059	3,673	76.6	80.4	22.9	25.7	3.7
Europe	6,400	6,485	74.1	66.2	47.8	45.3	0.3
Latin America and the Caribbean	1,051	1,124	33.0	37.4	7.9	7.8	1.4
North America	1,915	2,034	39.4	43.2	14.3	14.2	1.2
Oceania	493	436	46.2	42.4	3.7	3.0	-2.4
World	**13,386**	**14,319**	**64.1**	**63.1**	**100.0**	**100.0**	**1.4**

Note: World totals are WIPO estimates covering data for 66 offices. Each category included the following number of offices: Africa (4), Asia (10), Europe (33), Latin America and the Caribbean (14), North America (3) and Oceania (2).

Source: WIPO Statistics Database, October 2013

Table D.2.1.2 Plant variety applications by income group

Income group	Number of applications		Resident share (%)		Share in world total (%)		Average growth (%)
	2007	2012	2007	2012	2007	2012	2007-12
High-income	10,276	9,249	65.5	66.6	76.8	64.6	-2.1
Upper middle-income	2,313	3,447	63.7	70.2	17.3	24.1	8.3
Lower middle-income	704	1,567	48.4	29.6	5.3	10.9	17.4
Low-income	93	56	30.4	21.4	0.7	0.4	-9.6
World	**13,386**	**14,319**	**64.1**	**63.1**	**100.0**	**100.0**	**1.4**

Note: World totals are WIPO estimates covering data for 66 offices. Each category includes the following numbers of offices: high-income countries (35), upper middle-income countries (20), lower middle-income countries (9) and low income countries (2). CPOV data are allocated to the high-income countries group, as all of the CPVO member states are high-income countries.

Source: WIPO Statistics Database, October 2013

A shown in Table D.2.1.2, the majority of plant variety applications worldwide are filed at the offices of high-income countries. Despite the 12.2 percentage point decrease in high-income countries' share of total world filings, this group received 64.6% of all plant variety applications filed worldwide in 2012.[2] The upper middle-income countries received approximately a quarter of total applications filed in 2012, and their share of the world total increased by 6.8 percentage points between 2007 and 2012. The lower middle-income countries group doubled its share of the world total received over the same period.

In 2012, resident applications accounted for approximately two-thirds of all applications filed at the offices of high-income and upper middle-income countries. In addition, the resident share of the upper middle-income countries group increased by 6.6 percentage points between 2007 and 2012. In contrast, over the same period, the resident share for the lower middle-income countries group fell substantially from 48.4% to 29.6%. This fall was mainly due to a much faster growth in non-resident applications than that seen in resident applications at the office of Ukraine. The drop in the resident share for the low-income group of countries – i.e., a decrease from 30.4% in 2007 to 21.4% in 2012 – appears to be larger than it is. This is due to the small number of applications received, which in 2012 dropped from 28 to 12.

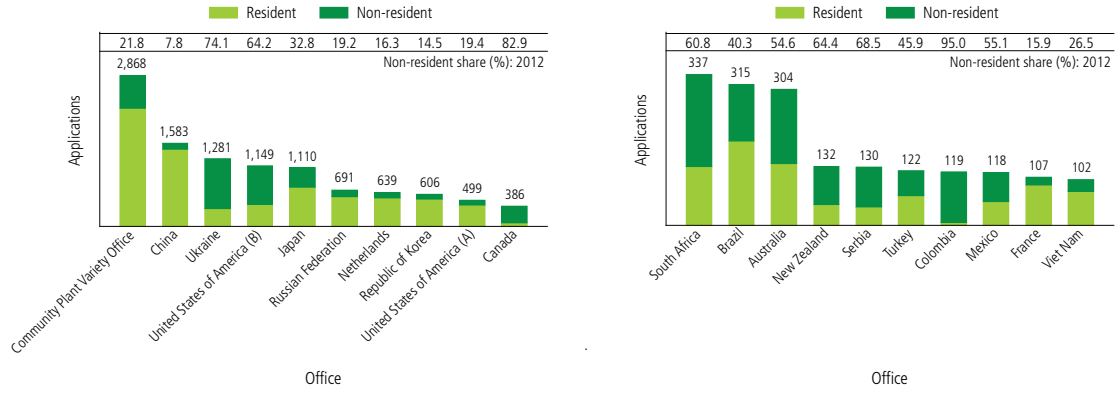
Figure D.2.1.3 shows the number of plant variety applications, broken down by resident and non-resident filings for the top 20 offices worldwide. The European Union's Community Plant Variety Office (CPVO) (2,868) received the highest number of applications in 2012, followed by the offices of China (1,583), Ukraine (1,281), the US (B, PPA data, 1,149) and Japan (1,110).[3] Despite a 9.9% decrease in applications at CPVO, this office received almost twice the number of applications received by China.

The non-resident share of total applications varied from 7.8% at the office of China to 95% at the office of Colombia. For nine of the top 20 offices, non-resident applications accounted for more than 50% of total applications received.

2 Such a finding is to be expected, as this country income group has 35 offices – a figure that is considerably higher than the number of offices in any other country income group.

3 The US is ranked in second position if PVPA and PPA data are combined.

Figure D.2.1.3 Plant variety applications for the top 20 offices, 2012

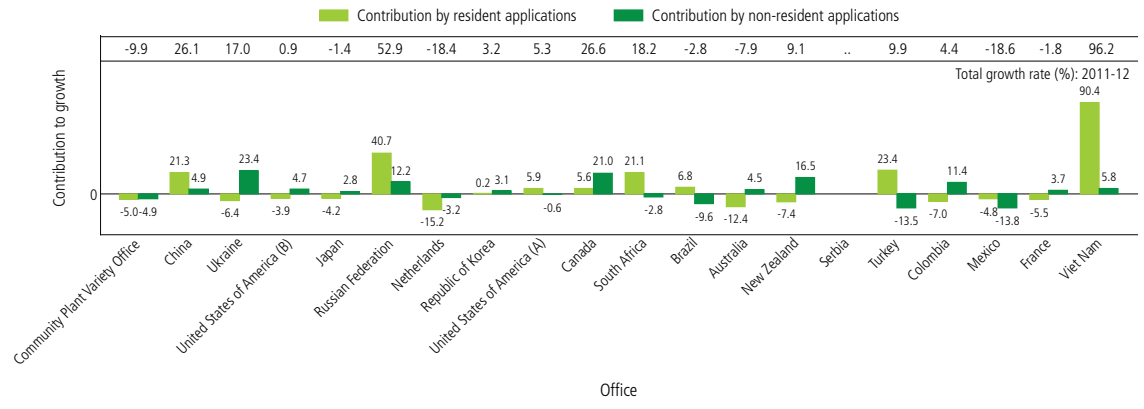


Note: United States of America (A) refers to PVPA data, and United States of America (B) refers to PPA data.

Source: WIPO Statistics Database, October 2013

Figure D.2.1.4 shows the contribution to total growth attributed to residents and non-residents for the top 20 offices. Plant variety applications nearly doubled for Viet Nam, which showed growth of 96.2% (due to an increase of 50 applications when figures are compared with 2011). Most of this growth (90.4 percentage points) came from a substantial increase in resident applications. Four of the five offices exhibiting the fastest growth in applications – Viet Nam (+96.2%), the Russian Federation (+52.9%), China (+26.1%) and South Africa (+18.2%) – showed substantially higher growth in resident applications than in non-resident applications. For example, growth in resident applications in China accounted for 21.3 percentage points of the 26.1% total growth. In contrast, growth in applications in Canada, New Zealand and Ukraine was mainly due to increases in non-resident applications. The CPVO, the largest office, received fewer resident and non-resident applications in 2012 than in 2011.

Figure D.2.1.4 Contribution of resident and non-resident applications to total growth for the top 20 offices



Note: ".." = not available

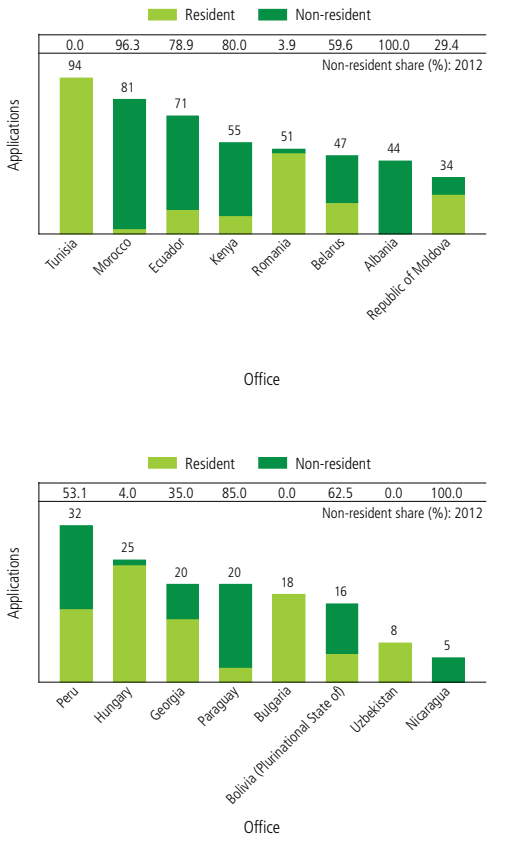
Source: WIPO Statistics Database, October 2013

Figure D.2.1.5 shows the number of applications filed, broken down by resident and non-resident filings for selected offices of middle- and low-income countries – excluding those already reported in Figure D.2.1.4.

All applications filed at the offices of Bulgaria, Tunisia and Uzbekistan were filed by residents. The offices of Hungary and Romania also received almost all of their applications from resident applicants; both of these countries' non-resident shares were below 5%. In contrast, the offices of Albania and Morocco received 100% and 96.3% of their filings from non-resident applicants.

Ecuador and Romania received more resident applications in 2012 than in 2011 (13 and 21 more applications, respectively), while the Republic of Moldova saw an increase of 16 applications in 2012. However, Ecuador saw a net decrease in total applications, due to receiving 27 fewer non-resident applications in 2012. Kenya also received 15 fewer non-resident applications in 2012 which together with a drop in resident applications, contributed to an overall decrease of 40.9%. Resident applications more than halved in Belarus (from 40 to 19 applications in 2012).

Figure D.2.1.5 Plant variety applications for offices of selected middle- and low-income countries, 2012



Source: WIPO Statistics Database, October 2013

D.2.2 Grants by office

Similar to the situation that applied in the case of applications, the CPVO (2,640 grants) issued the largest number of plant variety grants in 2012 i.e., approximately three times the number of grants issued by the offices of Japan (881), the US (B, PPA data) (860) and the Netherlands (830) (Figure D.2.2.1). All other offices, issued fewer than 500 grants each in 2012.

The office of Tunisia is the only reported office where resident applicants received all grants issued. Resident grants also accounted for the bulk of total grants in China. In contrast, Canada (81.6%), Colombia (91.9%) and Uruguay (82.5%) had high non-resident shares in 2012. With the exception of the offices of France, Serbia and Viet Nam, 17 of the top 20 offices in terms of applications received (Figure D.2.1.3), also ranked in the top 20 offices for grants issued (Figure D.2.2.1).[4] China slipped from second to eighth place. Mexico, on the other hand, moved up five places from 18th to 13th. The share of non-resident grants is of similar magnitude to the share of non-resident applications for nearly all offices reported in both indicators. The exceptions are Ukraine, whose non-resident share is 24 percentage points lower for grants compared to applications, New Zealand (-11.9 percentage points) and Australia (-10.8 percentage points).

Figure D.2.2.1 Plant variety grants for the top 20 offices

Note: United States of America (A) refers to PVPA data, and United States of America (B) refers to PPA data.

Source: WIPO Statistics Database, October 2013

4 Grant data for France were not available.

D.3

Plant variety applications and grants by origin

The statistics presented in this subsection offer insights into the origins of the demand for plant variety protection. Plant variety activity by origin includes resident applications and applications abroad. Origin is determined by the residence of the applicant.

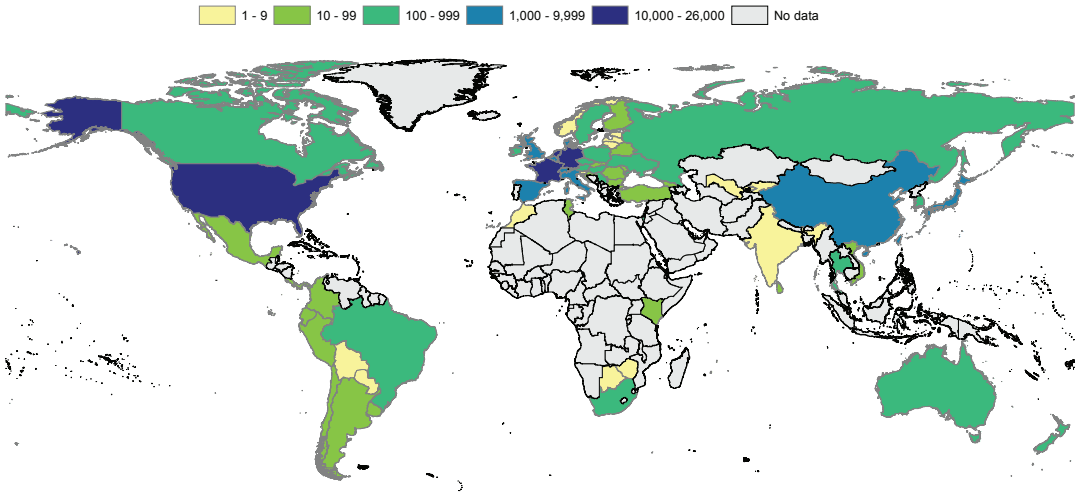
This subsection presents application and grant data by origin based on two different counting methods – data based on absolute number count and data based on the equivalent count concept. The difference between the two methods lies in the treatment of regional office (CPVO) data. Where the absolute count method is applied, an application received by the CPVO is counted only once; however, where the equivalent count method is applied, a single application filed at the CPVO is equivalent to multiple applications. In order to calculate the number of equivalent applications at the CPVO in 2012, each application was multiplied by the corresponding number of member states. If the applicant resided in one of the 27 EU member states in 2012, the application was counted as one resident filing and 26 filings abroad. However, if the applicant did not reside in an EU member state in 2012, the application was counted as 27 applications abroad.

D.3.1 Plant variety applications by origin

Map D.3.1.1 is a country-specific representation of the number of plant variety applications filed by residents of each country. The data are based on equivalent counts (i.e., an application filed with the CPVO is equivalent to multiple applications). Plant variety applications are concentrated among few origins, namely China, a number of Western European countries, Japan and the US.

Residents of China and Japan filed substantially higher numbers of applications than residents of all other countries in Asia. The biggest contributors in Europe were residents of France (12,206), Germany (11,192) and the Netherlands (25,882), with each of these countries filing over 10,000 plant variety applications. Most of the remaining countries in Western Europe reported between 1,000 and 9,999 filings. Residents of Eastern European countries filed substantially fewer applications, typically less than 1,000. In Latin America and the Caribbean, Brazilian residents accounted for the largest share of applications, filing 212 applications. In the case of most other countries of this region, residents of these countries filed between 10 and 99 applications. In North America, US residents (10,955) accounted for 98% of all applications. In contrast, the figures for Canada were very low, with Canadian residents filing the remaining 2% i.e., a total of 218 applications.

Figure D.3.1.1 Equivalent plant variety applications by origin, 2012



Note: As some offices do not provide data broken down by origin, the numbers of applications by origin reported here are likely to be lower than the actual numbers.

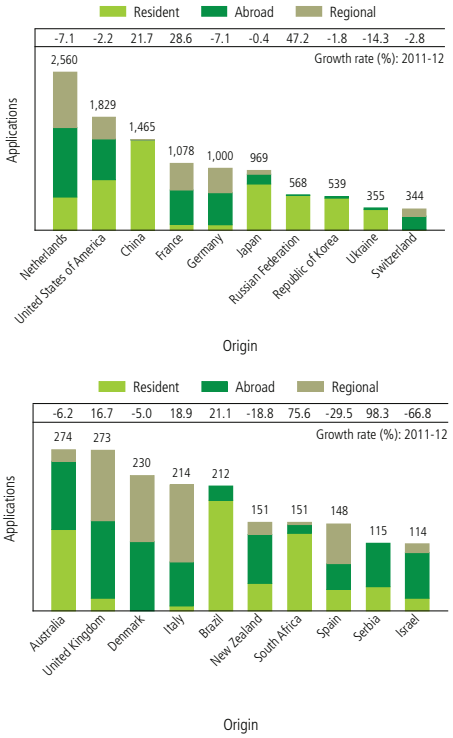
Source: WIPO Statistics Database, October 2013

Plant variety applications for the top 20 origins, based on the absolute count method, are presented in Figure D.3.1.2. In 2012, the largest number of plant variety applications originated in the Netherlands (2,560), followed by the US (1,829) and China (1,465). Residents of France, Germany and Japan had similar numbers of applications i.e., approximately 1,000 each.

Applicants residing in China, the Republic of Korea, the Russian Federation and Ukraine filed more than 90% of their applications with their respective national offices. In contrast, applications abroad and applications filed at the CPVO office accounted for more than 90% of all applications filed by residents of Denmark, France, Germany, Italy, Switzerland and the United Kingdom (UK).

Twelve of the top 20 origins, including the top two origins, filed fewer applications in 2012 than in 2011. Israel and Spain witnessed the fastest decreases in the numbers of applications filed in 2012. Between 2011 and 2012, residents of Serbia (+98.3%) and South Africa (+75.6%) saw the largest growth in applications.

Figure D.3.1.2 Plant variety applications for the top 20 origins, 2012



Note: As some offices do not provide data broken down by origin, the numbers of applications by origin reported here are likely to be lower than the actual numbers. Regional refers to applications filed at the CPVO.

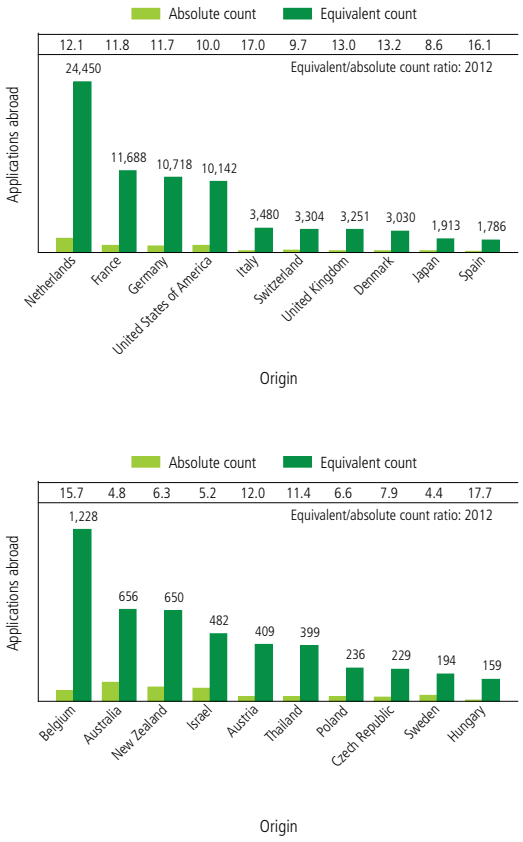
Source: WIPO Statistics Database, October 2013.

Figure D.3.1.3 compares the absolute and equivalent numbers of applications abroad for the top 20 origins. As outlined earlier, applications at regional offices are equivalent to multiple applications in the respective member states of those offices. The following example illustrates the difference between absolute count and equivalent count data for the Netherlands in 2012. The total number of applications in terms of absolute count was 2,560 (1,432 resident applications plus 1,128 abroad) compared to 25,882 (1,432 resident applications plus 24,450 abroad) for equivalent applications.

As Figure D.3.1.3 shows, in 2012 the Netherlands had the largest number of applications abroad in the equivalent counts category. This was more than double the number of applications abroad for France, which was ranked in second position. France, Germany and the US had a similar magnitude of applications abroad for both absolute counts and equivalent counts.

The greater the equivalent/absolute count ratio, the more frequently applicants made use of the CPVO to seek plant variety protection. Most EU origins had a high equivalent/absolute count ratio, which is to be expected, due to their frequent use of the CPVO. The highest ratios were seen in Hungary (17.7), Italy (17), Spain (16.1) and Belgium (15.7), reflecting the intensive use of the CPVO. In contrast, Sweden (4.4), Australia (4.8) and Israel (5.2) had the lowest ratios, reflecting less intensive use of the CPVO for applications abroad.

Figure D.3.1.3 Plant variety applications abroad for the top 20 origins, 2012



Note: As some offices do not provide data broken down by origin, the applications by origin reported here are likely to be lower than the actual numbers.

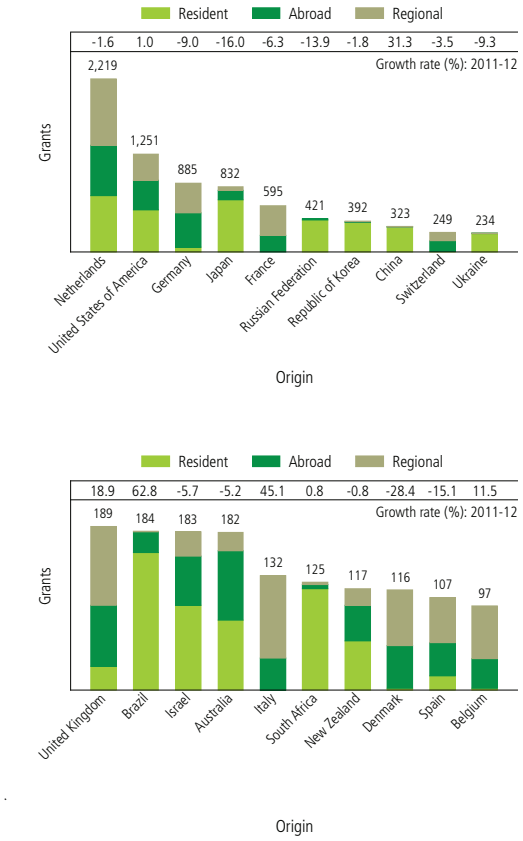
Source: WIPO Statistics Database, October 2013

D.3.2 Plant variety grants by origin

Figure D.3.2.1 presents plant variety grants for the top 20 origins based on absolute count data. Grant data provide a profile which is similar to that of application data for all reported origins. The top 10 origins comprise the same origins for grants as for applications, albeit with a slightly different ranking. Residents of the Netherlands (2,219) were issued the largest number of grants, followed by applicants residing in the US (1,251), Germany (885) and Japan (832). The majority of origins were issued fewer grants in 2012 compared to 2011. The most notable decreases in the number of grants issued related to

applicants residing in Denmark (-28.4%), Japan (-16%) and Spain (-15.1%). Residents of Brazil experienced the fastest growth, followed by residents of Italy and China. For all reported origins, the distributions of resident grants, grants abroad, and regional grants are similar to the distribution of applications.

Figure D.3.2.1 Plant variety grants for the top 20 origins, 2012

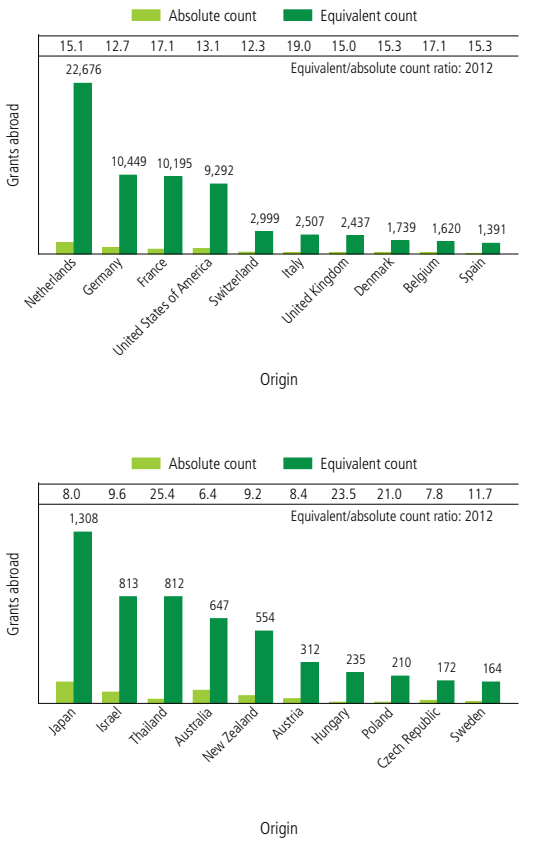


Note: As some offices do not provide data broken down by origin, the numbers of grants by origin reported here are likely to be lower than the actual numbers.

Source: WIPO Statistics Database, October 2013

Figure D.3.2.2 shows grants abroad based on the equivalent and absolute counts for the top 20 origins. Applicants from the Netherlands (22,676), Germany (10,449), France (10,195) and the US (9,292) were issued the highest number of equivalent grants. Applications and grants abroad for the top 20 origins presented a similar profile; however, there are a few differences. For example, Thailand had a much higher equivalent/absolute count ratio for grants (25.4) than for filings.

Figure D.3.2.2 Plant variety grants abroad for the top 20 origins, 2012



Note: As some offices do not provide data broken down by origin, the numbers of grants by origin reported here are likely to be lower than the actual numbers.

Source: WIPO Statistics Database, October 2013

D.4

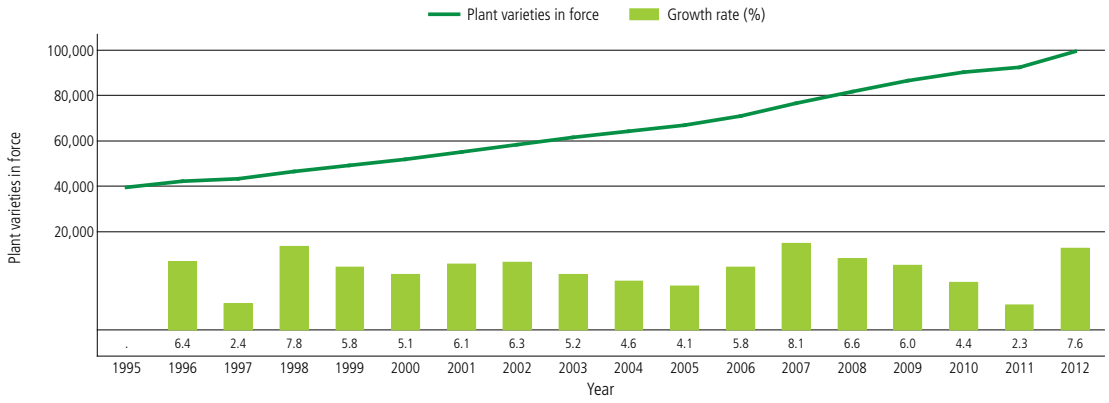
Plant varieties in force

In accordance with the legislation governing plant variety protection in the territory concerned, the protection of plant varieties is granted for a limited period of time. Figure D.4.1 shows the total number of plant varieties in force worldwide between 1995 and 2012. World totals are WIPO estimates covering data for 66 offices. In 2012, there were close to 100,000 plant varieties in force, which is more than double the number in force in 1995 (i.e., approximately 39,600). There has been a consistent upward trend in the number of plant varieties in force, with the 7.6% growth rate in 2012 representing the fastest growth rate since 2007. The CPVO, and the offices of China and the Netherlands accounted for two-fifths of total growth worldwide in 2012.

As Figure D.4.2 shows, the CPVO accounted for approximately 20% of all plant varieties in force worldwide in 2012. This reflects the fact that this office has issued the largest number of grants since the mid-1990s. In comparison with all other offices, a considerably higher number of plant varieties were also in force in the US (B, PPA data).

The majority of offices presented in Figure D.4.2 had more plant varieties in force in 2012 than in 2011. The offices of China (+32.9%), Ukraine (+11.8%), Brazil (+11%) and the Netherlands (+10%) saw double-digit growth. In contrast, Italy showed a substantial decrease of 10.1%.

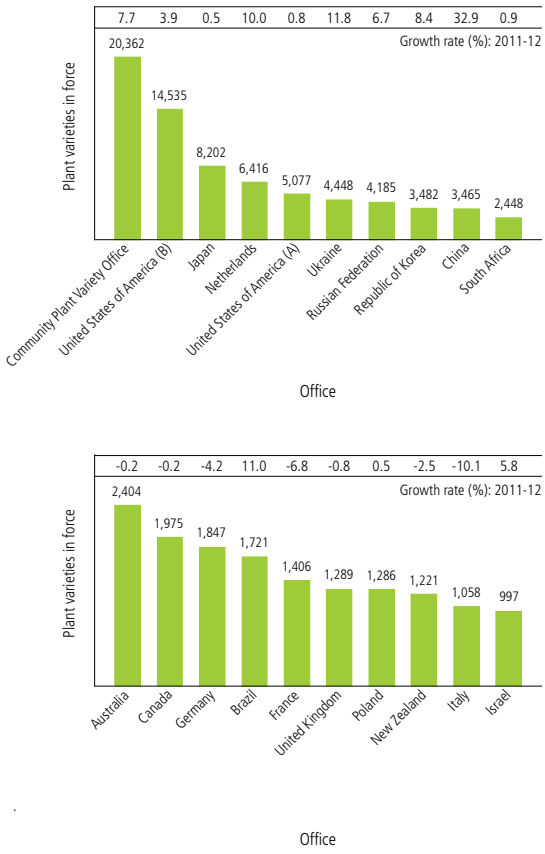
Figure D.4.1 Trend in plant varieties in force worldwide



Note: World totals are WIPO estimates covering data for 66 offices.

Source: WIPO Statistics Database, October 2013

Figure D.4.2 Plant varieties in force for selected offices, 2012



Note: United States of America (A) refers to PVPA data, and United States of America (B) refers to PPA data.

Source: WIPO Statistics Database, October 2013