IDENTIFICATION OF HOST RESISTANCE EFFECTIVE AGAINST THE BARLEY SPOT FORM NET BLOTCH PATHOGEN

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The Supervisory Committee certifies that this ***disquisition*** complies with North Dakota State University's regulations and meets the accepted standards for the degree of

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ABSTRACT

Spot form net blotch (SFNB) caused by *Pyrenophora teres* f. *maculata* is a major foliar disease of barley (*Hordeum vulgare* L.) worldwide. SFNB epidemics have recently been observed in major barley producing countries, suggesting that the local barley cultivars are not resistant and that virulence of the pathogen populations may have changed. Here we attempt to identify sources of resistance effective against diverse isolates of the SFNB pathogen. A total of 2062 world barley core collection accessions were phenotyped using isolates of this pathogen collected in the United States (FGO), Australia (SG1), New Zealand (NZKF2), and Denmark (DEN 2.6). Isolate-specific susceptibility was identified in several of the barley accessions tested, indicating variability in both pathogen virulence and host resistance/susceptibility. Collectively, only 15 barley accessions were resistant across all isolates tested. Future research will involve the characterization of host resistance, pathogen virulence, and the host-pathogen interaction associated with SFNB of barley.

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CHAPTER ONE. LITERATURE REVIEW

Host (Barley)

Barley (*Hordeum vulgare* L.), is a self-pollinating diploid species with seven pair of chromosomes. The wild species of domesticated barley is thought to be abundant in grasslands and woodlands in the Fertile Crescent area of western Asia and northeastern Africa (Badr *et al.* 2000). Barley is classified in categories based on different physio-morphological characteristics. It is divided into two-rowed or six-rowed types, and shattering or non-shattering based on the nature of the spikes, and hull-less or hulled based on grain covering. The barley genome consists of seven pair of nuclear chromosomes (designated as 1H, 2H, 3H, 4H, 5H, 6H and 7H), and one mitochondrial and one chloroplastic chromosome with a total size of ~5000 Mbp (Mayer *et al.* 2012).

Barley is one of the major crops of the United States and the world (FAO STAT 2012). North Dakota is the leading state in barley production, producing more than one fourth of the US barley based on data from 2011, 2012 and 2013 (USDA-NASS 2013). Recently spot form net blotch (SFNB) has been identified in North Dakota (Liu *et al.* 2010) and popular cultivars from this region such as Tradition, Pinnacle, Robust, Lacey, and Celebration are susceptible (North Dakota barley council website available at http://www.ndbarley.net/?id=48, 30 October 2013). Various unpublished field data also documented that this area is facing significant losses from SFNB disease. Therefore, identification and genetic characterization of effective sources of host resistance and genetic characterization of pathogen virulence are both necessary for developing effective management strategies for this disease.

Pathogen (*Pyrenophora teres* f. *maculata)*

P. teres is an ascomycete fungus that belongs to the Dothideomycete class and the order Pleosporales. Other important plant pathogenic genera such as *Stagonospora, Cochliobolus, Ascochyta* and *Leptosphaeria* also fall under this order. *P. teres* is heterothallic in nature and therefore the sexual stage requires the two opposite mating types, MAT1-1 and MAT1-2, for sexual reproduction (Rau *et al.* 2005). There are two forms of *P. teres*, *P. teres* f. *maculata* and *P. teres* f. *teres*, which are genetically isolated and phylogenetically independent (Smedegard-Peterson, 1971; Rau *et al.* 2007). Although two forms are morphologically undifferentiated (reviewed Liu *et al.* 2011), the mating type locus sequences show that the two forms are distinct (Lu *et al.* 2010; Lu *et al.* 2013). The genetic distinction of the two forms indicates that the host pathogen interaction associated with each disease should be studied separately. Campbell *et al.* (2003) however, studied the in vitro mating of *P. teres* f. *maculata* and *P. teres* f. *teres* and found that the hybrid progeny retained their virulence and fertility over time and were genetically stable after two cycles of inoculation and re-isolation. They also reported that inoculation of hybrid progeny produced an intermediate symptom resulting in a jagged type spot. *P. teres* f. *teres* typically causes lesions having dark brown blotches in a net like structure (NFNB) while *P. teres* f. *maculata* causes dark brown round to elliptical lesions surrounded by a chlorotic halo (SFNB) (Smedegard Peterson, 1977).

Life Cycle

Both forms of *P. teres* follow a similar life cycle (McLean *et al.* 2009). The pathogen inoculum survives or overwinters in the stubble in the form of pseudothecia that harbor asci, each containing eight ascospores that mature and produce light brown colored ascospores (Webster, 1951; Mathre, 1997). Ascospores are actively discharged and dispersed by wind and rain splash, and act as a primary source of inoculum (Jordan, 1981). Conidia produced after the initial colonization serve as secondary inoculum and get dispersed by wind to neighboring fields to cause infection. The rate of an epidemic is influenced by environmental factors including relative humidity, leaf wetness, and temperature (Jordan, 1981; Mathre, 1997). In each growing season, a repeating secondary cycle can occur causing high disease severity if susceptible barley is grown under favorable environmental conditions. Eventually the pathogen colonizes the senescent tissue and produces pseudothecia that serve as overwintering structures that produce ascospores to initiate the cycle the following season.

Infection and Disease Development

Usually, infection and disease development occurs on the leaf; however, other plant parts including the stem and kernel can also be infected (reviewed in Liu *et al.* 2011). The infection process begins when conidia or ascospores, produced by over-wintering pseudothecia, land on the leaf surface and germinate under suitable temperature and moisture. The hyphae from the germ tube grow to varying lengths and form a swollen, club shaped appressoria, which acts as a penetration structure (Van Caeseele and Grumbles, 1979). The fungus penetrates the outer epidermal cell wall and the hypha develops into an intracellular vesicle, from which intracellular hyphae emerge and grow through the lower epidermal cells and then penetrate the mesophyll

tissue and start nutrient uptake from the host (Keon and Hargreaves, 1983). The susceptible host cells start dying near or adjacent to the intracellular hyphae two days after inoculation (Keon and Hargreaves, 1983). A chlorotic area starts to develop around the initial necrotic lesion and is thought to be due to secretion of diffusible toxins or effectors disrupting the chloroplast or may be due to the host defense response causing the death of adjacent cells via a program cell death (PCD) mechanism like in other necrotrophic systems (Manning *et al.* 2009; Rasmussen *et al.* 2004 reviewed in Liu *et al.* 2011).

Host Pathogen Interaction

Plant disease results from the interaction of the host and the associated pathogen. The plant possesses a recognition system against pathogens and the pathogen delivers effectors or proteins to subvert plant defenses (Stukenbrock and McDonald, 2009). The specific host pathogen interaction and associated level of plant immunity is different based on whether the pathogen is biotrophic or necrotrophic. The model of the plant immune system often fits under the zig-zag model (Jones and Dangl, 2006). Dangl and Jones (2001) and Jones and Dangl (2006) defined a plant immunity model where the pathogen produces specific elicitors or pathogen associated molecular patterns (PAMPs) that are recognized by pattern recognition receptors (PRR), leading to downstream signaling, which induces resistance referred to as PAMP triggered immunity (PTI). This PTI confers basal defense of the pathogen and is effective against many non-adapted pathogens. Meanwhile, the pathogen also harbors virulence where new effectors are secreted to break PTI, and induce susceptibility. Plants have also evolved a second line of defense based on effector recognition. Classical resistance genes that often contain nucleotide binding and leucine rich repeat (NB-LRR) domains are involved in recognition and signaling

defense resulting in effector triggered immunity (ETI) or race specific resistance. ETI is often associated with the hypersensitive response (HR) causing cell death that prevents the further growth of the pathogen. In the case of the biotrophic flax rust pathogen (*Melamspora lini*), Flor (1956) proposed a specific interaction for disease response that results from the expression of a plant resistance gene (R) and a pathogen avirulence gene (Avr). If the pathogen containing the avirulence factor (Avr) attempts to penetrate the host, this Avr gene product acts as an elicitor, that is recognized directly or indirectly by the plant R protein, activating a downstream signaling pathway that leads to resistance (Lauge *et al.* 1998).

Necrotrophic specialist pathogens produce and secrete necrotrophic effectors (synonym: host selective/specific toxins) that interact with dominant host susceptibility genes. The interaction of pathogen produced necrotrophic effectors and host produced gene products results in effector triggered susceptibility (ETS) (Friesen *et al.* 2007). In the case of a necrotrophic pathogen that feeds on dead tissue, PCD allows for further pathogen propagation (Stukenbrock and McDonald, 2009). This sort of susceptible reaction was validated based on the ToxA-*Tsn1* interaction, found in both the wheat-*P. tritici-repentis* and wheat-*S. nodorum* systems in which *Tsn1* confers sensitivity to ToxA produced by both pathogens and induces susceptibility (Friesen and Faris, 2010). This leads to a modification of the classical gene-for-gene model where instead of the presence of both effector proteins and host genes inducing an incompatible (resistant) interaction, the necrotrophic effector interacts with a dominant susceptibility gene in the host, resulting in a compatible (susceptible) interaction (Friesen *et al.* 2007, Friesen *et al.* 2008). Faris *et al.* (2010) cloned the *Tsn1* gene and found that it contained nucleotide binding site (NBS), leucine rich repeat (LRR) and serine/threonine protein kinase (S/TPK) domains and all three domains were required for ToxA sensitivity and disease susceptibility.

The host pathogen interaction model associated with both forms of *P. teres* has been studied; however, not enough is known to definitively describe how this interaction takes place. The interaction model in *P. teres* f. *teres* and barley is explained based on the nature of the resistance. Qualitative forms of virulence/avirulence have been shown in *P. teres* f. *teres* (Weiland *et al*. 1999; Beattie *et al.* 2007; Lai *et al.* 2007) possibly suggesting involvement of a gene-for-gene interaction, where single dominant resistant genes present in the host directly or indirectly recognize pathogen effectors, inducing a resistance response. Abu Qamar *et al.* (2008) identified two distinct loci segregating in a Rika × Komber doubled haploid population. In a separate cross using an F_2 population, Abu Qamar *et al.* (2008) showed that, opposite of a gene-for-gene type interaction, susceptibility was dominant. The presence of quantitative resistance (Robinson *et al.* 1997), the involvement of dominant susceptibility (Abu Qamar *et al.* 2008), and the presence of several minor virulence factors that accumulate to induce susceptibility (Sarpeleh *et al.* 2007) show that in addition to gene-for-gene type interactions there is also evidence for an inverse gene-for-gene model in the NFNB system.

The host pathogen interaction behind the *P. teres* f. *maculata* - barley pathosystem has not been fully worked out, with even less work being done on this system compared to the NFNB system; however, a review of the available literature helps in suggesting a model. Karki and Sharp (1986) studied the pathogenic variation in isolates of *P. teres* f. *maculata* by performing a cluster analysis of the mean disease rating of 14 isolates of *P. teres* f. *maculata* on 20 barley cultivars; they identified six distinct clusters. The Montana, USA and Mediterranean isolates used in this study showed distinct virulent or avirulent reactions across some cultivars, indicating an interaction in which specific pathogen effectors were interacting with specific genes present in the host, and showing that specific (likely gene-for-gene or inverse gene-for-

gene) interactions, similar to other necrotrophic specialists are present. Ho *et al.* (1996) performed genetic studies on a barley doubled haploid population using isolates of *P. teres* f. *maculata* and *P. teres* f. *teres*. They found that doubled haploid lines segregated in a 1:1 resistance to susceptible ratio when inoculated with *P. teres* f. *maculata*, indicating the involvement of a single resistant/susceptibility gene. While in an F_2 population derived from the same parental lines, this ratio was 9:7, which suggested the involvement of two complementary genes. Williams *et al.* (1999) used a barley doubled haploid population to evaluate resistance to *P. teres* f. *maculata* and found that resistance: susceptibility (R:S) segregated 1:1 and indicated that a single gene on the long arm of barley chromosome 7H, designated *Rpt4* was associated with SFNB disease in this population. Later, Williams *et al.* (2003) phenotyped five doubled haploid populations for seedling resistance and found that in three of the populations, resistance: susceptible segregation was nearly 1:1, indicating the involvement of a single gene conferring resistance/susceptibility, consistent with earlier results (William *et al.* 1999), while in the fifth DH population (VB9104 × Dash) the R:S ratio was 8:173, strongly suggesting the involvement of several susceptibility genes associated with disease.

Thus, the involvement of single genes (William *et al.* 1999; William *et al.* 2003), complementary genes (Ho *et al.* 1996), and multiple genes (William *et al.* 2003) has been shown to be associated with the SFNB interaction. Based on the evidence in the literature specific to the SFNB system and on research from other closely related necrotrophic specialist pathogens within the Pleosporales, including the genera *Cochliobolus, Pyrenophora,* and *Stagonospora* that produce necrotrophic effectors or host selective toxin, it is likely that *P. teres* f. *maculata* also uses necrotrophic effectors to induce disease susceptibility and at least partially follows an inverse gene-for-gene model. In addition, Sarpeleh *et al.* (2007) showed that like other

necrotrophic pathogens, *P. teres* f. *maculata* also produces host specific toxins, now referred to as necrotrophic effectors that are potentially involved in disease susceptibility. Genetic characterization of virulence from the pathogen side will provide a better understanding of this host-pathogen interaction.

Pathogen Diversity

Several studies suggest that the virulence associated with *P. teres* f. *maculata* is diverse. Karki and Sharp (1986) compared the virulence of *P. teres* f. *maculata* populations collected from the Mediterranean region and Montana, USA, using 20 differential barley lines and found that all of the pathogen isolates were either virulent or avirulent on some barley cultivars, while other barley lines showed a differential reaction between different isolates. Tekauz *et al.* (1990) identified 20 different pathotypes of *P. teres* f. *maculata* by evaluating a Canadian pathogen population using 12 differential barley lines. Gupta *et al.* (2012) studied the characterization and diversity of *P. teres* f. *maculata* in Australia and found that the pathogen population was highly diverse. Gupta *et al.* (2012) found an opposite reaction in barley line Betzes, where a pathogen population from Victoria, Australia induced a susceptible reaction and a pathogen population from Western Australia induced a resistant reaction, indicating different virulence spectra are present between these two pathogen populations within Australia. This shows the likely involvement of multiple interactions involving host genes and pathogen effectors. McLean *et al.* (2012) also reported a high degree of pathogenic variation in isolates of *P. teres* f. *maculata,* all suggesting that the development of barley cultivars with durable resistance will require a combination of multiple genes conferring a cumulative effect or the elimination of susceptibility genes. This form of durable resistance will be achieved from the selection of barley lines that

lacks susceptibility and further introgression of resistance genes into selected barley lines by breeding programs.

Toxin Production

The development of different types of disease symptoms is thought to be associated with the production of various toxins. Three toxins, Toxin A, Toxin B and Toxin C have been isolated from culture filtrates of *P. teres* that incite expression of both NFNB and SFNB symptoms, including water soaking, and necrosis and chlorosis of the leaf. However, the toxins have not been tied to the development of well-defined net or spot type symptoms in the leaf (Smedegard-Peterson, 1977; Friis *et al.* 1991; Weirgang *et al.* 2002). Sarpeleh *et al.* (2007) reported the identification of phytotoxic proteinaceous metabolites that were able to induce brown necrotic spots or lesions on susceptible barley cultivars while low molecular weight compounds induced yellow chlorotic lesions. The corresponding severity of the symptoms depended on the amount of the secreted toxins (Sarpeleh *et al.* 2007 ; Sarpeleh *et al.* 2008; Sarpeleh *et al.* 2009). Thus, in the case of *P. teres* f. *maculata*, several virulence factors including toxins are potentially important for inducing disease.

Fungal Genomics

Aragona *et al.* (2000) assumed a total of nine chromosomes present in *P. teres*, consistent with a genome size of at least 35 Mb. Cytological karyotyping analysis confirmed there were at least nine chromosomes present in *P. teres* f. *teres* (Ellwood *et al.* 2010). Ellwood *et al.* (2010) published the first genome assembly of *P. teres* f. *teres*, which showed that the total assembly size was approximately 41.95 Mbp and contained 11,799 gene models of greater than 50 amino

acids. The sequencing and genome assembly of *P. teres* f. *maculata* has not yet been published. However, the recent assembly of *P. teres* f. *maculata* shows approximately 11,000 total genes present in the *P. teres* f. *maculata* genome (Ellwood *et al.* unpublished data).

Host Resistance

Host resistance is an effective method to control SFNB of barley (Østergård *et al.* 2008). Probable sources of resistance include local landraces, wild barley, and cultivated accessions. Jana and Bailey (1995) found that an equal number of wild and cultivated barley accessions harbored resistance to SFNB based on the screening of west Asian barley lines and wild relatives using a Canadian *P. teres* f. *maculata* isolate. Very little research has been documented to recommend specific barley lines as effective resistance sources for SFNB, emphasizing the fact that resistance is rare. For instance, Williams *et al.* 1999 performed a screening for SFNB resistance in 96 Australian and Non-Australian lines, using a mix of southern Australian isolates, identifying four new sources of resistance including the feed cultivar Galleon and the breeding line WI2976. Tekauz *et al.* 1990 found few barley lines (CI 9214 and Heartland) were resistant across almost all western Canadian isolates (38 out of 42 isolates); a few lines (CI 5791 and CI 9820) were resistant across approximately half of the isolates, and some cultivars (Bonanza, Steptoe, Herta and Betzes) were resistant to only one isolate, while one barley line (BT 201) was susceptible to all isolates tested in this study.

Additionally, SFNB resistance can be growth stage specific. William *et al.* (2003) performed a seedling and field screening for SFNB resistance and found barley lines CI 9214 (Korean landrace), Dairokkaku (Japanese landrace), ‘Keel’, ‘Tilga’, VB9104 and Galleon to be resistant at both the seedling and adult plant stage, while some barley lines (e.g. WI 3141) were

resistant at the seedling stage only. Further, Mclean *et al.* (2012) evaluated the responses of 95 barley lines and cultivars to SFNB seedling and adult plant resistance in Australia and Canada. They found that only two lines were resistant to all isolates at the seedling stage, whereas 15 lines and cultivars were resistant to the two Canadian isolates and a mixture of Australian isolates at the adult stage.

Research has been carried out to explore the chromosomal location of SFNB resistance. Major and relatively minor SFNB resistance genes have been identified (reviewed in Liu *et al.* 2011). Williams *et al.* (1999) reported the presence of a major gene for SFNB seedling resistance on barley chromosome 7H designated as *Rpt4*. Williams *et al.* (2003) reported adult SFNB resistance on chromosomes 7H, 5H, and 4H using the same doubled haploid population used by Williams *et al.* (1999). Williams *et al.* (2003) also reported seedling resistance to SFNB on chromosome 7H, 3H and 1H. Friesen *et al.* (2006) identified a major QTL for seedling resistance to SFNB on chromosome 4H using a barley doubled haploid population and a pathogen isolate from New Zealand. Molnar *et al.* (2000) found that chromosome 2H was also associated with seedling resistance to SFNB using a Canadian isolate. Grewal *et al.* (2008) identified barley chromosome 4H and 7H as harboring SFNB seedling resistance to a Canadian *P. teres* f. *maculata* isolate and Manninen *et al.* (2006) reported SFNB seedling resistant on chromosome 5H against Finnish isolate. Thus, based on the above evidence it is concluded that resistance to *P. teres* f. *maculata* is present across several barley chromosomes and it is speculated that the nature of disease resistance to SFNB of barley is likely complex considering the fact that the sources of resistance can have major gene effects showing complete resistance in all stages of the crop or minor gene effects showing partial resistance in specific growth stages of the crop.

Characterization of both pathogen virulence and host resistance provides the best information to breeders to combat this disease.

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CHAPTER TWO. IDENTIFICATION OF HOST RESISTANCE EFFECTIVE AGAINST THE BARLY SPOT FORM NET BLOTCH PATHOGEN

Introduction

Barley (*Hordeum vulgare* L.) is one of the major crops of the United States and the world. Barley production faces several limiting factors including several diseases that have the potential to induce significant losses. Net blotch is a major foliar disease of barley and has two forms, net form net blotch (NFNB) caused by *Pyrenophora teres* f. *teres* and spot form net blotch (SFNB) caused by *P. teres* f. *maculata*. SFNB epidemics have been reported in major barley producing countries of the world including the United States, Canada, Australia, Denmark, Norway, and South Africa (reviewed in McLean *et al.* 2009 and Liu *et al*. 2011). SFNB yield losses have been reported up to 44% in Australia (Khan 1989; Jayasena *et al.* 2007). An increase in SFNB has recently been observed in the Northern Great Plains of the United States (Liu *et al.* 2010). The increases in disease epidemics in these areas are likely due to shifts in the virulence within the pathogen population, which are likely in response to changes in resistance/susceptibility in the prevalent cultivars grown.

Disease management tactics for SFNB consist of fungicide application, inoculum reducing cultural practices, and the introgression of resistance into popular cultivars (McLean *et al.* 2012; Østergård *et al.* 2008). Very little research has been documented to recommend specific barley accessions as effective resistance sources for SFNB. William *et al.* (1999) evaluated 96 Australian and international accessions for SFNB resistance using a mix of south Australian isolates, identifying only a few resistant barley accessions. Likewise, Mclean *et al.* (2012) evaluated the responses of 95 barley accessions and cultivars to SFNB seedling and adult plant resistance in Australia and Canada and found that only two were resistant to all isolates tested,

whereas 15 accessions, including cultivars, were resistant to the Canadian isolates tested and a mixture of Australian isolates at the adult plant stage. Gupta *et al.* (2012) also studied the response of barley accessions to *P. teres* f. *maculata* and found that six were resistant across most of the western Australian isolates tested. In the current research project we are using the barley core collection (BCC), which consists of a diverse set of 2062 accessions selected based on a sampling of the country of origin (available at http://www.ars-grin.gov/cgi-bin/npgs/html/eval.pl?281, 07-26-2013) to represent the global genetic diversity of cultivated barley and barley landraces, to identify SFNB resistance.

Pyrenophora teres f. *maculata* is a sexually reproducing fungus that is pathogenically variable within and between the barley growing regions (Karki and Sharp, 1986; Tekauz, 1990; Arabi *et al*. 1992; Gupta *et. al*. 2001). A given source of resistance may be effective only towards a specific pathotype and may be susceptible to other pathotypes from other regions. Karki and Sharp (1986) compared the virulence of *P. teres* f. *maculata* populations collected from the Mediterranean region and Montana, USA, using 20 differential barley accessions; that found that approximately half of the accessions showed a differential response. Tekauz *et al.* (1990) identified 20 different pathotypes of *P. teres* f. *maculata* by evaluating a Canadian pathogen population using 12 differential barley genotypes. Gupta *et al.* (2012) studied the diversity of *P. teres* f. *maculata* in Australia and found that the pathogen population was highly diverse. Gupta *et al.* (2012) also found an opposite reaction in barley cultivars Betzes, where a pathogen population from Victoria induced a susceptible reaction and a pathogen population from Western Australia induced a resistant reaction, showing different virulence spectra was present between *P. teres* f. *maculata* populations within Australia. Collectively, these studies

indicated that the virulence of *P. teres* f. *maculata* was complex and needed further investigation before we could have confidence in the durability of any source of resistance.

The nature of host resistance involved in the SFNB interaction is not fully understood. Previous studies have reported involvement of single genes (William *et al.* 1999; William *et al.* 2003), complementary genes (Ho *et al.* 1996) and multiple genes (William *et al.* 2003) in the SFNB interaction. Additionally, resistance has been mapped to several barley chromosome arms and in some cases the resistance has been shown to be only effective at specific growth stages (reviewed in Liu *et al.* 2011).

The objective of this study was to identify barley lines that harbored high levels of SFNB resistance effective against a geographically and pathogenically diverse set of *P. teres* f. *maculata* isolates to be used in population development aimed at the characterization of SFNB resistance, as well as in germplasm and cultivar development.

Materials and Methods

Plant materials

A total of 2062 accessions of barley were evaluated for resistance to spot form net blotch (SFNB) (Appendix Table 1). This collection, referred to hereafter as the barley core collection (BCC), is made up of barley accessions representing 10% of the core set within the cultivated *H. vulgare* chosen based on country of origin (USDA, ARS, National Genetic Resources Program. *Germplasm Resources Information Network - (GRIN).* National Germplasm Resources Laboratory, Beltsville, Maryland. Available at http://www.ars-grin.gov/cgi-bin/npgs/html/eval.pl?281) (26 July 2013). The BCC was obtained from Harold Bockelman at

the USDA-ARS Small Grains Collection in Aberdeen, Idaho. Barley lines CIho 14219 and PI 67381 were used as resistant checks and Robust as a susceptible check.

Disease evaluations

All 2062 barley lines were evaluated using four *P. teres* f. *maculata* isolates including FGOB10Ptm-1 (FGO) collected in North Dakota, USA (from our collection), SG1 collected in Western Australia (obtained from Richard P. Oliver, Curtin University Perth Western Australia), NZKF2 collected in New Zealand and DEN 2.6 collected in Denmark (NZKF2 and DEN 2.6 isolates were obtained from Brian Steffenson, University of MN, USA). These isolates were chosen due to their different geographical distribution and therefore likely harbored different virulence.

The 2062 BCC lines were divided into 35 blocks; each block contained 60 barley accessions that fit into one rack surrounded by a border row of Robust barley to reduce any edge effect. Three barley seeds per line per replicate were sown into a single cone containing Metro mix soil (Sun Gro Hort. Co., USA). Plants were grown in the greenhouse until inoculations. Cones of one week old seedlings were fertilized with approximately 2 g of Osmocote controlled release fertilizer (Scotts, Marysville, OH, USA) having 15:9:12 NPK content. Barely accessions were inoculated as previously described by Friesen *et al.* (2006). Briefly, dried fungal mycelial plugs were placed in Petri plates containing V8-PDA media (150ml V8 juice, 10g difco PDA, 3g CaCO3, 10g agar, and 850ml distilled water). The plates were incubated in the dark at room temperature for 5 d and then subjected to 24 h continuous light at room temperature followed by another 24 h in the dark at 15°C to enhance sporulation. Conidia were harvested by scraping the surface of the plates with a sterile inoculating loop and the conidial concentration was adjusted to

2000 conidia/ml. Before inoculation, Tween 20 was applied at 2 drops/ 100 ml to enhance uniform distribution of the spores and adherence to the leaf surface. Two week old seedlings were spray inoculated to just before runoff using an air sprayer at 15-20 psi. Following inoculation, plants were incubated in a mist chamber for 22 - 24 h at 100% relative humidity under 24 h light to facilitate infection. The inoculated plants were then placed in a growth chamber under a 12 h photoperiod for 6 d at 21°C.

Disease reactions were evaluated 7 d post inoculation using a 1-5 rating scale (Figure 1). This rating scale categorizes the disease reaction based on lesion size and characteristic (Figure 1). Three seedlings planted in a single cone were evaluated collectively as one replicate. Plants having approximately equal amounts of two reaction types were given an intermediate rating (e.g. equal amounts of reaction type 2 and 3 resulted in a 2.5 rating). The overall experiment consisted of three replicates.

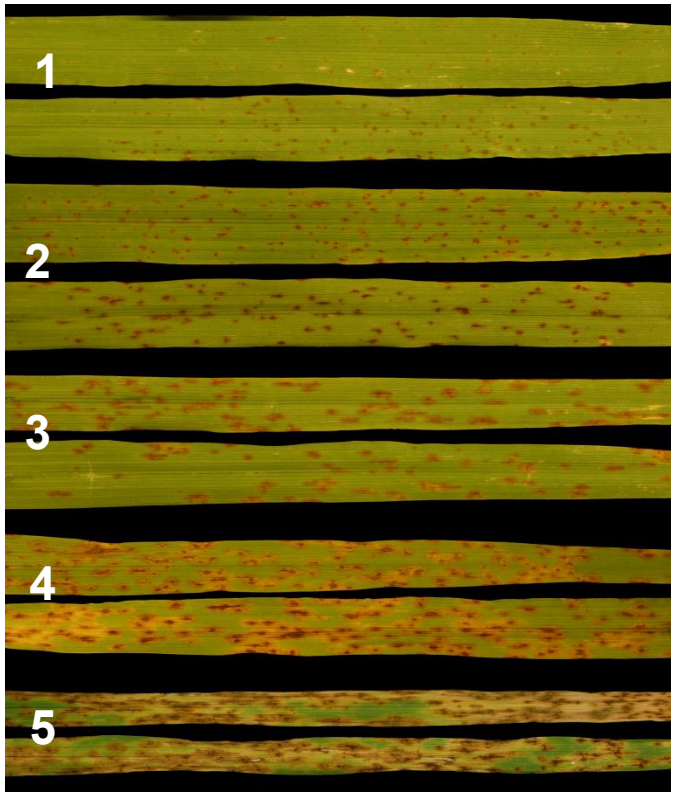

Figure 1. SFNB disease rating scale. Disease reactions were scored on a 1 (top) to 5 (bottom) reaction type scales. Two leaves are shown for each reaction type. A disease reaction type of 1 (resistant) consisted of small pinpoint lesions with no surrounding tan necrosis or yellow chlorosis, 2 consisted of pin point lesions with a small amount of necrosis and/or chlorosis around the penetration point, 3 consisted of necrotic or chlorotic lesions of 2-3 mm in size with little or no coalescence of the lesions, 4 consisted of necrotic and chlorotic lesions of greater than 3mm in diameter with moderate amounts of coalescing between lesions and covering less than 70% of the leaf area, and 5 consists of necrotic or chlorotic lesions coalescing and covering greater than 70% of the leaf area.

Results

Disease progression and phenotypes

Since little information has been reported on the progression of SFNB disease induced by *P. teres* f. *maculata*, we evaluated disease progression in a single susceptible barley cultivar (Tradition) with a single *P. teres* f. *maculata* isolate (FGO) (Figure 2). Additionally, using the 2062 accessions in the barley core collection we identified disease reactions on several accessions that showed phenotypic differences (Figure 3) including combinations of necrosis and chlorosis as well as regular and irregular lesion shapes. This allowed us to best be able to identify a standard disease reaction type scale to evaluate levels of resistance/susceptibility across different barley backgrounds.

For disease progress, disease was evaluated visually on the fully expanded secondary leaf (approximately 14 d old seedlings). Leaves were cut and photographed at 24 h intervals until the 7^{th} day (Figure 2). At one-day post inoculation (dpi), the inoculated leaves had a water soaked appearance where the fungus had initiated penetration but no yellow or brown necrosis had developed. At two dpi, diffuse chlorosis was beginning to develop and at three dpi, lesions were becoming more distinct but continued to grow. Between four and six dpi the lesion size expanded slightly but after six days, lesion size changes were not obvious. Therefore, disease reaction types were evaluated at seven dpi when the lesion size had become static but before leaf senescence. When evaluating the BCC, several different phenotypes were identified. Several of these lesion phenotypes are presented in Figure 3. These phenotypes included various forms of necrosis (Figure 3 A, C) and chlorosis (Figure 3 B) and combinations of the two (Figure 3 D, E,

F). Most commonly, susceptible reactions were displayed as circular to oval lesions that consisted of light brown to brown necrosis similar to the leaves in Figure 3 A and C.

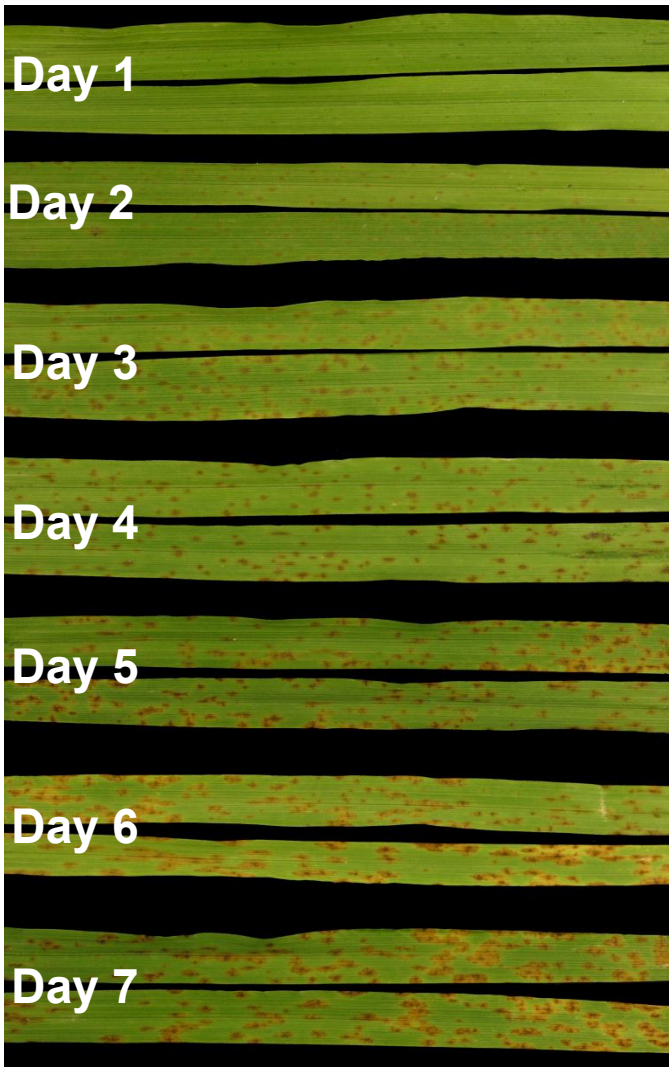

Figure 2. SFNB disease progression. Disease progression was from 1 day to 7 d post inoculation using the *P. teres* f. *maculata* isolate FGO inoculated on the susceptible barley cultivar Tradition.

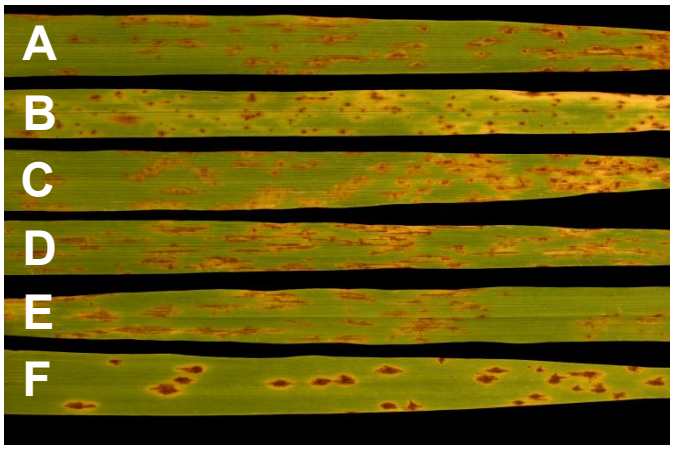

Figure 3. Different lesion characteristics expressed by barley lines 7 days post inoculation using the *P. teres* f. *maculata* isolate FGO. The top barley line (leaf A and C) shows necrosis, leaf B shows chlorosis, leaf D, E and F shows combination of both necrosis and chlorosis. Leaf A, B, and C have circular to elliptical lesions while D, E and F have elongated/irregular type lesions.

Numerical disease reaction type scale

Based on the disease progress observed in the previous section, disease reaction types were evaluated at 7 dpi based on a 1-5 reaction type scale where 1 was the most resistant and 5 was the most susceptible (Figure 1). Due to the differences identified in lesion types across the BCC, we based this disease scale primarily on lesion size and disease coverage on the leaf. A disease reaction type of 1 (resistant) consisted of small pinpoint lesions with no surrounding tan necrosis or yellow chlorosis. A disease reaction type of 2 (moderately resistant) consisted of pinpoint lesions with a small amount of necrosis and/or chlorosis around the penetration point. A disease reaction type of 3 (moderately susceptible) consisted of necrotic or chlorotic lesions of 2-3 mm across with little or no coalescence of the lesions. A disease reaction type of 4 (susceptible) consisted of necrotic and chlorotic lesions of greater than 3mm in diameter with moderate amounts of coalescing between lesions and covering less than 70% of the leaf area. A

disease reaction type of 5 (highly susceptible) consisted of necrotic or chlorotic lesions coalescing and covering greater than 70% of the leaf area.

Pathogen virulence

One of the objectives of this study was to identify barley accessions that showed a differential response among the four isolates used in this study for use in characterization of the genetics of pathogen virulence. When using a differential cutoff of 1.8, thirteen accessions showed a differential reaction between FGO and SG1 with twelve of those being more susceptible to FGO than to SG1 and only one being more susceptible to SG1 than FGO. Similarly, forty-two accessions showed a differential reaction between FGO and NZKF2 and twenty-seven accessions showed a differential reaction between FGO and DEN 2.6 with only one and five of those being more susceptible to NZKF2 and DEN 2.6, respectively. When comparing SG1 with NZKF2 and DEN 2.6, SG1 showed higher virulence on thirty-seven and twenty-nine accessions respectively, with NZKF2 and DEN 2.6 showing higher virulence to SG1 on only eight and ten accessions, respectively. When comparing NZKF2 and DEN 2.6, three lines showed a differential reaction with all three accessions being more susceptible to DEN 2.6.

Host line responses and identification of resistant lines

The disease score patterns observed were distributed in bell shaped pattern across the BCC with each of the four *P. teres* f. *maculata* isolates. The disease score reaction was categorized into five groups based on a numerical disease reaction; 1 to less than 1.5, 1.5 to less than 2.5, 2.5 to less than 3.5, 3.5 to less than 4.5 and 4.5 to 5. We found that only a few barley accessions fell under the resistant extreme (< 1.5) or the susceptible extreme (> 4.5), with most

of the accessions falling into an intermediate range of reaction types creating a bell shaped distribution (Figure 4). Out of the 2062 barley accessions evaluated, only 50 showed an average disease reaction of less than 2 using the FGO isolate, similarly only 79, 182 and 244 accessions showed average disease reactions of less than 2 to SG1, DEN 2.6 and NZKF2, respectively. Only 12, 21, 42 and 66 accessions showed average disease reactions of 1 to less than 1.5 with FGO, SG1, DEN 2.6 and NZKF2 isolates, respectively. Additionally, only 15 accessions showed a disease reaction of less than or equal to 2 for all four isolates tested (Table 1).

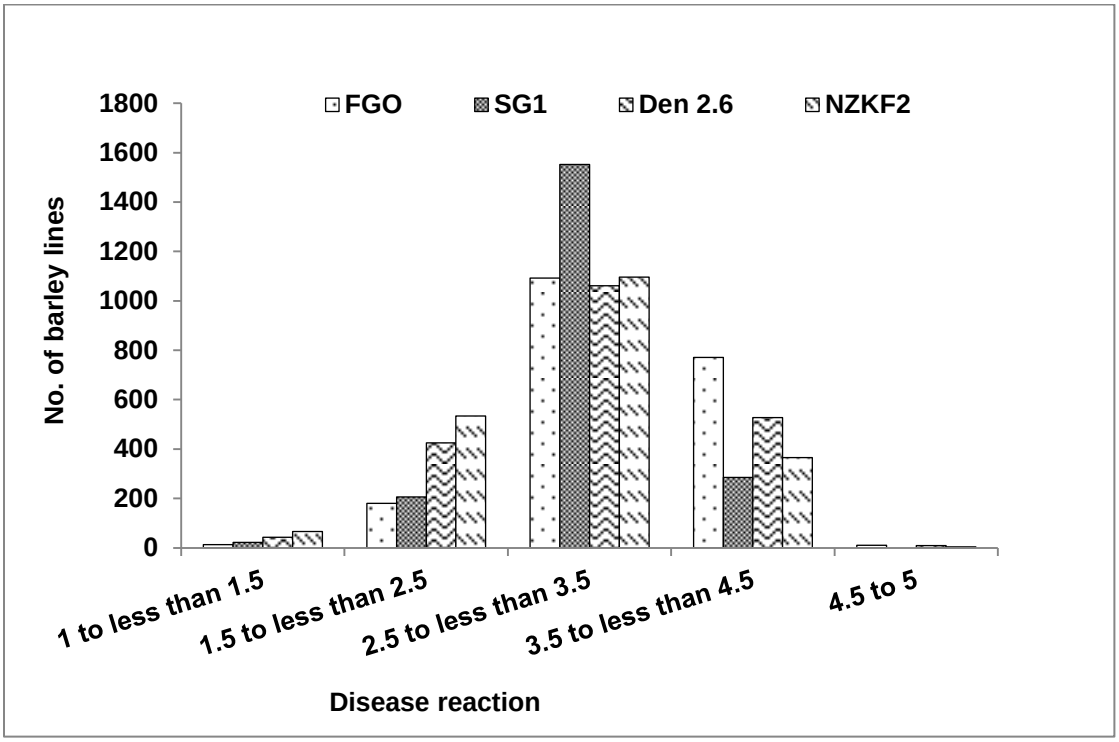

Figure 4. Disease reaction score distribution of the four *P. teres* f. *maculata* isolates used. Few barley accessions are highly resistant or highly susceptible with most of the accessions showing an intermediate reaction for each isolate resulting in a bell shaped curve.

Table 1. Resistant barley accessions having average disease reaction scores of less than or equal to two across all four *P. teres* f *maculata* isolates (FGO, SG1, NZKF2, and DEN 2.6) tested.

Barley Accession	Country	Row type*	Accession type*	FGO	SG1	NZKF2	DEN 2.6
PI 67381	Turkistan	2	Breeding line	1.5	1.0	1.3	1.5
PI 84314	Uzbekistan	6	Landrace	1.2	1.7	1	1.5
PI 640382	United States	6	Breeding line	2.0	1.2	1.4	1
PI 296996	Argentina	2	Breeding line	1.7	1.3	1.7	1.3
PI 61584	Mongolia	6	Landrace	1.0	1.5	1.5	2
PI 84311	Uzbekistan	6	Landrace	1.7	1.3	1.5	1.5
CIho 14214	Mongolia	6	Landrace	1.2	1.3	1.9	1.6
PI 84312	Uzbekistan	6	Landrace	2	1.5	1.3	1.2
PI 182625	Japan	6	Cultivar	1.7	2	1.3	1.2
CIho 14219	Mongolia	6	Landrace	1.5	1.8	1.2	1.8
PI 290316	Hungary	6	Cultivar	2	1	1.8	1.5
PI 28624	Iran	2	Landrace	1.3	1.5	1.8	1.8
PI 296998	Argentina	2	Breeding line	1.3	1.6	1.8	1.8
PI 60205	China	6	Landrace	1.5	2	2	1.5
CIho 15270	Canada	6	Landrace	1.7	2	2	1.8

*Row type and accession type data were obtained from The Triticeae Tool Box (available at http://triticeaetoolbox.org/). Barley accessions were ordered based on average disease reaction from top to bottom respectively.

Discussion

Disease development and disease reaction characteristics

The development of the SFNB disease results from the infection process carried out by the pathogen *P. teres* f. *maculata*. The infection process includes the attachment of the spore to the leaf surface followed by spore germination, appressoria and penetration peg formation, the subsequent disease development, and finally sporulation (reviewed in Liu *et al.* 2011). We observed a periodic development of the disease beginning at 24 h after inoculation and progressing up to 7 d after inoculation (Figure 2). Karki and Sharp (1986) also noted that disease development started from the appearance of small water soaked areas on the leaves 24 h after inoculation followed by the development of visible necrotic lesions 3-4 d later. Keon and Hargreaves (1983) noted that the susceptible host cells started dying near or adjacent to the intracellular hyphae 2 d after inoculation (Figure 2). A chlorotic area starts to develop around the initial necrotic lesion and is thought to be due to the secretion of diffusible toxins or effectors that induce PCD similar to other necrotrophic systems involving closely related fungi (Manning *et al.* 2009; Liu *et al.* 2011; Oliver *et al.* 2010; Oliver *et al*. 2012).

Karki and Sharp (1986) noted different lesion characteristics in specific barley genotype-isolate combinations, where in general, Montana isolates induced more chlorotic and necrotic type lesions in several barley genotypes compared to Mediterranean isolates. In our study, we also found different lesion characteristics in specific barley accession-isolate combinations (Figure 3). It is likely that specific isolates have different virulence factors that interact with corresponding host factors that confer a distinct visible symptom. Distinctly different visible symptoms have also been shown in the tan spot of wheat pathosystem caused by the closely

related pathogen, *P. tritici-repentis*. In the tan spot of wheat interaction, depending on the host selective toxin (HST) – host gene combination, infection results in necrotic or chlorotic spots, spreading chlorosis, or a combination of necrosis and chlorosis (Reviewed in Faris et *al.* 2013). These different symptoms have been traced back to three HSTs including Ptr ToxA, Ptr ToxB, and Ptr ToxC and the corresponding host sensitivity genes, *Tsn1*, *Tsc2* and *Tsc1*, respectively (Effertz *et al.* 2002; Friesen and Faris; 2004; Faris *et al.* 2010; reviewed in Faris *et al.* 2013). The different symptoms present in the SFNB pathosystem also indicates the involvement of different pathogen-host combinations that result in different visible phenotypes resulting from a complex system of host-pathogen interactions.

Tekauz (1985) proposed a SFNB rating scale that included ratings of 1-9, with 1-3 being resistant, 5 being intermediate, and 7-9 being susceptible; however, in this scale no 4 or 6 ratings were described, making statistical analysis problematic. Karki and Sharp (1986) proposed a 1-10 rating scale that was based on a combination of lesion size and leaf tip necrosis, that we rarely observed. Therefore, we have proposed a SFNB disease rating scale (Figure 1) that is based on the 1-5 disease rating scale proposed by Lamari *et al.* (1989) for use with *Pyrenophora tritici-repentis* causal agent of tan spot of wheat, where 1 is most resistant and 5 is most susceptible. Our proposed SFNB scale takes into consideration primarily lesion size but also percent leaf area coverage in the higher reaction types.

Based on reports in the literature of proteinaceous and non-proteinaceous toxins being present in the SFNB and NFNB system (Reviewed in Liu *et al.* 2011), it is likely that underlying this quantitative trait, there are several effector-host gene interactions that, in combination with one another, result in the different visual phenotypes and varying disease reaction scores. Several of the Pleosporales pathogens in the Dothideomycete class of fungi have been shown to produce necrotrophic effectors that interact with dominant host susceptibility gene products (Reviewed in Wolpert *et al.* 2002 and Stergiopoulos *et al*. 2013). The work presented here lays the groundwork for evaluating the genetics of this host-pathogen interaction. Based on this work and the work presented in the adjoining paper, we have provided information about specific accessions and pathogen isolates that are currently being used in host and pathogen population development. The genetic characterization of both virulence and resistance is critical to a complete understanding of this system.

Diversity in pathogen virulence

The isolates used in this study were collected from four different barley-growing regions and were therefore expected to have some genetic diversity. Several of the barley accessions evaluated showed a differential reaction between the isolates tested, indicating that each isolate used contained a different set of virulence factors. Interestingly, the FGO isolate collected in North Dakota, where epidemics have recently occurred, harbored the most virulence, with only a few accessions showing lower levels of susceptibility to FGO than the other three. The epidemic in North Dakota has been fairly recent and may be a result of a virulence shift where the local *P. teres* f. *maculata* population has adapted to current local barley cultivars. Previous studies have also reported a higher virulence of isolates collected in the Northern Great Plains of the United

States and the Canadian prairie region compared to other regions (Karki and Sharp, 1986; Tekauz *et al.* 1990; Tekauz *et al.* 1997). SFNB epidemics have also recently been reported in Australia (McLean *et al.* 2009; McLean *et al.* 2010) and we found that the average virulence of the Australian isolate SG1 was somewhat lower than the US isolate but higher than isolates collected in New Zealand and Denmark (Table 2-7). Based on our results collected for these four isolates across the 2062 barley accessions, it is likely that the four isolates harbor several common virulence factors; however, each isolate also harbors at least one unique factor with the FGO isolate harboring the most unique virulence factors followed by the Australian isolate SG1. It is likely that the local barley cultivars are driving adaptation in each local pathogen population, however; additional isolates from each of these regions will need to be tested to identify which virulence are unique to each region.

Table 2. Barley core collection accessions showing a differential reaction between *P. teres* f. *maculata* isolates FGO and SG1.

Barley Accession	Country of origin	FGO	SG1
CIho 3694	Egypt	3.5	1.3
PI 138711	Iran	3.9	1.8
CIho 14882	Eritrea	4.3	2.3
CIho 4050	Mongolia	2.9	1.0
PI 410646	Pakistan	3.8	2.0
CIho 4056	Mongolia	3.5	1.7
PI 290366	Hungary	3.2	1.3
PI 292019	Israel	3.2	1.3
PI 138726	Iran	4.0	2.2
PI 410483	Pakistan	4.1	2.3
CIho 15339	Tunisia	4.1	2.3
PI 573662	Georgia	3.1	1.4
PI 533205	Pakistan	1.0	2.8

*Underlined numbers indicate higher differential virulence for that isolate. Difference of greater than or equal to 1.8 was set for choosing differential accessions. Country of origin and average disease reactions for the North Dakota isolate (FGO) and the Australian isolate (SG1) are given for each barley accession.

Table 3. Barley core collection accessions showing a differential reaction between *P. teres* f. *maculata* isolates FGO and DEN 2.6.

Barley Accession	Country of origin	FGO	DEN 2.6
PI 138711	Iran	3.9	1.0
PI 327667	Tajikistan	4.5	2.0
PI 410451	Pakistan	4.3	1.8
PI 410525	Pakistan	3.7	1.5
PI 38305	Russian Federation	4.3	2.2
PI 244823	Pakistan	3.0	1.0
PI 64004	Algeria	3.8	1.8
CIho 7491	Mexico	3.2	1.2
PI 565826	China	3.7	1.7
PI 402037	Colombia	2.9	1.0
PI 190790	Korea, North	3.6	1.8
PI 243184	France	3.3	1.5
PI 611592	Tajikistan	3.8	2.0
PI 34424	Venezuela	3.3	1.5
PI 145693	Saudi Arabia	3.7	1.8
PI 190786	Korea, North	3.2	1.3
PI 327833	Uzbekistan	3.2	1.3
PI 478431	Bolivia	3.0	1.2
PI 564649	Oman	3.7	1.8
PI 39592	Venezuela	3.5	1.7
PI 328632	Greece	4.3	2.5
PI 57065	Algeria	4.3	2.5
PI 467731	Norway	2.2	4.0

Continued…….

Table 3. Barley core collection accessions showing a differential reaction between *P. teres* f. *maculata* isolates FGO and DEN 2.6 (continued).

Barley Accession	Country of origin	FGO	DEN 2.6
PI 548761	Israel	2.2	4.0
PI 573659	Georgia	1.3	3.3
PI 356226	Morocco	1.3	3.3
PI 304912	Morocco	1.2	3.3

*Underlined numbers indicate higher differential virulence for that isolate. Difference of greater than or equal to 1.8 was set for choosing differential accessions. Country of origin and average disease reactions for the North Dakota isolate (FGO) and the Denmark isolate (DEN 2.6) are given for each barley accession.

Table 4. Barley core collection accessions showing a differential reaction between *P. teres* f. *maculata* isolates FGO and NZKF2.

Barley Accession	Country of origin	FGO	NZKF2
PI 410525	Pakistan	3.7	1.2
PI 145693	Saudi Arabia	3.7	1.4
Ciho7491	Mexico	3.2	1.0
PI 327833	Uzbekistan	3.2	1.0
PI 138711	Iran	3.9	1.8
PI 328498	Greece	4.3	2.2
PI 410451	Pakistan	4.3	2.2
PI 38305	Russian Federation	4.3	2.2
Ciho 4072	Mongolia	3.3	1.3
PI 327667	Tajikistan	4.5	2.5
PI 328976	Ethiopia	3.5	1.5
PI 429314	Yemen	4.0	2.0
PI 564477	Bulgaria	3.5	1.5
PI 584971	China	3.3	1.3
PI 55551	Chile	3.3	1.3
PI 414082	Bolivia	4.3	2.3
Ciho 15355	Tunisia	4.3	2.3
PI 289805	Iran	3.6	1.7
PI 402078	Colombia	3.8	1.8
PI 157884	Italy	3.3	1.3
PI 134636	Afghanistan	3.7	1.8
PI 223136	Jordan	3.3	1.5
PI 610230	China	3.3	1.5

Continued……..

Table 4. Barley core collection accessions showing a differential reaction between *P. teres* f. *maculata* isolates FGO and NZKF2 (continued).

Barley Accession	Country of origin	FGO	NZKF2
PI 611480	Korea, North	3.8	2.0
PI 611592	Tajikistan	3.8	2.0
PI 414083	Bolivia	4.0	2.2
PI 429526	Nepal	4.0	2.2
Ciho 3512	China	3.7	1.8
PI 222508	Croatia	3.2	1.3
PI 328577	Greece	3.5	1.7
PI 565826	China	3.7	1.8
PI 70853	China	3.2	1.3
PI 429510	Nepal	3.2	1.3
PI 434852	Canada	3.0	1.2
PI 328632	Greece	4.3	2.5
PI 129484	Finland	4.2	2.4
PI 328924	Italy	3.6	1.8
PI 159126	Mexico	3.0	1.3
PI 270683	Peru	3.8	2.0
PI 270687	Peru	4.3	2.5
PI 548761	Israel	2.2	4.0

*Underlined numbers indicate higher differential virulence for that isolate. Difference of greater than or equal to 1.8 was set for choosing differential accessions. Country of origin and average disease reactions for the North Dakota isolate (FGO) and the New Zealand isolate (NZKF2) are given for each barley accession.

Table 5. Barley core collection accessions showing a differential reaction between *P. teres* f. *maculata* isolates SG1 and DEN 2.6.

Barley Accession	Country of origin	SG1	DEN 2.6
PI 244823	Pakistan	3.3	1.0
CIho 2348	India	3.0	1.0
CIho 15364	Tunisia	3.3	1.3
PI 268391	Afghanistan	3.0	1.0
CIho 7492	Mexico	3.7	1.7
PI 584977	China	3.2	1.2
PI 29004	Turkmenistan	3.4	1.5
PI 57089	China	3.3	1.5
PI 361711	Denmark	2.8	1.0
PI 410525	Pakistan	3.3	1.5
PI 611592	Tajikistan	3.8	2.0
CIho 7491	Mexico	3.0	1.2
CIho 14291	China	3.5	1.7
PI283433	Cyprus	3.2	1.3
PI 327833	Uzbekistan	3.2	1.3
PI 361929	Romania	3.0	1.2
PI 566140	China	3.0	1.2
PI 584971	China	3.5	1.7
PI 189770	Tunisia	3.0	1.3
CIho4050	Mongolia	1.0	2.8
PI 467731	Norway	2.2	4.0
PI 548760	Syria	1.5	3.3
PI 94806	Former Soviet Union	2.2	4.0

Continued……

Table 5. Barley core collection accessions showing a differential reaction between *P. teres* f. *maculata* isolates SG1 and DEN 2.6 (continued).

Barley Accession	Country of origin	SG1	DEN 2.6
CIho 14250	Afghanistan	1.5	3.5
PI 356226	Morocco	1.0	3.3
PI 573662	Georgia	1.4	4.0
PI 292017	Israel	1.2	3.8
PI 548761	Israel	1.0	4.0

*Underlined numbers indicate higher differential virulence for that isolate. Difference of greater than or equal to 1.8 was set for choosing differential accessions. Country of origin and average disease reactions for the Australian isolate (SG1) and the Denmark isolate (DEN 2.6) are given for each barley accession.

Table 6. Barley core collection accessions showing a differential reaction between *P. teres* f. *maculata* isolates SG1 and NZKF2.

Barley Accession	Country of origin	SG1	NZKF2
PI 87840	Korea, North	3.8	1.6
CIho 14291	China	3.5	1.3
PI 410525	Pakistan	3.3	1.2
PI 584971	China	3.5	1.3
PI 327833	Uzbekistan	3.2	1.0
CIho7491	Mexico	3.0	1.0
CIho 15364	Tunisia	3.3	1.3
PI 222508	Croatia	3.3	1.3
PI 268391	Afghanistan	3.0	1.0
PI 564477	Bulgaria	3.5	1.5
CIho 11533	Argentina	3.2	1.2
PI 283433	Cyprus	3.2	1.2
PI 55551	Chile	3.3	1.3
PI 29004	Turkmenistan	3.4	1.5
CIho 2353	Turkmenistan	2.8	1.0
CIho 14070	Spain	4.0	2.2
PI 270683	Peru	3.8	2.0
PI 296192	Tajikistan	4.0	2.2
PI 611592	Tajikistan	3.8	2.0
PI 640390	United States	3.3	1.5
CIho 2622	Israel	3.2	1.3
CIho 3387	Algeria	3.2	1.3
CIho 7339	Japan	3.2	1.3

Continued…….

Table 6. Barley core collection accessions showing a differential reaction between *P. teres* f. *maculata* isolates SG1 and NZKF2 (continued).

Barley Accession	Country of origin	SG1	NZKF2
PI 283445	Belgium	3.5	1.7
PI 296453	Eritrea	3.7	1.8
PI 328924	Italy	3.7	1.8
PI 402264	Colombia	3.5	1.7
PI 157884	Italy	3.2	1.3
PI 327831	Turkmenistan	3.1	1.3
PI 436155	Chile	2.5	4.3
PI 94797	Armenia	1.3	3.2
PI 190762	Japan	1.3	3.2
PI 292017	Israel	1.2	3.0
PI 344903	Serbia	2.0	3.8
PI 428499	Sweden	2.3	4.2
PI 73298	Armenia	2.3	4.2
PI 548761	Israel	1.0	4.0

*Underlined numbers indicate higher differential virulence for that isolate. Difference of greater than or equal to 1.8 was set for choosing differential accessions. Country of origin and average disease reactions for the Australian isolate (SG1) and New Zealand isolate (NZKF2) isolate are given for each barley accession.

Table 7. Barley core collection accessions showing a differential reaction between *P. teres* f. *maculata* isolates DEN 2.6 and NZKF2.

Barley Accession	Country of origin	DEN 2.6	NZKF2
PI 270605	Peru	3.5	1.7
PI 310480	France	4.2	2.3
PI 289805	Iran	3.7	1.7

*Underlined numbers indicate higher differential virulence for that isolate. Difference of greater than or equal to 1.8 was set for choosing differential accessions. Country of origin and average disease reactions for the Denmark isolate (DEN 2.6) and the New Zealand isolate (NZKF2) are given for each barley accession.

Nature of disease resistance

Tekauz *et al.* (1990) evaluated 42 isolates of *P. teres* f. *maculata* collected in western Canada and showed that 20 different pathotypes were present based on the use of a 12 barley genotype differential set. Similarly, Karki and Sharp (1986) characterized a set of 14 *P. teres* f. *maculata* isolates collected in Montana, USA, Morocco, Tunisia, and Turkey on 20 barley genotypes with 12 of these showing a differential reaction between the isolates tested. These previous studies indicated that virulence variability was prevalent in the populations tested. Based on a gene-for-gene (Flor, 1956) or inverse gene-for-gene hypothesis (Friesen and Faris, 2010), for each pathogen virulence there should be a distinct corresponding host resistance/susceptibility gene and therefore we expected that the BCC tested here should have a high level of resistance diversity. To our knowledge, the study we are presenting here is the first documentation of the screening of a large world barley collection using a diverse collection of *P. teres* f. *maculata* isolates. Based on the diversity of the 2062 barley accessions tested in this study, we would expect that the vast majority of the resistance/susceptibility loci present in

cultivated barley are represented here. It was interesting to note that only a very small percentage of the accessions evaluated showed high levels of resistance to all four isolates tested (Table 2, Figure 5, and Figure 4). Similarly, only a few accessions showed a high level of susceptibility to all isolates tested (Figure 4) with the remainder of the accessions falling in the moderately resistant to moderately susceptible region, resulting in a bell shaped curve. Several accessions showed a strong differential reaction between isolates (Table 2-7) indicating that these accessions harbor resistance/susceptibility that is unique to a specific isolate. The observation of several sources of resistance being effective to only one, two or three but not all of the isolates used in this study along with the normal distribution of reaction types and the fact that several recent outbreaks of this disease have occurred around the world (Liu *et al.* 2011) are all indications of a complex host pathogen interaction that is highly variable in the natural population. This makes the complete characterization of both host resistance and pathogen virulence critical. The disease reaction information presented here lays the foundation for further studies involving the characterization of these resistance sources. Currently, barley populations are being developed using resistant accessions identified here and resistance/susceptibility loci have been mapped by an association mapping strategy utilizing the phenotyping data generated in this study (Tamang *et al.* 2014, unpublished). The overall goal is to characterize the different sources of broad resistance and intelligently deploy them in regional barley cultivars.

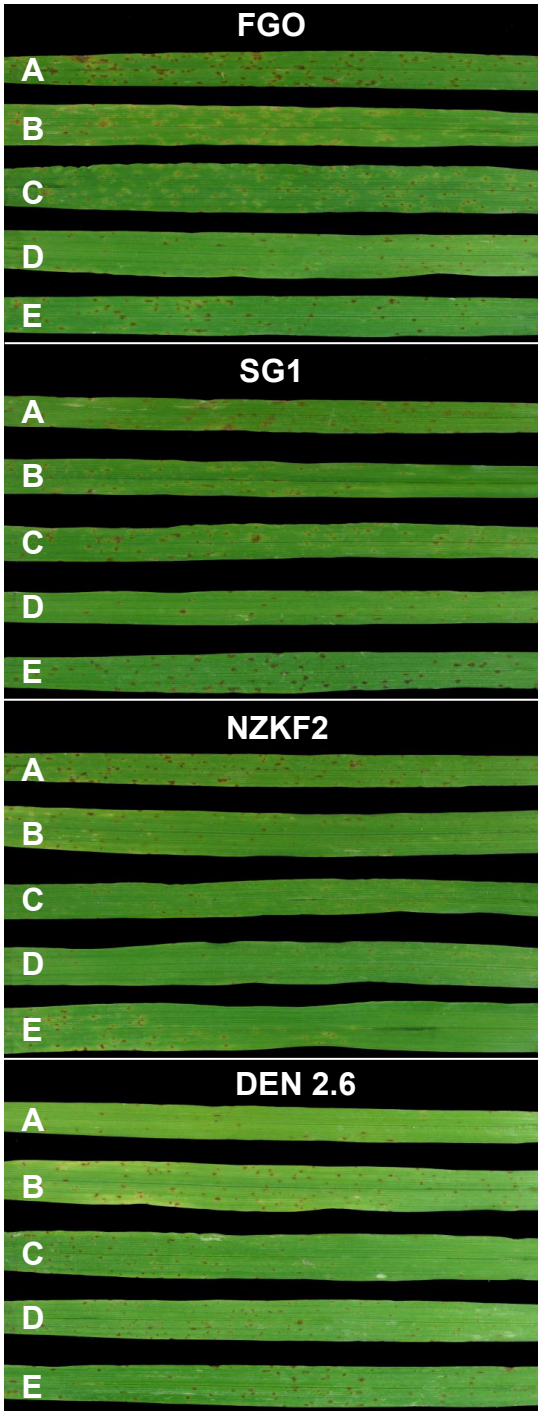

Figure 5. Uniformly resistant barley lines seven days post inoculation using *P. teres* f. *maculata* isolates FGO, SG1, NZKF2 and DEN 2.6. Barley accessions used were the five most resistant accessions: PI 61584 (A), PI 296996 (B), PI 640382 (C), PI 84314 (D), and PI 67381 (E) for each isolate inoculation.

Based on this study we can conclude that resistance to *P. teres* f. *maculata* is complex. This complexity is likely due to the number of distinct virulence loci in the pathogen and the distinct corresponding resistance/susceptibility loci present in the host. The isolates used in this study have been used to develop mapping populations to evaluate the genetics of virulence and the resistant barley accessions are being used in population development for the characterization of resistance/susceptibility, leading to a better understanding of this important host pathogen interaction.

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APPENDIX. ALL BARLEY ACESSIONS USED AND THEIR AVERAGE DISEASE REACTION USING EACH ISOLATE

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
Resistant check -		Ciho14219	Mongolia	1.5	1.8	1.2	1.8
Resistant check -		PI 67381	Turkistan	1.5	1.0	1.3	1.5
Susceptible check-		Robust	United States	3.3	3.2	3.1	3.1
1	CIho	424	Italy	1.8	1.4	2.2	2.2
2	CIho	455	Portugal	3.5	2.8	2.7	2.5
3	CIho	497	Egypt	2.7	2.8	1.7	1.2
4	CIho	521	Bulgaria	2.9	3.3	2.7	2.8
5	CIho	1138	United States	2.2	3.2	2.3	2.2
6	CIho	1172	Guatemala	4.0	2.9	3.2	3.0
7	CIho	1388	Denmark	3.8	3.1	3.8	3.8
8	CIho	1457	Iraq	3.0	3.0	2.8	2.5
9	CIho	1458		3.5	3.0	3.3	3.7
10	CIho	1461	Iraq	4.0	3.3	3.2	3.3
11	CIho	1462	Iraq	3.6	3.3	3.2	3.3
12	CIho	1468	Iraq	3.3	3.7	4.0	3.3
13	CIho	1551	Canada	2.7	2.7	1.7	1.7
14	CIho	1584	Uzbekistan	3.4	2.9	2.8	2.7
15	CIho	1604	Ethiopia	2.8	3.3	3.0	3.7
16	CIho	1615	China	2.8	3.4	4.0	3.8
17	CIho	1621	Venezuela	3.8	3.3	2.3	2.8
18	CIho	1624	Sudan	3.3	3.1	2.2	2.7
19	CIho	1641	Algeria	3.3	3.0	2.3	2.7
20	CIho	1688	Sudan	3.3	2.9	2.8	2.3
21	CIho	2045	Iran	3.1	3.5	2.3	3.0
22	CIho	2205	Japan	2.5	2.3	2.5	2.5
23	CIho	2208	United States	4.1	3.5	3.0	3.3
24	CIho	2215	South Africa	1.7	2.8	2.5	2.7
25	CIho	2224	United States	3.0	3.3	3.3	3.5
26	CIho	2236	United States	3.1	3.0	2.5	2.8
27	CIho	2293	United States	3.8	3.0	3.2	3.8
28	CIho	2337	Iraq	3.9	3.9	4.3	3.8
29	CIho	2338	Iraq	3.1	3.1	2.2	2.7

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
30	CIho	2339	Iraq	1.0	2.5	2.0	2.0
31	CIho	2342	Zimbabwe	3.6	3.6	3.3	3.2
32	CIho	2348	India	2.5	3.0	1.7	1.0
33	CIho	2353	Turkmenistan	1.5	2.8	1.0	1.2
34	CIho	2367	Sudan	3.4	3.1	3.3	2.7
35	CIho	2441	Peru	3.4	3.5	2.5	2.8
36	CIho	2451	Russian Federation	2.4	3.0	3.0	2.3
37	CIho	2456	Australia	3.5	3.4	2.5	2.7
38	CIho	2480	Venezuela	3.4	3.3	3.3	3.5
39	CIho	2481	Venezuela	3.2	3.3	2.3	2.2
40	CIho	2483	Uruguay	2.2	3.0	2.3	2.0
41	CIho	2494	United States	3.1	2.8	3.3	2.5
42	CIho	2519	United States	3.4	2.8	3.3	2.8
43	CIho	2539	Italy	3.2	3.7	2.8	2.7
44	CIho	2542	Italy	2.3	3.0	2.8	3.0
45	CIho	2543	Italy	3.3	3.7	3.0	3.5
46	CIho	2547	Italy	4.1	3.5	4.0	3.5
47	CIho	2551	Taiwan	2.3	1.9	2.3	2.7
48	CIho	2622	Israel	2.3	3.2	1.3	2.0
49	CIho	2631	Sweden	3.8	3.8	3.8	4.3
50	CIho	3044	Austria	2.8	3.8	2.8	2.8
51	CIho	3240	Egypt	3.9	3.5	3.0	3.3
52	CIho	3387	Algeria	2.8	3.2	1.3	2.0
53	CIho	3388	Algeria	3.0	3.3	2.0	2.5
54	CIho	3389	Algeria	3.3	3.5	2.8	2.8
55	CIho	3390	Algeria	3.5	3.7	4.0	4.5
56	CIho	3512	China	3.7	3.0	1.8	2.0
57	CIho	3551	Egypt	2.7	3.2	2.7	2.5
58	CIho	3556	Egypt	2.3	3.2	1.7	1.5
59	CIho	3581	Egypt	2.8	2.9	2.5	2.7
60	CIho	3642	Egypt	2.8	2.9	2.5	2.7
61	CIho	3685	Egypt	2.7	3.3	1.7	2.0
62	CIho	3694	Egypt	3.5	1.3	2.2	2.5
63	CIho	3709	Egypt	3.5	3.1	3.3	3.3
64	CIho	3734	Egypt	3.2	3.3	2.8	2.8

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
65	CIho	4046	Mongolia	2.7	2.2	1.8	1.3
66	CIho	4049	Mongolia	3.0	3.0	2.7	2.7
67	CIho	4050	Mongolia	2.9	1.0	2.3	2.8
68	CIho	4054	Mongolia	1.5	1.9	2.2	2.7
69	CIho	4055	Mongolia	1.9	1.8	2.5	2.3
70	CIho	4056	Mongolia	3.5	1.7	2.3	2.0
71	CIho	4063	Mongolia	3.3	2.7	2.2	1.8
72	CIho	4064	Mongolia	3.0	3.3	2.8	3.2
73	CIho	4069	Mongolia	3.7	3.2	3.7	3.2
74	CIho	4072	Mongolia	3.3	3.0	1.3	2.3
75	CIho	4074	Mongolia	3.0	2.7	2.0	2.2
76	CIho	4083	Mongolia	2.8	1.6	2.3	2.2
77	CIho	4087	Russian Federation	3.0	2.8	1.7	3.0
78	CIho	4088	Russian Federation	3.3	3.1	3.3	2.7
79	CIho	4090	Georgia	2.5	2.5	3.0	2.7
80	CIho	4095	Georgia	2.7	3.0	1.7	1.5
81	CIho	4144	Afghanistan	3.2	2.8	3.0	2.7
82	CIho	4153	Afghanistan	3.1	3.0	3.2	3.0
83	CIho	4159	Afghanistan	1.7	2.5	1.3	1.0
84	CIho	4165	Afghanistan	1.7	2.7	1.8	2.2
85	CIho	4169	Afghanistan	2.9	2.4	3.3	3.0
86	CIho	4176	Afghanistan	3.2	2.8	2.8	3.0
87	CIho	4184	Afghanistan	3.1	3.4	2.8	2.3
88	CIho	4188	Afghanistan	2.8	3.0	3.3	2.8
89	CIho	4208	Venezuela	2.0	2.2	1.3	1.8
90	CIho	4223	Chile	2.5	3.3	1.8	1.7
91	CIho	4264	Venezuela	2.3	3.0	1.5	1.5
92	CIho	4622	Japan	2.4	2.0	3.3	2.7
93	CIho	4969	China	3.2	3.3	1.7	2.5
94	CIho	4981	Norway	3.6	3.4	3.0	3.0
95	CIho	5003	Ireland	4.2	3.5	3.0	2.5
96	CIho	5023	India	2.9	3.3	3.0	3.0
97	CIho	5024	India	3.8	4.0	4.0	3.7
98	CIho	5053	Australia	2.0	2.8	2.5	2.3
99	CIho	5056	Australia	3.1	3.1	3.3	3.2

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
100	CIho	5057	Australia	1.8	2.2	2.2	1.8
101	CIho	5058	Australia	3.6	3.6	3.5	3.0
102	CIho	5068	Canada	3.8	3.0	2.8	2.8
103	CIho	5329	United States	2.5	2.5	2.2	1.5
104	CIho	5337	United States	2.3	3.3	2.7	1.8
105	CIho	5440	United States	3.2	3.0	3.5	3.3
106	CIho	5989	Ireland	2.3	3.0	2.8	2.8
107	CIho	6020	Australia	3.3	3.2	2.7	2.3
108	CIho	6024	Australia	2.8	2.8	2.5	2.7
109	CIho	6091	Canada	3.2	2.3	2.5	2.3
110	CIho	6092	Canada	3.5	3.3	3.2	2.5
111	CIho	6194	Argentina	3.5	3.4	2.8	3.0
112	CIho	6251	Finland	4.2	3.7	3.0	2.7
113	CIho	6275	Romania	3.3	3.4	3.3	3.3
114	CIho	6276	Romania	2.5	2.8	2.3	2.7
115	CIho	6277	Bulgaria	2.0	3.0	2.2	2.5
116	CIho	6294	Turkey	2.5	2.7	2.8	3.3
117	CIho	6371	United States	2.5	3.2	3.2	3.7
118	CIho	6487	Portugal	3.0	2.8	1.7	1.5
119	CIho	6488	Portugal	3.4	3.4	3.7	3.7
120	CIho	6489	Portugal	3.4	3.1	2.7	3.0
121	CIho	6493	Portugal	2.5	3.5	1.8	3.0
122	CIho	6496	China	3.0	3.2	3.7	3.8
123	CIho	6510	Russian Federation	3.2	2.3	3.3	4.0
124	CIho	6533	Russian Federation	3.3	2.7	3.0	3.8
125	CIho	6546	Denmark	3.3	3.4	3.5	2.8
126	CIho	6549	Sweden	3.0	2.8	2.5	2.2
127	CIho	6554	Sweden	3.2	3.3	3.7	3.8
128	CIho	6557	Norway	3.6	3.3	3.5	2.7
129	CIho	6601	Afghanistan	3.0	3.1	2.3	2.0
130	CIho	6721	Egypt	3.8	3.7	3.0	2.9
131	CIho	6880	United States	2.8	3.2	2.8	2.5
132	CIho	6939	Afghanistan	2.5	3.0	2.8	4.0
133	CIho	6943	Afghanistan	3.2	3.7	2.1	2.1
134	CIho	6950	Iran	2.3	3.0	1.7	1.3

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
135	CIho	6952	Iran	2.7	3.0	1.9	1.9
136	CIho	6966	Mexico	3.8	3.5	2.6	2.1
137	CIho	7030	Canada	2.8	2.7	3.0	2.8
138	CIho	7055	Canada	2.8	2.5	2.3	2.7
139	CIho	7153	United States	4.2	3.2	3.4	4.0
140	CIho	7240	Iraq	3.5	3.2	3.1	3.1
141	CIho	7247	United States	3.5	3.2	2.9	2.8
142	CIho	7265	France	3.8	3.2	2.6	3.3
143	CIho	7267	France	3.7	3.5	2.6	3.3
144	CIho	7339	Japan	2.3	3.2	1.3	2.2
145	CIho	7342	Japan	2.3	2.2	2.3	2.1
146	CIho	7491	Mexico	3.2	3.0	1.0	1.2
147	CIho	7492	Mexico	3.2	3.7	2.0	1.7
148	CIho	7494	Mexico	3.3	3.3	3.0	3.7
149	CIho	7498	Mexico	3.3	3.0	2.9	2.6
150	CIho	7503	Mexico	3.0	2.8	2.0	2.7
151	CIho	7504	Mexico	2.7	3.0	1.5	2.2
152	CIho	7782	Slovakia	3.5	3.0	1.8	3.0
153	CIho	7783	Czechoslovakia	2.8	2.5	2.8	3.5
154	CIho	7790	United Kingdom	3.8	2.3	3.3	3.7
155	CIho	7791	Zimbabwe	3.0	3.0	2.3	2.3
156	CIho	8051	Canada	3.5	3.0	3.5	4.0
157	CIho	8054	United States	3.2	3.2	3.5	3.3
158	CIho	8091	Yemen	3.3	3.3	2.5	3.2
159	CIho	8162	Argentina	3.5	3.5	2.3	2.3
160	CIho	9143	Austria	3.0	3.0	3.4	3.4
161	CIho	9148	India	3.3	2.8	2.6	2.6
162	CIho	9181	United States	2.7	3.3	2.4	2.6
163	CIho	9183	United States	3.0	2.7	2.8	3.7
164	CIho	9537	Canada	2.7	2.8	2.8	3.0
165	CIho	9555	Canada	3.7	2.7	2.5	3.2
166	CIho	9559	Denmark	3.5	3.2	4.0	4.3
167	CIho	9562	Norway	4.2	3.2	4.3	4.3
168	CIho	9997	Sweden	2.2	3.2	3.2	3.8
169	CIho	9998	Sweden	3.7	2.7	3.5	3.6

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
170	CIho	10033	Norway	4.0	3.5	3.6	4.1
171	CIho	10034	Norway	3.3	3.0	3.5	3.5
172	CIho	10035	Norway	3.3	3.3	4.5	4.2
173	CIho	10036	Norway	3.3	3.3	3.3	3.5
174	CIho	10086	Netherlands	2.7	3.0	3.0	3.8
175	CIho	10253	Japan	2.7	3.2	3.1	3.3
176	CIho	10260	Japan	2.5	2.7	2.3	2.5
177	CIho	10420	Germany	3.2	3.0	3.2	3.7
178	CIho	10521	United States	3.2	3.0	3.2	3.2
179	CIho	10522	United States	3.3	3.5	2.8	2.9
180	CIho	10549	Syria	2.8	2.7	2.5	3.0
181	CIho	10550	Syria	3.0	3.0	2.8	3.5
182	CIho	10620	China	2.8	2.8	2.6	3.0
183	CIho	10645	United States	3.3	3.3	3.0	3.1
184	CIho	10661	United States	1.8	3.0	2.2	2.2
185	CIho	11477	Netherlands	3.2	3.0	3.3	3.3
186	CIho	11505	United States	2.8	2.7	1.5	1.7
187	CIho	11517	United States	3.3	3.2	2.6	3.1
188	CIho	11532	Argentina	2.5	3.5	2.8	3.2
189	CIho	11533	Argentina	2.8	3.2	1.2	1.5
190	CIho	11587	Israel	3.2	2.8	2.6	3.0
191	CIho	11588	Israel	2.2	2.7	3.3	3.5
192	CIho	11688	Afghanistan	3.0	2.5	2.8	3.3
193	CIho	11709	Ethiopia	3.8	3.5	3.4	3.6
194	CIho	11764	Netherlands	3.3	3.8	3.1	3.0
195	CIho	11787	Ancient Palestine	3.5	3.5	2.8	2.9
196	CIho	11788	Ethiopia	3.8	3.7	3.1	3.5
197	CIho	11789	Saudi Arabia	4.0	2.8	3.3	3.8
198	CIho	11792	Netherlands	2.8	3.0	2.3	3.2
199	CIho	11794	Netherlands	3.0	3.7	2.6	2.6
200	CIho	11796	Netherlands	3.3	3.2	3.1	3.5
201	CIho	11812	Ethiopia	4.3	4.2	3.9	4.0
202	CIho	11813	Ethiopia	4.3	4.0	3.5	4.0
203	CIho	11829	Germany	2.7	3.8	2.9	2.5
204	CIho	11830	Greece	4.2	2.7	3.0	3.2

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
205	CIho	11845	Israel	3.2	3.3	3.2	3.7
206	CIho	11849	Ethiopia	2.2	3.0	1.7	2.2
207	CIho	11852	United States	2.7	3.0	3.3	3.0
208	CIho	11855	Norway	3.7	3.2	3.0	2.8
209	CIho	11864	United States	3.5	3.5	2.9	3.1
210	CIho	12125	Canada	2.8	2.3	2.0	2.5
211	CIho	12232	United States	3.3	2.8	2.8	3.8
212	CIho	13132	Germany	2.3	3.3	1.8	3.0
213	CIho	13135	Germany	2.8	2.7	2.8	3.5
214	CIho	13136	Germany	3.2	2.0	3.0	3.2
215	CIho	13141	Ethiopia	3.3	3.2	3.3	3.3
216	CIho	13353	Ethiopia	3.5	3.7	3.5	3.6
217	CIho	13453	Romania	3.5	3.8	2.5	2.9
218	CIho	13454	Romania	3.2	2.5	1.8	2.3
219	CIho	13461	Romania	2.8	3.3	2.5	2.8
220	CIho	13507	Romania	3.5	3.0	2.9	3.0
221	CIho	13651	Israel	3.2	3.3	2.6	2.5
222	CIho	13653	Former Soviet Union	1.7	2.7	3.1	3.1
223	CIho	13737	Ethiopia	3.7	3.2	2.7	3.3
224	CIho	13740	Eritrea	4.0	3.5	4.0	3.5
225	CIho	13741	Eritrea	3.8	3.5	3.8	3.8
226	CIho	13742	Eritrea	3.7	3.5	3.7	3.7
227	CIho	13743	Eritrea	3.7	2.5	3.2	3.7
228	CIho	13745	Eritrea	4.3	3.7	3.8	4.0
229	CIho	13797	Canada	4.3	3.2	3.9	4.3
230	CIho	13824	United States	2.3	3.0	2.3	2.5
231	CIho	13839	India	3.0	3.2	2.5	3.0
232	CIho	14010	Czech Republic	3.3	2.5	3.2	3.3
233	CIho	14019	Sweden	3.5	3.5	3.6	3.8
234	CIho	14052	Algeria	3.2	3.5	2.5	2.8
235	CIho	14053	Algeria	3.7	3.3	3.0	3.3
236	CIho	14054	Algeria	2.8	3.2	2.6	3.1
237	CIho	14055	Algeria	2.8	3.2	2.8	2.9
238	CIho	14059	Algeria	3.2	2.7	2.8	2.8
239	CIho	14061	Algeria	2.3	3.0	1.5	1.5

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
240	CIho	14070	Spain	3.0	4.0	2.2	2.3
241	CIho	14085	Tunisia	3.8	3.2	3.3	2.4
242	CIho	14124	Ethiopia	4.2	4.3	3.7	4.2
243	CIho	14151	Mongolia	2.8	2.5	2.9	2.6
244	CIho	14158	Mongolia	2.5	2.5	3.0	2.6
245	CIho	14170	Mongolia	2.5	2.8	1.8	2.0
246	CIho	14214	Mongolia	1.2	1.3	1.9	1.6
247	CIho	14216	Mongolia	4.0	3.0	2.5	3.0
248	CIho	14219	Mongolia	1.5	1.8	1.2	1.8
249	CIho	14222	Mongolia	2.8	2.6	2.5	2.8
250	CIho	14224	Mongolia	3.3	2.1	2.3	2.7
251	CIho	14228	Mongolia	2.7	2.7	1.3	1.7
252	CIho	14234	Mongolia	2.7	2.8	2.0	2.0
253	CIho	14239	Mongolia	2.7	1.6	1.8	2.8
254	CIho	14240	Mongolia	2.2	1.4	1.8	2.2
255	CIho	14250	Afghanistan	3.2	1.5	2.0	3.5
256	CIho	14255	Afghanistan	3.2	2.9	2.5	3.5
257	CIho	14258	Afghanistan	3.2	3.0	2.8	3.3
258	CIho	14260	Afghanistan	2.0	2.2	2.0	2.3
259	CIho	14268	China	2.3	3.0	1.8	3.3
260	CIho	14280	Venezuela	3.5	3.0	2.7	3.3
261	CIho	14281	Venezuela	4.0	2.8	3.5	4.0
262	CIho	14282	Russian Federation	3.2	3.7	2.0	2.2
263	CIho	14286	Chile	2.3	3.0	1.7	2.0
264	CIho	14287	Chile	3.2	3.4	1.8	2.7
265	CIho	14290	China	2.8	3.3	2.2	1.7
266	CIho	14291	China	2.7	3.5	1.3	1.7
267	CIho	14301	Armenia	3.7	2.6	2.5	3.0
268	CIho	14302	Armenia	3.0	2.8	2.3	3.3
269	CIho	14315	China	3.0	2.4	1.8	2.2
270	CIho	14319	Denmark	3.8	2.6	3.0	3.3
271	CIho	14333	Azerbaijan	3.0	3.1	3.0	3.3
272	CIho	14334	Azerbaijan	3.7	3.3	3.5	4.0
273	CIho	14344	Azerbaijan	2.7	3.7	2.5	3.0
274	CIho	14345	Azerbaijan	3.8	3.1	3.5	4.2

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
275	CIho	14391	Armenia	3.5	3.3	3.8	3.8
276	CIho	14394	Armenia	2.7	2.9	4.2	3.8
277	CIho	14395	Armenia	3.3	3.1	3.3	3.5
278	CIho	14402	Myanmar	1.3	1.7	2.0	2.3
279	CIho	14752	United States	2.8	2.2	3.0	3.5
280	CIho	14807	United States	3.3	2.5	2.8	3.3
281	CIho	14880	Eritrea	3.2	3.3	3.2	3.5
282	CIho	14881	Eritrea	3.8	2.4	3.0	3.3
283	CIho	14882	Eritrea	4.3	2.3	3.5	3.2
284	CIho	14883	Eritrea	3.8	3.8	2.8	3.2
285	CIho	14978	Ethiopia	3.5	2.9	3.3	3.5
286	CIho	15203	United States	4.2	3.0	3.3	3.3
287	CIho	15270	Canada	1.7	2.0	2.0	1.8
288	CIho	15279	Tunisia	3.7	3.1	3.0	3.5
289	CIho	15282	Tunisia	3.7	4.2	3.5	4.0
290	CIho	15286	Tunisia	3.0	2.5	2.0	2.2
291	CIho	15288	Tunisia	3.2	2.3	1.8	2.0
292	CIho	15290	Tunisia	3.0	4.0	3.5	4.0
293	CIho	15291	Tunisia	3.8	3.3	3.3	3.5
294	CIho	15299	Tunisia	4.5	3.3	3.2	3.2
295	CIho	15304	Tunisia	3.5	3.0	3.2	3.2
296	CIho	15309	Tunisia	2.5	3.3	3.2	3.3
297	CIho	15310	Tunisia	3.8	3.1	3.0	3.8
298	CIho	15311	Tunisia	3.2	3.3	3.3	3.5
299	CIho	15313	Tunisia	2.2	3.0	2.5	2.8
300	CIho	15326	Tunisia	3.5	3.3	3.7	3.5
301	CIho	15336	Tunisia	3.3	2.9	2.8	3.2
302	CIho	15339	Tunisia	4.1	2.3	2.8	3.2
303	CIho	15340	Tunisia	3.0	2.6	2.8	3.7
304	CIho	15349	Tunisia	2.2	3.2	2.5	2.8
305	CIho	15350	Tunisia	4.5	3.0	3.3	3.8
306	CIho	15353	Tunisia	3.2	2.8	3.2	3.7
307	CIho	15355	Tunisia	4.3	2.6	2.3	3.3
308	CIho	15362	Tunisia	1.8	3.0	2.0	2.0
309	CIho	15363	Tunisia	2.7	2.3	1.5	1.8

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
310	CIho	15364	Tunisia	2.0	3.3	1.3	1.3
311	CIho	15365	Tunisia	3.7	2.6	2.3	2.8
312	CIho	15369	Tunisia	3.2	2.5	3.3	2.7
313	CIho	15498	United States	3.7	2.9	3.0	3.2
314	CIho	15575	Canada	3.8	2.5	3.0	3.3
315	CIho	15582	Canada	3.7	3.0	2.7	2.7
316	CIho	15589	Canada	2.2	3.0	2.3	2.7
317	CIho	15590	Canada	2.7	3.3	2.8	3.0
318	CIho	15591	Canada	4.0	3.4	3.2	3.5
319	CIho	15593	Canada	4.3	2.9	3.2	3.5
320	CIho	15594	Canada	4.3	3.6	3.5	3.7
321	CIho	15600	Canada	3.0	3.2	2.8	3.2
322	CIho	15601	Canada	4.0	3.4	2.8	3.7
323	CIho	15616	Canada	3.0	2.9	2.7	3.3
324	CIho	15625	Unknown	4.3	3.9	3.5	4.3
325	CIho	15803	United States	3.0	3.8	2.3	2.7
326	CIho	16008	United States	2.5	1.5	1.3	1.5
327	CIho	16152	United States	3.5	3.1	2.8	2.8
328	CIho	16498	United States	3.2	2.6	2.2	2.2
329	CIho	16516	United States	3.3	2.5	2.2	2.5
330	CIho	16555	United States	2.3	2.5	2.3	2.7
331	CIho	16612	United States	3.5	2.9	4.0	3.8
332	CIho	16658	United States	2.3	3.3	2.8	3.3
333	CIho	16671	United States	4.2	3.3	3.5	3.3
334	CIho	16676	United States	4.2	3.5	3.5	3.3
335	PI	5846	Germany	2.8	2.5	4.0	4.2
336	PI	5873	Germany	4.2	3.5	4.0	3.7
337	PI	5975	Czech Republic	3.5	3.0	3.2	3.0
338	PI	19894	Japan	2.2	2.5	2.0	1.7
339	PI	20909	Finland	2.8	2.5	1.3	1.7
340	PI	26179	Libya	2.5	2.8	1.2	1.8
341	PI	28624	Iran	1.3	1.5	1.8	1.8
342	PI	29004	Turkmenistan	2.7	3.4	1.5	1.5
343	PI	30842	India	3.2	3.3	2.7	1.8
344	PI	34314	Bolivia	2.7	3.2	2.3	2.5

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
345	PI	34424	Venezuela	3.3	3.0	1.7	1.5
346	PI	35051	Uzbekistan	3.7	3.1	3.8	3.5
347	PI	35052	Uzbekistan	2.8	3.7	2.0	2.7
348	PI	35053	Kyrgyzstan	3.5	2.9	3.3	3.3
349	PI	37156	Russian Federation	3.7	2.9	2.5	2.3
350	PI	37707	Denmark	3.8	4.2	3.2	3.5
351	PI	38305	Russian Federation	4.3	3.8	2.2	2.2
352	PI	38310	Russian Federation	3.5	3.1	2.2	2.2
353	PI	38317	Russian Federation	3.8	2.6	2.7	3.0
354	PI	38320	Russian Federation	3.3	2.6	3.7	3.5
355	PI	38490	Bolivia	3.8	3.4	3.3	3.2
356	PI	38885	Turkmenistan	4.0	3.4	3.5	3.3
357	PI	38887	Turkmenistan	2.5	3.1	1.5	2.0
358	PI	39192	Libya	3.3	2.9	3.0	3.3
359	PI	39367	India	3.0	3.0	2.2	3.2
360	PI	39368	India	2.7	3.1	3.0	3.3
361	PI	39395	Australia	3.5	3.1	3.3	2.8
362	PI	39590	Algeria	3.5	3.4	1.8	1.8
363	PI	39592	Venezuela	3.5	2.9	1.8	1.7
364	PI	40387	Denmark	4.2	3.5	2.7	3.2
365	PI	41250	Russian Federation	3.5	2.5	3.8	3.7
366	PI	42889	Sudan	3.0	2.8	3.0	3.0
367	PI	42890	Sudan	3.3	3.4	3.0	2.0
368	PI	42891	Sudan	3.3	2.6	2.5	2.5
369	PI	45492	Uruguay	3.0	3.1	2.0	2.7
370	PI	48133	Australia	3.7	3.5	2.5	2.0
371	PI	48135	Australia	3.7	2.4	2.8	3.0
372	PI	48142	Australia	3.2	3.3	2.7	2.2
373	PI	48143	Russian Federation	3.2	2.9	2.5	2.5
374	PI	48641	Iran	2.8	3.8	3.5	4.5
375	PI	49154	Zimbabwe	3.3	3.3	3.0	2.7
376	PI	53239	Libya	3.8	3.5	2.3	2.2
377	PI	54912	Norway	3.3	4.0	2.3	2.7
378	PI	54915	Norway	3.0	2.9	2.2	2.3
379	PI	54916	Norway	3.5	3.5	3.7	4.2

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
380	PI	55526	Tunisia	3.8	3.7	3.2	3.7
381	PI	55551	Chile	3.3	3.3	1.3	2.0
382	PI	57015	Iraq	3.3	3.5	4.2	3.3
383	PI	57033	Egypt	3.0	3.3	2.2	2.0
384	PI	57046	Algeria	4.2	4.1	3.5	3.5
385	PI	57057	Algeria	2.8	2.9	1.5	1.8
386	PI	57065	Algeria	4.3	3.3	3.0	2.5
387	PI	57089	China	2.3	3.3	2.3	1.5
388	PI	57095	Georgia	3.3	3.8	3.3	3.2
389	PI	57099	Georgia	3.2	2.3	3.2	3.0
390	PI	57296	China	3.0	2.8	2.3	2.3
391	PI	57752	Egypt	2.7	2.5	2.5	2.8
392	PI	57958	Pakistan	2.2	3.3	2.8	3.8
393	PI	60205	China	1.5	2.0	2.0	1.5
394	PI	60663	Libya	2.5	3.0	2.0	2.7
395	PI	60679	Egypt	2.7	2.6	2.3	2.5
396	PI	60694	Ethiopia	4.2	4.0	4.0	4.5
397	PI	60701	Egypt	3.5	4.0	3.2	3.2
398	PI	61342	Japan	3.2	3.0	2.3	2.8
399	PI	61509	Armenia	2.8	3.5	2.8	3.8
400	PI	61510	Armenia	3.0	3.4	2.5	2.0
401	PI	61533	Mongolia	3.2	2.5	1.7	2.3
402	PI	61537	Mongolia	3.3	2.4	2.2	2.5
403	PI	61554	Mongolia	3.5	2.8	2.5	2.8
404	PI	61576	Mongolia	2.8	3.1	2.3	2.3
405	PI	61577	Mongolia	2.2	1.6	1.5	1.7
406	PI	61578	Mongolia	2.2	1.5	1.3	2.0
407	PI	61584	Mongolia	1.0	1.5	1.5	2.0
408	PI	61589	Mongolia	1.7	2.5	1.7	2.2
409	PI	62358	Venezuela	2.7	1.8	1.2	1.7
410	PI	64004	Algeria	3.8	2.9	2.3	1.8
411	PI	64022	Uzbekistan	2.3	2.5	1.5	1.3
412	PI	67381	Turkistan	1.5	1.0	1.3	1.5
413	PI	67384	Former Soviet Union	4.2	3.8	3.7	3.3
414	PI	67385	Turkistan	3.0	1.9	1.5	1.8

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
415	PI	69421	China	3.0	2.7	2.2	2.3
416	PI	69563	China	3.3	3.0	2.2	2.7
417	PI	70839	China	3.7	2.3	2.2	2.3
418	PI	70853	China	3.2	2.8	1.3	2.2
419	PI	71075	Uzbekistan	3.8	3.1	4.2	3.5
420	PI	71076	Uzbekistan	3.7	3.1	3.8	3.3
421	PI	73291	Armenia	2.2	2.8	3.0	3.3
422	PI	73292	Armenia	2.8	2.0	3.2	2.3
423	PI	73298	Armenia	2.7	2.3	4.2	3.7
424	PI	73299	Armenia	2.8	3.3	3.0	3.5
425	PI	73301	Armenia	2.7	2.7	3.7	3.8
426	PI	73700	China	3.0	2.7	2.3	2.2
427	PI	76280	Iraq	3.2	2.7	2.8	2.7
428	PI	76284	Iraq	2.2	2.8	2.3	2.3
429	PI	76285	Iraq	2.3	2.7	2.4	2.8
430	PI	76286	Iraq	3.5	2.8	2.7	3.2
431	PI	76290	Iraq	3.2	2.3	1.8	2.0
432	PI	76291	Iraq	2.8	2.5	1.8	2.2
433	PI	76294	Iraq	2.5	2.8	2.8	3.2
434	PI	76296	Iraq	2.5	3.2	2.5	2.5
435	PI	78246	Ukraine	2.8	3.5	2.3	3.3
436	PI	83793	Korea, North	2.3	1.8	1.0	1.2
437	PI	84311	Uzbekistan	1.7	1.3	1.5	1.5
438	PI	84312	Uzbekistan	2.0	1.5	1.3	1.2
439	PI	84313	Uzbekistan	2.3	2.2	2.0	1.7
440	PI	84314	Uzbekistan	1.2	1.7	1.0	1.5
441	PI	86185	Russian Federation	3.2	2.7	2.7	3.0
442	PI	86188	Russian Federation	3.0	2.7	3.0	3.2
443	PI	86189	Russian Federation	3.2	3.0	3.0	3.3
444	PI	87180	Korea, South	2.5	2.3	2.4	3.0
445	PI	87403	Lithuania	3.2	3.0	2.4	2.8
446	PI	87404	Lithuania	2.5	3.2	3.1	3.5
447	PI	87779	Korea, North	3.5	2.5	3.0	2.8
448	PI	87780	Korea, North	2.5	2.8	2.1	2.3
449	PI	87781	Korea, North	3.0	3.5	2.6	2.5

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
450	PI	87782	Korea, North	2.8	2.3	2.6	3.2
451	PI	87800	Korea, South	3.0	2.3	2.6	2.5
452	PI	87802	Korea, South	3.2	3.0	2.5	2.8
453	PI	87836	Korea, North	3.3	2.3	2.3	2.3
454	PI	87838	Korea, North	2.7	2.7	1.4	1.5
455	PI	87840	Korea, North	3.3	3.8	1.6	2.7
456	PI	87844	Korea, North	3.8	3.8	2.1	2.3
457	PI	94790	Georgia	3.0	2.7	2.8	2.7
458	PI	94797	Armenia	2.5	1.3	3.2	2.8
459	PI	94800	Former Soviet Union	3.7	2.8	3.0	3.0
460	PI	94806	Former Soviet Union	2.8	2.2	3.7	4.0
461	PI	94833	Ukraine	3.2	3.2	3.3	3.5
462	PI	94834	Ukraine	3.5	2.8	3.8	4.2
463	PI	94862	Georgia	3.0	3.5	2.4	2.8
464	PI	94875	Russian Federation	3.0	3.3	1.6	2.3
465	PI	94886	Turkey	4.0	3.5	3.7	3.3
466	PI	94919	Ukraine	4.0	3.0	3.3	3.8
467	PI	95140	Unknown	2.5	1.7	2.0	2.5
468	PI	95157	Unknown	3.3	3.0	4.3	3.8
469	PI	95165	Unknown	3.7	3.3	3.7	4.5
470	PI	95167	Unknown	3.3	3.3	3.8	3.7
471	PI	95175	Unknown	3.3	3.5	4.2	3.5
472	PI	95181	Unknown	3.2	3.0	3.5	3.5
473	PI	95189	Unknown	4.2	3.5	3.7	3.5
474	PI	95192	Unknown	4.2	3.7	3.7	3.5
475	PI	95198	Unknown	3.3	2.8	3.8	3.3
476	PI	95212	Unknown	3.2	3.2	3.7	3.5
477	PI	95229	Unknown	3.7	3.2	3.2	3.0
478	PI	95253	Unknown	3.8	3.8	3.2	3.2
479	PI	95265	Unknown	3.2	2.7	2.7	2.0
480	PI	95270	Unknown	3.0	2.7	3.0	2.7
481	PI	95278	Unknown	3.3	2.7	2.8	2.8
482	PI	101564	China	3.0	3.0	2.4	3.2
483	PI	102157	Finland	3.8	2.8	2.3	3.2
484	PI	110934	Venezuela	2.8	2.0	1.1	1.2

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
485	PI	117347	Turkey	3.0	2.2	2.5	3.2
486	PI	118487	Brazil	3.0	3.7	2.4	2.7
487	PI	122036	Paraguay	2.8	2.5	1.6	1.5
488	PI	125321	Afghanistan	3.5	3.2	2.5	2.8
489	PI	129428	Germany	3.7	3.2	2.7	3.3
490	PI	129438	Czechoslovakia	3.0	2.8	3.5	3.8
491	PI	129453	Czech Republic	3.0	2.8	2.3	3.0
492	PI	129457	Poland	3.5	2.5	3.2	3.2
493	PI	129460	Austria	4.0	3.7	2.8	2.8
494	PI	129466	Former Soviet Union	2.3	1.7	2.0	1.7
495	PI	129477	Poland	3.2	2.7	2.8	2.7
496	PI	129482	Poland	3.8	3.7	2.9	2.8
497	PI	129484	Finland	4.2	3.7	2.4	2.8
498	PI	129489	Poland	2.8	2.7	2.8	2.7
499	PI	129491	Tunisia	3.7	3.2	3.0	3.3
500	PI	129492	Belgium	3.2	2.7	2.3	2.3
501	PI	129496	Czech Republic	4.3	2.8	2.8	2.8
502	PI	129499	Poland	3.5	3.2	2.3	3.2
503	PI	134636	Afghanistan	3.7	2.5	1.8	2.2
504	PI	135758	Afghanistan	2.5	2.5	2.5	1.3
505	PI	135761	Afghanistan	3.8	2.5	3.0	3.3
506	PI	138698	Iran	3.0	2.5	2.3	3.3
507	PI	138699	Iran	3.2	2.8	2.3	2.5
508	PI	138706	Iran	4.0	3.2	3.7	3.3
509	PI	138709	Iran	3.0	3.2	2.7	2.5
510	PI	138710	Iran	3.0	3.0	3.0	2.7
511	PI	138711	Iran	3.9	1.8	1.8	1.0
512	PI	138726	Iran	4.0	2.2	3.7	2.7
513	PI	140278	Afghanistan	3.7	3.0	3.0	2.8
514	PI	141423	Iran	3.5	3.7	3.3	3.8
515	PI	141441	Iran	3.0	2.7	2.8	3.3
516	PI	145693	Saudi Arabia	3.7	3.0	1.4	1.8
517	PI	146663	Australia	3.8	3.2	3.5	4.0
518	PI	150605	Tunisia	3.2	3.0	2.0	2.7
519	PI	151787	Ethiopia	4.3	3.0	3.5	4.0

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
520	PI	151795	Ethiopia	3.2	3.2	2.1	1.7
521	PI	152256	Belgium	3.5	3.0	2.8	2.8
522	PI	155303	Yemen	3.5	3.5	2.5	2.6
523	PI	156654	Russian Federation	3.2	3.5	2.1	3.0
524	PI	156658	Russian Federation	2.4	2.8	2.7	2.8
525	PI	157651	Korea, South	2.8	2.3	2.6	2.7
526	PI	157884	Italy	3.3	3.2	1.3	2.4
527	PI	157889	Italy	3.5	3.5	2.8	2.4
528	PI	157890	Italy	2.8	3.2	2.3	2.5
529	PI	157892	Italy	4.0	3.5	3.3	3.8
530	PI	159126	Mexico	3.0	2.5	1.3	2.0
531	PI	159127	Mexico	3.0	3.0	2.0	2.8
532	PI	159128	Mexico	3.0	3.0	2.5	2.3
533	PI	160380	Czechoslovakia	3.8	3.3	2.7	3.1
534	PI	160381	Czechoslovakia	3.5	3.0	3.2	3.3
535	PI	161975	Austria	3.1	2.5	3.0	3.0
536	PI	163088	India	3.3	2.5	2.2	3.0
537	PI	163409	Argentina	4.0	3.7	4.0	4.0
538	PI	164385	India	3.5	3.3	2.7	3.1
539	PI	164744	India	3.4	3.3	2.7	3.1
540	PI	165883	India	3.1	3.2	3.3	3.3
541	PI	166058	India	2.5	3.0	3.0	2.7
542	PI	166060	India	2.5	3.0	1.6	1.7
543	PI	167256	Turkey	4.2	3.3	3.3	3.5
544	PI	167271	Turkey	3.0	3.2	3.0	2.5
545	PI	168328	Turkey	3.2	3.8	2.3	2.3
546	PI	168367	Turkey	2.9	3.3	3.2	3.4
547	PI	168904	Argentina	3.2	4.0	2.4	2.3
548	PI	168905	Brazil	3.6	3.7	2.2	2.3
549	PI	170942	Turkey	2.8	2.8	1.5	2.0
550	PI	170970	Turkey	3.5	2.8	3.2	3.4
551	PI	171933	Argentina	3.0	2.5	2.1	2.7
552	PI	172506	Turkey	3.1	3.2	3.3	3.8
553	PI	173518	Turkey	2.9	3.0	3.5	3.5
554	PI	173577	Turkey	3.1	3.0	3.0	3.6

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
555	PI	174472	France	3.5	2.8	2.8	3.3
556	PI	174478	France	4.0	2.8	3.0	3.4
557	PI	174496	Morocco	2.7	3.2	1.9	1.8
558	PI	174497	Morocco	3.5	3.2	2.5	2.3
559	PI	175502	Finland	3.4	2.8	3.5	3.6
560	PI	175506	Finland	3.3	2.5	2.8	3.3
561	PI	176004	India	3.6	3.8	3.5	4.0
562	PI	176010	India	2.6	3.2	2.2	3.6
563	PI	176021	India	2.8	2.8	2.5	3.0
564	PI	176035	India	3.8	3.5	3.8	3.4
565	PI	176042	India	3.2	3.0	1.8	3.0
566	PI	176112	India	2.9	3.7	2.5	3.0
567	PI	176129	India	3.0	3.0	2.2	2.1
568	PI	176144	India	3.5	3.8	2.4	2.8
569	PI	176162	India	3.0	3.0	2.5	2.3
570	PI	178283	Turkey	3.0	3.0	2.5	3.2
571	PI	178285	Turkey	3.5	3.3	3.0	3.5
572	PI	178332	Turkey	3.0	3.0	2.5	3.0
573	PI	178594	Turkey	3.0	3.0	3.8	4.2
574	PI	178609	Turkey	3.1	3.0	3.0	3.5
575	PI	178635	Iraq	1.8	2.2	2.3	2.1
576	PI	178636	Iraq	3.0	2.8	3.3	3.7
577	PI	178637	Iraq	3.0	2.7	1.7	1.5
578	PI	178639	Iraq	3.0	2.7	2.0	2.0
579	PI	180670	Germany	4.0	3.2	3.7	3.4
580	PI	181088	Pakistan	1.8	2.8	2.3	2.7
581	PI	181102	India	3.0	2.8	1.7	2.0
582	PI	181108	India	2.7	3.5	2.2	2.2
583	PI	181113	India	4.0	3.7	3.3	3.4
584	PI	181148	Netherlands	4.0	3.0	3.2	4.0
585	PI	181151	Denmark	3.4	2.7	3.5	3.6
586	PI	182373	Turkey	3.3	2.7	3.5	3.6
587	PI	182396	Turkey	2.4	2.3	3.0	2.9
588	PI	182625	Japan	1.7	2.0	1.3	1.2
589	PI	182645	Japan	3.9	3.3	3.2	3.4

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
590	PI	182659	Syria	3.3	2.5	3.3	3.3
591	PI	182660	Lebanon	3.0	2.8	2.7	2.1
592	PI	182661	Lebanon	3.7	3.7	3.5	3.3
593	PI	182662	Lebanon	2.8	3.3	2.8	2.4
594	PI	182663	Lebanon	3.0	3.2	2.7	2.3
595	PI	182679	Syria	4.1	4.0	3.7	3.9
596	PI	182681	Syria	1.5	2.7	2.8	2.8
597	PI	182684	Syria	2.8	3.8	2.7	2.2
598	PI	182687	Syria	1.8	1.5	2.3	1.9
599	PI	182691	Syria	2.1	2.2	2.5	1.8
600	PI	182693	Syria	3.4	3.0	3.3	3.4
601	PI	182694	Syria	3.2	2.3	3.5	3.2
602	PI	182726	Turkey	3.4	2.3	3.3	2.5
603	PI	182843	Czech Republic	3.6	2.8	3.2	2.5
604	PI	183590	Austria	3.9	2.8	3.3	3.3
605	PI	183596	Austria	3.0	3.3	3.0	3.2
606	PI	183598	Austria	3.1	2.8	2.7	2.9
607	PI	184055	Serbia	3.5	3.3	3.3	3.3
608	PI	184102	Montenegro	3.2	3.5	2.8	3.2
609	PI	184103	Montenegro	3.9	3.0	4.3	3.5
610	PI	184112	Montenegro	2.7	3.5	3.0	2.5
611	PI	184873	Sweden	2.5	2.8	4.2	3.5
612	PI	184876	Sweden	2.3	3.0	3.8	3.2
613	PI	184877	Sweden	2.2	3.0	3.2	3.5
614	PI	184880	Sweden	2.8	3.0	3.5	3.8
615	PI	184883	Sweden	3.6	3.3	4.0	3.8
616	PI	184884	Denmark	2.2	2.8	3.5	3.2
617	PI	185328	Portugal	2.8	3.0	3.0	3.3
618	PI	186125	Korea, South	2.3	1.3	1.7	1.0
619	PI	186155	Korea, South	2.3	2.0	2.0	1.7
620	PI	186424	Ethiopia	3.5	3.0	3.2	3.2
621	PI	188831	Sweden	2.9	2.8	3.0	3.5
622	PI	189764	Sweden	2.8	3.0	3.5	3.8
623	PI	189768	Tunisia	3.5	3.7	2.8	2.7
624	PI	189770	Tunisia	2.0	3.0	1.8	1.3

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
625	PI	190200	Europe	2.7	3.2	2.5	2.5
626	PI	190201	Europe	3.2	2.8	2.7	3.0
627	PI	190203	Germany	4.0	3.5	3.7	3.0
628	PI	190207	Europe	3.5	2.5	3.3	3.4
629	PI	190485	Sweden	2.3	3.0	3.2	3.0
630	PI	190711	Japan	3.2	3.3	2.8	3.0
631	PI	190762	Japan	2.3	1.3	3.2	2.8
632	PI	190780	Taiwan	2.3	1.7	2.2	1.8
633	PI	190781	Taiwan	3.5	3.5	3.0	2.2
634	PI	190786	Korea, North	3.2	3.0	1.8	1.3
635	PI	190787	Korea, North	2.2	2.0	2.7	2.7
636	PI	190788	Korea, North	3.8	2.5	2.3	2.6
637	PI	190790	Korea, North	3.6	2.8	2.2	1.8
638	PI	190824	Korea, South	2.1	1.5	2.8	2.8
639	PI	190852	Korea, South	2.5	2.3	2.2	2.0
640	PI	193061	Belgium	2.3	2.8	3.5	2.8
641	PI	193063	Belgium	3.3	3.2	3.5	4.0
642	PI	193729	Ireland	2.8	3.0	3.2	3.5
643	PI	193730	Ireland	2.8	3.2	3.7	3.8
644	PI	193731	Ireland	3.0	3.3	3.7	3.5
645	PI	193799	Ethiopia	3.4	3.2	2.7	2.8
646	PI	194550	Pakistan	3.2	3.8	3.5	2.3
647	PI	194556	Germany	2.7	2.8	3.0	3.3
648	PI	194951	Ethiopia	4.2	3.8	3.7	4.2
649	PI	194952	Ethiopia	4.2	3.8	3.7	4.0
650	PI	195317	Guatemala	2.6	1.8	1.8	2.8
651	PI	195318	Guatemala	2.6	1.7	2.2	3.0
652	PI	195319	Guatemala	2.8	2.0	2.0	2.3
653	PI	195320	Guatemala	3.0	3.0	2.3	2.9
654	PI	195898	Morocco	2.8	3.0	1.7	1.3
655	PI	197103	Japan	3.6	3.2	2.8	3.0
656	PI	197617	Germany	3.8	3.2	3.5	3.8
657	PI	197622	Germany	4.0	3.0	3.5	3.5
658	PI	198734	Afghanistan	3.3	3.7	3.5	4.0
659	PI	201097	Austria	3.0	3.8	3.0	3.5

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
660	PI	202873	Austria	3.5	3.5	3.3	4.0
661	PI	202940	Sweden	2.2	2.3	1.7	2.2
662	PI	205638	Ecuador	2.5	1.8	2.2	2.2
663	PI	205639	Ecuador	2.7	2.8	2.8	2.7
664	PI	205640	Ecuador	2.0	2.0	2.2	2.8
665	PI	210308	Colombia	3.7	3.3	3.7	3.5
666	PI	220659	Afghanistan	3.0	3.0	2.8	2.7
667	PI	221307	Finland	3.0	3.5	3.3	3.7
668	PI	221310	Ukraine	3.6	2.8	2.8	3.0
669	PI	221315	Serbia	1.7	2.2	2.5	2.5
670	PI	221326	Serbia	2.8	2.5	1.8	1.5
671	PI	222508	Croatia	3.2	3.3	1.3	1.8
672	PI	223130	Jordan	3.5	2.7	2.7	3.0
673	PI	223131	Jordan	3.0	3.0	1.8	1.5
674	PI	223132	Jordan	2.7	2.8	2.3	2.2
675	PI	223134	Jordan	3.0	2.7	1.8	1.8
676	PI	223135	Jordan	3.2	2.8	2.0	1.5
677	PI	223136	Jordan	3.3	3.2	1.5	1.8
678	PI	223138	Jordan	3.3	3.2	2.0	1.7
679	PI	223139	Jordan	3.1	3.3	3.0	2.5
680	PI	223142	Jordan	3.0	3.0	2.3	2.8
681	PI	223143	Jordan	3.7	2.8	2.0	2.2
682	PI	223144	Jordan	3.6	2.8	3.0	2.6
683	PI	223145	Jordan	2.8	2.8	2.0	2.0
684	PI	223146	Jordan	2.6	2.7	2.7	2.8
685	PI	223149	Jordan	3.3	3.5	2.8	3.0
686	PI	223446	Afghanistan	2.5	3.0	2.0	2.0
687	PI	223509	Afghanistan	3.8	3.7	3.0	3.8
688	PI	223879	Afghanistan	3.2	3.5	2.7	2.7
689	PI	223883	Afghanistan	2.3	3.0	2.5	1.8
690	PI	224749	Indonesia	3.1	2.7	3.0	2.3
691	PI	224750	Indonesia	2.6	2.8	2.3	2.5
692	PI	225019	Japan	2.4	1.5	1.8	2.1
693	PI	225025	Japan	2.8	2.2	3.2	3.0
694	PI	225037	Germany	4.2	3.7	4.3	4.5

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
695	PI	226611	Cyprus	3.0	3.0	2.5	2.0
696	PI	226612	Cyprus	3.2	1.5	2.0	2.2
697	PI	226613	Cyprus	2.8	2.2	2.5	2.3
698	PI	226614	Cyprus	3.3	3.5	2.7	3.0
699	PI	226639	Iran	3.5	3.7	3.2	2.8
700	PI	227449	Iran	2.8	2.3	2.8	2.8
701	PI	231151	Colombia	3.0	2.5	2.0	2.3
702	PI	231161	Colombia	3.0	2.7	2.3	3.0
703	PI	232914	Hungary	3.7	2.8	3.2	3.8
704	PI	232922	Hungary	3.4	3.3	3.0	2.5
705	PI	233834	Jordan	2.5	2.5	2.2	2.0
706	PI	233835	Jordan	3.0	2.7	1.5	1.5
707	PI	233838	Jordan	3.3	3.2	2.3	2.3
708	PI	234846	Kenya	3.7	3.2	3.0	3.5
709	PI	235172	Turkey	3.2	2.8	3.2	3.3
710	PI	235178	Cyprus	4.2	3.8	3.7	3.8
711	PI	235179	Cyprus	2.9	3.3	2.7	2.4
712	PI	235180	Cyprus	3.3	3.5	3.2	3.3
713	PI	235181	Cyprus	2.5	2.7	2.5	2.6
714	PI	235182	Cyprus	2.9	3.0	2.7	2.6
715	PI	235185	Australia	3.5	4.0	2.7	2.8
716	PI	235186	Libya	2.5	2.2	2.3	2.5
717	PI	235191	Sweden	3.8	3.3	3.7	4.2
718	PI	237571	Colombia	2.8	2.8	2.5	2.8
719	PI	237580	Colombia	2.7	2.8	2.5	1.8
720	PI	237581	Colombia	3.3	3.3	3.5	3.3
721	PI	238387	Jordan	3.2	3.0	1.7	2.0
722	PI	243181	Netherlands	3.2	3.2	3.3	3.3
723	PI	243184	France	3.3	2.3	2.0	1.5
724	PI	243189	France	3.3	3.0	2.2	2.6
725	PI	243579	Iran	2.8	1.8	3.0	2.7
726	PI	243588	Iran	2.9	2.7	3.5	3.5
727	PI	243607	Iran	2.0	1.0	2.0	2.2
728	PI	244041	Yemen	3.8	3.2	3.0	3.0
729	PI	244785	Afghanistan	3.2	3.3	3.2	3.5

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
730	PI	244791	Afghanistan	3.7	3.0	2.7	3.0
731	PI	244823	Pakistan	3.0	3.3	1.8	1.0
732	PI	244826	Pakistan	3.9	2.7	3.0	3.5
733	PI	246788	Colombia	3.5	4.0	3.0	3.3
734	PI	246795	Colombia	4.1	3.5	3.5	4.0
735	PI	247924	France	3.0	3.7	3.7	3.7
736	PI	247928	Cyprus	3.3	3.0	2.3	2.9
737	PI	250365	Pakistan	3.4	3.7	3.2	3.4
738	PI	250775	Afghanistan	3.1	3.3	2.7	2.8
739	PI	250778	Afghanistan	2.8	2.7	1.2	1.7
740	PI	250861	Iran	3.9	2.7	3.8	4.1
741	PI	253312	Bosnia and Herzegovina	3.8	2.7	3.5	3.5
742	PI	253313	Bosnia and Herzegovina	3.4	2.7	4.2	4.3
743	PI	253574	Israel	3.0	2.8	2.5	2.6
744	PI	253938	Iraq	3.5	3.3	3.0	2.9
745	PI	253940	Afghanistan	1.7	2.2	1.2	1.2
746	PI	254790	Denmark	2.7	2.7	3.3	3.8
747	PI	259875	Croatia	3.6	3.3	2.8	3.0
748	PI	259876	Croatia	3.0	3.0	2.7	2.7
749	PI	262220	Sweden	3.7	3.5	3.0	3.0
750	PI	262397	Ireland	4.0	3.5	3.3	3.2
751	PI	262398	Ireland	3.7	3.2	3.8	3.7
752	PI	263576	Sweden	2.7	3.2	2.8	3.3
753	PI	264203	Morocco	2.4	3.2	1.8	2.4
754	PI	264204	Morocco	2.5	3.0	1.5	2.0
755	PI	264205	Morocco	2.7	1.2	1.3	1.8
756	PI	264208	Libya	2.2	2.2	2.2	2.3
757	PI	264209	Libya	3.3	2.5	2.2	2.3
758	PI	264210	Libya	2.8	3.0	2.2	2.8
759	PI	264213	Algeria	3.4	3.0	2.7	3.0
760	PI	264251	Turkey	2.0	1.8	2.2	2.5
761	PI	264864	Italy	3.3	3.3	3.5	3.2
762	PI	264865	Italy	1.6	1.7	2.3	2.0
763	PI	264870	Turkey	2.8	2.0	2.3	1.8
764	PI	264888	Italy	3.3	3.2	2.0	2.3

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
765	PI	264890	Italy	3.8	3.8	3.2	2.3
766	PI	264891	Italy	2.6	2.5	3.0	2.6
767	PI	264892	Italy	2.8	2.8	3.3	3.0
768	PI	264894	Italy	2.9	3.0	2.5	2.6
769	PI	264897	Greece	3.4	3.5	3.2	2.9
770	PI	264903	Greece	3.6	3.5	3.5	3.5
771	PI	264904	Greece	3.0	2.5	2.8	2.9
772	PI	264906	Greece	3.5	2.8	3.0	2.6
773	PI	264907	Greece	3.5	3.7	3.3	3.6
774	PI	264909	Greece	3.5	3.8	2.8	3.5
775	PI	264911	Greece	3.0	3.3	3.0	3.2
776	PI	264912	Greece	3.0	3.0	2.0	2.7
777	PI	264918	Croatia	3.1	3.3	3.0	2.9
778	PI	264921	Croatia	2.5	3.5	2.0	2.5
779	PI	264922	Croatia	3.9	3.3	2.7	3.0
780	PI	264923	Croatia	4.0	3.0	3.5	3.5
781	PI	264926	Italy	3.8	3.0	4.0	3.2
782	PI	265462	Finland	3.4	2.8	3.0	3.3
783	PI	265465	Finland	3.3	3.5	3.3	3.5
784	PI	265965	Sweden	2.9	2.8	3.5	3.7
785	PI	266132	Sweden	3.8	3.3	2.7	3.0
786	PI	266133	Sweden	3.4	3.2	3.8	4.0
787	PI	266835	United Kingdom	3.6	2.7	2.7	2.8
788	PI	266859	Australia	3.9	3.3	3.0	4.0
789	PI	266889	Portugal	3.1	3.3	4.3	2.8
790	PI	266891	Portugal	3.6	3.8	3.7	3.5
791	PI	266892	Portugal	2.8	3.7	3.0	2.8
792	PI	268158	Czech Republic	3.6	2.5	3.8	3.8
793	PI	268166	Czech Republic	3.0	2.5	3.7	3.3
794	PI	268167	Ukraine	3.5	3.3	4.2	3.7
795	PI	268169	Czechoslovakia	2.8	2.7	2.8	3.0
796	PI	268172	Czechoslovakia	3.3	3.0	4.2	2.7
797	PI	268173	Czech Republic	4.0	2.7	3.7	3.2
798	PI	268174	Czechoslovakia	3.7	2.0	3.5	3.2
799	PI	268175	Czech Republic	2.3	2.7	3.3	3.3

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
800	PI	268176	Czechoslovakia	3.7	3.0	2.7	3.2
801	PI	268180	Czech Republic	3.5	2.5	3.2	3.3
802	PI	268182	Portugal	4.3	3.3	3.5	3.5
803	PI	268186	Croatia	3.0	3.0	1.8	1.8
804	PI	268187	Croatia	4.4	3.7	3.3	3.5
805	PI	268188	Croatia	3.7	3.3	2.7	3.3
806	PI	268192	Former Yugoslavia	3.8	3.5	3.3	3.5
807	PI	268195	Former Yugoslavia	3.8	2.7	3.2	3.0
808	PI	268196	Former Yugoslavia	3.7	3.0	3.5	3.3
809	PI	268203	Germany	4.2	2.8	3.3	3.5
810	PI	268204	Austria	3.0	3.7	3.0	2.8
811	PI	268241	Iran	3.0	2.5	2.3	2.8
812	PI	268250	Iran	3.5	2.8	3.0	3.8
813	PI	268255	Iran	3.7	3.0	3.3	3.5
814	PI	268256	Iran	2.8	3.2	3.7	3.5
815	PI	268391	Afghanistan	1.6	3.0	1.0	1.0
816	PI	269151	United Kingdom	3.6	2.5	3.0	3.2
817	PI	269154	Sweden	3.8	3.3	2.3	2.8
818	PI	269899	Pakistan	3.3	3.2	3.0	3.3
819	PI	269912	Pakistan	3.2	2.8	1.7	2.5
820	PI	270605	Peru	3.3	2.8	1.7	3.5
821	PI	270618	Peru	1.1	2.3	1.7	1.0
822	PI	270623	Peru	2.9	2.7	1.5	1.8
823	PI	270632	Peru	3.5	3.0	2.7	3.0
824	PI	270641	Peru	4.0	3.5	3.0	3.2
825	PI	270645	Peru	3.8	3.8	2.3	2.7
826	PI	270666	Peru	3.3	3.2	2.2	3.2
827	PI	270667	Peru	2.9	3.0	2.7	2.8
828	PI	270669	Peru	3.5	3.5	3.0	3.5
829	PI	270683	Peru	3.8	3.8	2.0	2.3
830	PI	270686	Peru	4.0	3.8	2.3	2.3
831	PI	270687	Peru	4.3	3.8	2.5	3.7
832	PI	270692	Peru	3.7	3.3	2.0	2.7
833	PI	270695	Peru	3.3	3.7	3.0	2.5
834	PI	270700	Peru	3.6	3.7	2.5	2.8

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
835	PI	270702	Peru	2.8	2.8	2.5	2.3
836	PI	270703	Peru	2.2	2.3	1.8	2.5
837	PI	270708	Peru	3.0	3.3	2.5	2.7
838	PI	270716	Peru	3.6	3.5	2.0	2.2
839	PI	270722	Peru	3.7	3.3	2.0	2.5
840	PI	270755	Peru	3.5	3.2	1.8	2.3
841	PI	271250	India	2.5	2.5	1.5	2.0
842	PI	273905	Ethiopia	3.9	4.0	3.5	4.2
843	PI	274620	Poland	2.9	3.3	3.8	4.2
844	PI	274624	Poland	3.1	2.8	2.7	3.5
845	PI	274625	Poland	3.5	3.5	3.0	3.7
846	PI	277393	Ethiopia	3.6	3.2	2.7	3.2
847	PI	280420	United Kingdom	3.1	3.0	3.7	3.5
848	PI	280440	Russian Federation	2.9	3.5	3.8	3.2
849	PI	280441	Russian Federation	2.8	3.0	4.0	3.2
850	PI	281524	Argentina	3.4	3.5	3.7	3.3
851	PI	281525	Argentina	3.7	3.5	3.7	3.5
852	PI	281528	Argentina	3.5	3.3	2.2	2.7
853	PI	281853	United States	2.1	2.8	1.8	1.8
854	PI	282616	Israel	3.2	2.0	2.2	2.0
855	PI	283389	Norway	3.1	2.8	3.7	4.0
856	PI	283394	Morocco	2.8	3.3	2.2	2.3
857	PI	283396	Sweden	4.0	2.7	2.5	3.2
858	PI	283397	Armenia	3.9	3.8	2.3	3.3
859	PI	283401	Hungary	3.8	3.5	3.3	3.7
860	PI	283403	Hungary	3.0	2.7	3.3	2.8
861	PI	283410	Former Soviet Union	4.0	2.8	3.3	3.7
862	PI	283412	Czechoslovakia	3.8	2.8	3.2	3.5
863	PI	283413	Czechoslovakia	2.2	1.3	1.5	1.5
864	PI	283415	Czechoslovakia	3.5	2.3	3.2	3.0
865	PI	283416	Czechoslovakia	2.8	2.7	2.2	2.3
866	PI	283425	Portugal	3.4	3.5	2.7	3.0
867	PI	283426	Former Soviet Union	3.7	3.0	3.0	3.2
868	PI	283428	Sweden	3.5	2.5	3.0	2.8
869	PI	283429	Denmark	3.5	3.0	3.0	3.3

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
870	PI	283430	Denmark	2.8	3.0	3.0	4.0
871	PI	283433	Cyprus	2.4	3.2	1.2	1.3
872	PI	283434	Cyprus	2.8	2.8	1.7	1.8
873	PI	283439	Italy	3.3	3.5	2.8	2.7
874	PI	283441	Ethiopia	4.3	3.2	3.2	3.3
875	PI	283445	Belgium	2.9	3.5	1.7	2.0
876	PI	283446	Cyprus	3.8	3.5	2.2	2.8
877	PI	283456	Morocco	2.8	2.3	2.3	2.5
878	PI	283459	Sweden	3.3	3.0	2.7	3.2
879	PI	283464	Hungary	2.8	3.3	3.2	3.2
880	PI	285084	France	4.0	3.7	3.5	3.3
881	PI	285118	Eritrea	3.1	2.8	2.8	3.2
882	PI	285124	Ethiopia	4.0	3.5	3.2	3.0
883	PI	285636	Poland	3.0	2.7	3.5	3.8
884	PI	286388	Eritrea	3.8	2.5	3.0	3.8
885	PI	286389	Eritrea	2.9	2.5	2.2	2.0
886	PI	289805	Iran	3.6	3.0	1.7	3.7
887	PI	289811	Iran	3.7	3.2	3.0	3.5
888	PI	290165	Hungary	3.0	3.0	2.5	3.7
889	PI	290169	Hungary	4.1	3.3	3.8	3.7
890	PI	290175	Poland	3.8	2.8	3.5	3.8
891	PI	290177	Germany	4.0	2.7	3.3	3.3
892	PI	290181	Hungary	3.6	3.8	3.3	4.2
893	PI	290193	Hungary	3.3	3.5	3.0	3.2
894	PI	290215	Hungary	3.8	3.5	3.0	3.7
895	PI	290230	Hungary	3.5	2.5	3.2	4.0
896	PI	290234	Hungary	4.3	3.3	4.0	3.7
897	PI	290236	Hungary	4.2	2.8	4.0	3.7
898	PI	290242	Slovakia	3.1	3.0	2.7	3.5
899	PI	290259	Czechoslovakia	4.2	2.7	2.7	3.2
900	PI	290267	Hungary	3.3	3.0	2.5	3.0
901	PI	290272	Austria	3.8	3.5	3.2	3.3
902	PI	290276	Hungary	3.5	2.7	2.7	2.2
903	PI	290281	Hungary	2.0	3.3	1.8	1.8
904	PI	290288	Hungary	3.3	3.0	2.8	2.7

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
905	PI	290290	Romania	2.6	3.2	1.8	2.2
906	PI	290300	Hungary	2.9	3.7	2.7	3.2
907	PI	290306	Hungary	4.2	2.7	3.0	3.0
908	PI	290312	Hungary	3.8	3.3	3.2	3.8
909	PI	290316	Hungary	2.0	1.0	1.8	1.5
910	PI	290322	Hungary	3.1	3.5	2.8	3.3
911	PI	290336	Hungary	3.8	2.7	2.5	3.0
912	PI	290346	Ethiopia	4.0	3.3	2.8	3.0
913	PI	290351	Netherlands	2.9	3.0	1.5	2.2
914	PI	290363	Hungary	3.8	3.5	2.3	2.7
915	PI	290366	Hungary	3.2	1.3	1.7	2.3
916	PI	290743	Kenya	3.8	3.2	3.2	3.5
917	PI	292016	Israel	2.8	3.0	3.0	2.3
918	PI	292017	Israel	2.3	1.2	3.0	3.8
919	PI	292018	Israel	2.9	1.5	1.5	2.2
920	PI	292019	Israel	3.2	1.3	1.7	2.2
921	PI	292767	Sweden	3.4	3.0	2.7	3.2
922	PI	294731	Bulgaria	2.3	1.5	1.3	1.7
923	PI	294734	Bulgaria	3.3	3.2	2.7	2.7
924	PI	294739	Western Asia	3.2	2.3	1.8	2.3
925	PI	294740	Bulgaria	3.4	3.3	2.8	3.2
926	PI	294743	Romania	2.8	1.3	1.2	1.7
927	PI	294746	Bulgaria	3.0	2.2	2.0	1.8
928	PI	294747	Bulgaria	3.8	2.2	3.8	4.0
929	PI	294750	Romania	2.6	3.3	2.0	2.2
930	PI	294755	Hungary	3.0	2.9	2.2	2.7
931	PI	294765	Bulgaria	3.1	3.2	3.7	3.3
932	PI	294786	Bulgaria	2.5	3.0	2.7	2.0
933	PI	294787	Bulgaria	3.0	2.8	2.8	2.5
934	PI	295373	Ethiopia	3.5	2.8	3.3	3.2
935	PI	295442	Ethiopia	3.8	3.3	3.7	3.3
936	PI	295581	Ethiopia	4.3	3.3	3.2	3.3
937	PI	295956	Israel	3.1	3.2	3.8	3.2
938	PI	295958	Israel	2.4	3.2	2.8	2.5
939	PI	295960	Israel	2.4	3.0	2.2	2.2

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
940	PI	296185	Yemen	2.8	3.0	3.7	3.2
941	PI	296188	Russian Federation	3.5	2.5	3.7	4.0
942	PI	296192	Tajikistan	3.4	4.0	2.2	2.3
943	PI	296197	Kazakhstan	3.4	4.2	2.7	3.0
944	PI	296202	Ukraine	3.8	2.8	2.7	3.8
945	PI	296453	Eritrea	2.6	3.7	1.8	2.3
946	PI	296455	Ethiopia	2.9	3.2	3.3	3.5
947	PI	296457	Ethiopia	3.5	3.7	2.8	3.0
948	PI	296459	Eritrea	2.6	2.0	2.7	3.0
949	PI	296460	Eritrea	3.3	3.1	3.3	3.0
950	PI	296472	Ethiopia	3.1	2.7	1.5	2.7
951	PI	296990	Argentina	1.5	1.6	2.5	3.2
952	PI	296992	Argentina	2.9	2.3	2.3	2.0
953	PI	296995	Argentina	2.8	2.2	2.0	2.3
954	PI	296996	Argentina	1.7	1.3	1.7	1.3
955	PI	296998	Argentina	1.3	1.6	1.8	1.8
956	PI	297408	Netherlands	2.9	3.2	2.8	3.3
957	PI	298708	Ethiopia	3.8	3.0	2.8	3.3
958	PI	298738	Ethiopia	3.8	4.2	3.8	4.3
959	PI	304912	Morocco	1.2	1.6	2.5	3.3
960	PI	306439	Romania	3.3	3.3	3.2	3.2
961	PI	306443	Romania	3.5	3.1	3.2	3.0
962	PI	306444	Romania	3.4	3.2	2.5	3.2
963	PI	306450	Romania	3.2	3.0	3.0	3.0
964	PI	306462	Romania	2.9	2.8	2.3	2.7
965	PI	306466	Romania	3.3	3.3	2.5	2.7
966	PI	306467	Romania	2.8	3.0	2.5	2.8
967	PI	306469	Romania	2.2	2.8	2.0	1.8
968	PI	306472	Romania	3.0	2.8	3.2	3.2
969	PI	306477	Romania	3.3	3.0	2.5	2.2
970	PI	306479	Romania	3.2	2.6	2.0	2.7
971	PI	308138	Ukraine	2.5	3.0	3.0	3.5
972	PI	308142	Ukraine	3.3	3.8	2.3	2.8
973	PI	310480	France	4.0	3.1	2.3	4.2
974	PI	313097	Ireland	3.5	3.2	3.7	3.8

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
975	PI	313113	Germany	3.3	3.8	4.2	4.0
976	PI	313908	Netherlands	3.3	3.8	3.5	3.8
977	PI	315932	France	3.6	3.3	3.2	3.5
978	PI	315936	France	3.0	2.8	3.8	3.7
979	PI	316801	Ethiopia	4.0	3.3	3.8	3.7
980	PI	316835	Ethiopia	3.0	3.0	2.2	3.0
981	PI	316874	Ethiopia	3.7	2.8	3.2	3.0
982	PI	319867	Turkey	3.6	3.7	2.8	3.7
983	PI	320213	Australia	2.4	2.8	2.0	2.3
984	PI	320216	Australia	2.7	2.8	1.3	2.3
985	PI	320217	Australia	3.2	2.8	2.8	2.0
986	PI	320219	Australia	3.7	3.1	2.7	3.5
987	PI	320227	Australia	3.2	3.4	2.5	2.7
988	PI	320239	Australia	4.2	3.5	3.0	3.0
989	PI	320931	Tajikistan	4.2	3.6	3.5	3.7
990	PI	321769	Switzerland	3.2	2.0	3.5	3.5
991	PI	321770	Slovenia	3.8	2.3	3.3	3.7
992	PI	321771	Germany	3.8	2.8	3.3	3.5
993	PI	321773	Slovenia	3.0	3.0	3.3	3.3
994	PI	321774	Poland	3.2	3.0	3.5	3.5
995	PI	321784	Belgium	3.5	2.8	3.2	3.8
996	PI	321791	Slovenia	3.5	3.0	3.5	3.8
997	PI	321796	Sweden	3.8	3.2	3.0	2.8
998	PI	321797	Netherlands	3.5	2.5	3.8	3.8
999	PI	321807	Ukraine	3.5	2.8	3.2	4.2
1000	PI	321817	Croatia	3.3	2.6	3.5	4.0
1001	PI	321820	Austria	3.3	3.3	3.5	4.0
1002	PI	321823	Czechoslovakia	3.7	3.0	3.2	3.5
1003	PI	321827	Slovenia	3.5	3.3	3.0	3.5
1004	PI	321844	Slovenia	3.8	3.4	3.3	4.0
1005	PI	321845	Slovenia	3.3	2.8	2.8	3.7
1006	PI	321854	Croatia	3.2	2.8	3.0	3.3
1007	PI	321855	Slovenia	3.8	3.1	3.2	3.3
1008	PI	321856	Germany	3.5	3.5	2.0	2.5
1009	PI	321857	Netherlands	3.5	2.8	1.8	2.2

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1010	PI	323352	Canada	3.8	2.3	3.2	3.3
1011	PI	327601	Bulgaria	2.7	2.7	1.3	2.0
1012	PI	327607	Czechoslovakia	3.2	2.5	2.8	3.2
1013	PI	327617	Hungary	3.3	4.3	2.7	3.0
1014	PI	327635	Romania	3.5	3.0	2.7	2.8
1015	PI	327641	Tajikistan	3.2	3.1	2.5	3.0
1016	PI	327651	Uzbekistan	2.5	2.7	1.8	2.0
1017	PI	327658	Azerbaijan	3.5	3.0	3.2	3.7
1018	PI	327666	Former Soviet Union	3.0	2.9	3.0	3.5
1019	PI	327667	Tajikistan	4.5	3.7	2.5	2.0
1020	PI	327672	Russian Federation	3.2	2.7	3.5	3.8
1021	PI	327676	Uzbekistan	4.3	3.3	2.8	3.3
1022	PI	327678	Ukraine	3.7	3.5	3.0	3.7
1023	PI	327680	Ukraine	3.2	3.3	3.7	3.7
1024	PI	327704	Russian Federation	4.2	3.5	3.3	4.2
1025	PI	327716	Ukraine	3.0	3.1	3.5	4.0
1026	PI	327719	Ukraine	3.2	3.1	3.5	4.2
1027	PI	327724	Ukraine	2.8	2.9	3.3	3.0
1028	PI	327831	Turkmenistan	2.3	3.1	1.3	1.7
1029	PI	327833	Uzbekistan	3.2	3.2	1.0	1.3
1030	PI	327859	Turkmenistan	3.7	3.3	4.0	3.5
1031	PI	327860	Turkmenistan	3.3	3.3	2.0	2.2
1032	PI	327861	Uzbekistan	3.5	3.0	3.0	3.3
1033	PI	327868	Turkmenistan	3.3	3.3	2.2	2.7
1034	PI	327869	Turkmenistan	3.7	3.2	2.5	2.8
1035	PI	327870	Turkmenistan	3.3	3.0	1.7	1.7
1036	PI	327882	Turkmenistan	1.5	1.9	2.2	2.3
1037	PI	327894	Algeria	2.7	3.0	1.7	1.5
1038	PI	327902	Bulgaria	3.2	2.9	2.2	2.5
1039	PI	327907	Bulgaria	3.2	2.7	3.0	2.8
1040	PI	327967	Finland	3.7	3.6	2.7	3.0
1041	PI	327969	Finland	3.7	2.7	3.0	3.7
1042	PI	327970	Finland	3.5	3.4	2.5	3.2
1043	PI	327977	Netherlands	3.5	3.0	2.2	2.7
1044	PI	327997	Japan	2.8	3.2	2.5	2.8

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1045	PI	327998	Japan	3.7	3.7	3.0	3.0
1046	PI	328015	Romania	3.7	3.0	3.7	3.7
1047	PI	328052	United States	3.8	3.8	2.8	3.0
1048	PI	328072	United States	3.0	3.0	1.3	2.2
1049	PI	328112	Sweden	3.5	2.5	3.0	3.0
1050	PI	328135	Bulgaria	3.5	2.6	3.3	3.7
1051	PI	328152	Bulgaria	1.7	2.7	1.2	2.0
1052	PI	328154	Bulgaria	2.8	2.8	2.7	2.3
1053	PI	328155	Bulgaria	3.0	2.9	2.7	2.7
1054	PI	328156	Bulgaria	2.7	2.6	3.0	3.5
1055	PI	328159	Bulgaria	2.8	3.3	2.3	3.0
1056	PI	328162	Bulgaria	3.2	2.7	2.5	3.0
1057	PI	328171	Turkey	2.2	3.0	2.8	2.7
1058	PI	328200	Turkey	3.5	3.3	2.7	3.2
1059	PI	328207	Turkey	3.5	3.0	2.5	3.7
1060	PI	328208	Turkey	3.5	2.5	2.8	3.8
1061	PI	328244	Turkey	3.2	2.8	3.2	3.3
1062	PI	328253	Turkey	3.3	2.8	3.0	3.0
1063	PI	328279	Turkey	3.3	3.0	3.2	3.8
1064	PI	328299	Turkey	3.2	4.0	4.0	3.7
1065	PI	328327	Turkey	3.3	3.7	2.8	3.2
1066	PI	328336	Turkey	3.3	3.5	3.0	3.7
1067	PI	328388	Greece	4.2	3.4	3.2	3.7
1068	PI	328409	Greece	2.3	2.8	1.2	1.7
1069	PI	328417	Greece	3.3	3.3	2.3	3.2
1070	PI	328484	Greece	3.2	3.3	1.8	3.0
1071	PI	328485	Greece	3.8	3.2	3.0	3.8
1072	PI	328486	Greece	3.8	3.2	3.7	3.8
1073	PI	328498	Greece	4.3	3.3	2.2	3.5
1074	PI	328520	Greece	3.8	3.8	2.7	3.3
1075	PI	328577	Greece	3.5	3.2	1.7	2.7
1076	PI	328578	Greece	3.3	3.2	2.7	3.5
1077	PI	328587	Albania	3.3	3.4	4.0	4.2
1078	PI	328619	Romania	2.3	1.9	1.9	1.8
1079	PI	328632	Greece	4.3	3.3	2.5	2.5

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1080	PI	328637	Greece	3.8	3.2	2.8	4.0
1081	PI	328639	Greece	2.8	3.0	2.8	3.0
1082	PI	328672	Finland	3.8	3.0	2.8	3.2
1083	PI	328675	Finland	3.6	3.3	3.2	3.2
1084	PI	328728	Afghanistan	2.6	3.0	1.7	1.5
1085	PI	328729	Afghanistan	3.0	3.5	2.5	2.3
1086	PI	328742	Austria	3.7	2.8	2.7	2.8
1087	PI	328752	Uruguay	2.7	3.4	2.6	2.3
1088	PI	328758	Czech Republic	3.4	3.2	3.2	3.7
1089	PI	328787	Greece	2.7	3.0	2.1	2.7
1090	PI	328790	Romania	3.5	3.1	3.0	3.5
1091	PI	328808	Czechoslovakia	2.8	2.8	2.5	3.2
1092	PI	328835	Hungary	3.5	3.0	3.3	4.0
1093	PI	328849	Germany	3.5	2.8	3.2	2.8
1094	PI	328855	Netherlands	3.6	2.8	2.5	3.3
1095	PI	328907	Turkey	2.8	2.7	3.7	4.2
1096	PI	328924	Italy	3.6	3.7	1.8	3.5
1097	PI	328933	Uruguay	2.8	3.0	2.5	2.2
1098	PI	328936	Uruguay	2.8	3.0	2.2	2.2
1099	PI	328938	Morocco	3.0	2.7	3.3	3.3
1100	PI	328945	Italy	3.3	3.3	3.5	3.5
1101	PI	328950	Netherlands	3.4	3.2	3.2	3.8
1102	PI	328954	Sweden	3.3	2.7	3.5	3.7
1103	PI	328976	Ethiopia	3.5	2.8	1.5	2.0
1104	PI	329000	Ethiopia	4.0	3.5	4.0	4.5
1105	PI	329008	Netherlands	2.6	2.5	2.0	1.3
1106	PI	329013	Iraq	2.8	3.0	3.4	3.5
1107	PI	329032	Greece	2.7	2.5	2.8	3.0
1108	PI	329042	Greece	3.6	3.0	2.2	3.0
1109	PI	329117	Hungary	2.8	3.3	2.9	2.8
1110	PI	329121	Ukraine	3.2	3.6	3.1	3.5
1111	PI	329122	Hungary	3.6	3.0	2.7	2.3
1112	PI	329123	Hungary	3.5	3.3	2.3	2.7
1113	PI	329131	Croatia	3.2	3.1	2.9	3.2
1114	PI	330326	Colombia	3.0	3.0	2.4	2.8

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1115	PI	330397	Czechoslovakia	4.0	3.5	3.5	4.2
1116	PI	330398	Slovakia	3.8	4.0	2.7	2.7
1117	PI	330399	Czech Republic	4.3	4.2	3.8	3.8
1118	PI	330400	Czech Republic	3.6	3.0	3.0	3.8
1119	PI	330513	United Kingdom	3.0	2.8	3.1	2.8
1120	PI	330520	United Kingdom	3.5	3.0	2.8	3.3
1121	PI	330524	United Kingdom	2.1	2.0	2.0	2.5
1122	PI	331217	Eritrea	2.3	2.8	2.5	2.7
1123	PI	331803	India	2.8	2.5	1.9	2.8
1124	PI	331817	Greece	2.8	2.0	2.0	1.5
1125	PI	331841	France	3.1	3.3	2.5	2.7
1126	PI	331878	Italy	2.8	3.1	1.8	2.8
1127	PI	331895	Afghanistan	3.5	2.8	2.2	2.8
1128	PI	331912	Italy	3.4	3.5	2.5	2.7
1129	PI	331915	Italy	3.3	3.3	2.9	3.3
1130	PI	337142	Argentina	3.4	2.8	3.2	4.0
1131	PI	337143	Argentina	3.5	3.3	3.4	3.5
1132	PI	337144	Argentina	3.2	3.0	2.8	3.2
1133	PI	337145	Argentina	3.9	3.3	3.0	3.3
1134	PI	338354	Belgium	3.6	2.8	3.7	3.5
1135	PI	339814	Netherlands	3.0	2.7	3.3	3.8
1136	PI	339830	France	3.9	3.2	3.5	4.2
1137	PI	339889	Finland	3.6	2.7	3.3	3.7
1138	PI	341947	Romania	2.8	3.1	2.8	3.2
1139	PI	341949	Romania	3.3	2.9	3.3	2.8
1140	PI	341952	Romania	2.1	1.8	2.2	1.7
1141	PI	342031	Turkey	3.5	4.0	4.0	4.2
1142	PI	342136	Turkey	3.4	3.7	3.5	3.5
1143	PI	342139	Turkey	2.5	2.0	2.0	2.2
1144	PI	342198	Turkey	3.1	2.5	2.5	2.8
1145	PI	342219	Turkey	2.6	3.2	3.8	2.8
1146	PI	342270	Turkey	2.5	3.3	2.3	2.3
1147	PI	342283	Turkey	4.1	3.2	3.8	3.7
1148	PI	342329	Turkey	3.1	2.5	3.0	3.3
1149	PI	342331	Turkey	3.3	3.2	2.3	2.8

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1150	PI	343713	Saudi Arabia	3.2	3.3	3.1	3.7
1151	PI	343714	Saudi Arabia	3.8	3.0	3.2	3.2
1152	PI	343725	Netherlands	3.2	3.4	4.4	4.0
1153	PI	343726	Germany	3.3	2.8	3.4	3.5
1154	PI	343748	Germany	4.1	3.8	2.7	2.8
1155	PI	344727	Argentina	3.3	3.4	2.3	2.8
1156	PI	344729	Argentina	3.5	3.3	3.3	3.5
1157	PI	344863	Serbia	3.0	3.3	2.6	3.0
1158	PI	344865	Serbia	3.5	3.3	2.9	3.2
1159	PI	344867	Serbia	2.3	3.0	2.3	3.2
1160	PI	344871	Macedonia	3.0	3.0	1.8	2.7
1161	PI	344874	Macedonia	3.9	3.5	3.0	3.0
1162	PI	344885	Serbia	3.7	2.8	2.6	3.0
1163	PI	344886	Serbia	3.1	3.3	3.3	3.7
1164	PI	344889	Macedonia	2.5	3.0	2.1	2.7
1165	PI	344894	Serbia	3.3	2.8	2.8	2.8
1166	PI	344903	Serbia	2.9	2.0	3.8	3.5
1167	PI	344920	Bosnia and Herzegovina	3.6	3.0	3.5	4.3
1168	PI	344926	Bosnia and Herzegovina	3.4	3.2	2.8	2.8
1169	PI	344928	Bosnia and Herzegovina	2.8	2.2	2.8	3.2
1170	PI	344930	Bosnia and Herzegovina	3.9	3.8	3.3	3.8
1171	PI	344932	Bosnia and Herzegovina	4.0	3.4	3.3	3.8
1172	PI	344936	Bosnia and Herzegovina	4.1	3.0	3.5	3.5
1173	PI	344938	Bosnia and Herzegovina	3.4	3.0	2.8	2.8
1174	PI	344940	Bosnia and Herzegovina	3.4	3.2	3.3	3.2
1175	PI	344941	Bosnia and Herzegovina	3.4	3.5	3.5	4.0
1176	PI	344942	Bosnia and Herzegovina	3.8	2.8	3.7	3.0
1177	PI	344943	Bosnia and Herzegovina	3.7	3.2	2.5	2.7
1178	PI	344944	Montenegro	3.2	2.2	2.8	3.0
1179	PI	344956	Montenegro	3.2	2.9	3.1	3.5
1180	PI	344958	Montenegro	3.0	3.1	2.9	3.7
1181	PI	345615	Latvia	3.0	2.9	2.6	3.7
1182	PI	345618	Russian Federation	3.7	3.2	3.2	2.8
1183	PI	346387	Argentina	3.0	3.0	2.7	3.0
1184	PI	346389	Argentina	3.5	3.4	3.4	3.0

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1185	PI	346390	Argentina	3.8	3.5	3.5	3.0
1186	PI	346396	Argentina	3.5	3.4	3.0	3.3
1187	PI	347750	France	3.2	2.6	3.1	2.8
1188	PI	349359	United Kingdom	2.8	2.8	1.8	2.3
1189	PI	349681	Finland	2.7	3.0	2.8	3.2
1190	PI	349896	Serbia	3.7	3.0	3.3	3.7
1191	PI	349907	Bosnia and Herzegovina	3.7	3.2	2.8	2.5
1192	PI	350713	Austria	3.3	3.0	4.0	4.2
1193	PI	350715	Austria	4.0	3.1	4.0	4.5
1194	PI	350725	Austria	3.5	2.6	3.9	4.0
1195	PI	356226	Morocco	1.3	1.0	2.4	3.3
1196	PI	356264	Ethiopia	3.7	3.1	3.5	4.3
1197	PI	356333	Ethiopia	3.2	3.3	3.3	3.5
1198	PI	356505	Ethiopia	3.0	3.5	3.1	4.0
1199	PI	356580	Ethiopia	3.2	3.2	2.7	3.0
1200	PI	356672	Morocco	1.7	2.6	1.3	1.8
1201	PI	356673	Morocco	2.5	2.6	1.4	1.8
1202	PI	356674	Morocco	2.3	2.5	1.4	1.5
1203	PI	356683	Morocco	2.7	1.8	1.8	1.5
1204	PI	356690	Morocco	2.8	2.6	3.8	3.0
1205	PI	356696	Morocco	3.3	2.8	2.4	3.2
1206	PI	356711	Morocco	3.3	3.0	1.7	2.0
1207	PI	356713	Morocco	3.8	3.2	2.7	3.2
1208	PI	356715	Morocco	4.2	4.0	3.2	3.3
1209	PI	356718	Morocco	2.7	2.7	2.0	1.3
1210	PI	356719	Morocco	2.7	2.4	2.6	2.2
1211	PI	356732	Morocco	3.0	2.8	2.3	2.8
1212	PI	356734	Morocco	3.7	3.0	2.8	3.0
1213	PI	356738	Morocco	2.8	3.0	2.3	1.7
1214	PI	356741	Morocco	4.0	3.3	2.2	2.3
1215	PI	356742	Morocco	3.5	3.5	2.8	3.2
1216	PI	356746	Morocco	4.0	3.8	2.8	2.8
1217	PI	356750	Morocco	2.7	1.7	2.0	2.0
1218	PI	356755	Morocco	2.7	2.0	1.5	1.8
1219	PI	356759	Morocco	3.8	3.3	3.0	3.7

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1220	PI	356763	Morocco	3.0	3.1	2.1	2.7
1221	PI	356771	Morocco	3.2	3.2	1.7	1.5
1222	PI	356775	Morocco	3.5	3.0	2.8	2.7
1223	PI	356805	Canada	3.7	3.0	3.5	2.5
1224	PI	357314	Denmark	3.3	3.0	3.0	3.0
1225	PI	357317	Denmark	4.0	3.0	3.0	3.3
1226	PI	361034	United Kingdom	3.2	2.8	4.0	3.7
1227	PI	361036	United Kingdom	3.2	3.0	3.5	3.3
1228	PI	361038	United Kingdom	3.2	2.7	3.8	3.3
1229	PI	361042	United Kingdom	3.0	2.8	4.0	3.2
1230	PI	361609	Denmark	1.8	1.8	2.2	2.7
1231	PI	361616	Denmark	2.8	2.7	3.3	3.0
1232	PI	361623	Denmark	3.7	2.5	3.0	3.0
1233	PI	361642	Denmark	3.0	2.7	3.3	3.3
1234	PI	361648	Denmark	3.7	3.2	3.5	3.5
1235	PI	361665	Denmark	2.5	3.0	2.7	2.7
1236	PI	361669	Denmark	3.5	2.5	3.0	3.0
1237	PI	361670	Belarus	3.3	3.0	2.7	2.8
1238	PI	361671	Denmark	3.8	3.0	3.0	3.2
1239	PI	361672	Denmark	3.5	3.2	3.0	3.5
1240	PI	361676	Denmark	3.7	3.3	3.3	3.3
1241	PI	361687	Norway	3.7	3.2	3.7	4.2
1242	PI	361691	Denmark	3.5	3.3	2.5	2.2
1243	PI	361695	Finland	3.3	3.3	2.8	2.8
1244	PI	361707	Denmark	3.5	3.2	2.2	1.8
1245	PI	361711	Denmark	2.5	2.8	2.2	1.0
1246	PI	361914	Romania	3.7	2.8	3.7	3.5
1247	PI	361927	Romania	3.0	2.8	2.7	2.3
1248	PI	361929	Romania	2.8	3.0	2.2	1.2
1249	PI	361930	Romania	4.2	3.3	3.5	3.0
1250	PI	362203	Belgium	3.8	3.3	3.5	3.8
1251	PI	362207	France	4.2	3.3	3.2	2.5
1252	PI	365439	Netherlands	3.7	3.2	3.3	3.0
1253	PI	365547	Netherlands	3.3	3.2	3.0	3.5
1254	PI	365634	Australia	3.0	3.2	2.7	2.7

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1255	PI	366439	Afghanistan	1.7	1.7	2.2	2.3
1256	PI	366450	Afghanistan	2.2	2.2	1.8	1.2
1257	PI	366453	Afghanistan	3.3	3.0	3.2	3.3
1258	PI	369729	Latvia	4.0	3.5	3.0	2.5
1259	PI	369731	Kazakhstan	1.7	2.8	2.2	1.5
1260	PI	369732	Ukraine	3.3	3.7	3.8	4.0
1261	PI	369740	Tajikistan	3.0	3.0	2.8	3.0
1262	PI	369741	Lithuania	3.0	3.0	2.8	2.8
1263	PI	369742	Azerbaijan	3.0	3.0	2.8	2.7
1264	PI	369744	Kyrgyzstan	3.3	3.0	2.5	3.3
1265	PI	369746	Tajikistan	3.2	3.2	2.3	2.7
1266	PI	369747	Ukraine	3.0	3.0	3.0	2.5
1267	PI	370696	Poland	3.3	2.7	3.0	2.3
1268	PI	370779	Switzerland	3.0	3.2	3.2	3.8
1269	PI	370782	Switzerland	2.8	3.2	2.5	2.2
1270	PI	370821	Switzerland	3.2	3.5	3.2	3.3
1271	PI	370852	Switzerland	2.8	3.2	4.2	3.8
1272	PI	370867	Switzerland	4.2	3.8	3.8	3.2
1273	PI	370869	Switzerland	4.3	3.5	4.2	3.7
1274	PI	370963	Switzerland	3.7	2.7	3.0	3.7
1275	PI	370966	Switzerland	4.0	3.0	3.0	3.0
1276	PI	370970	Switzerland	4.0	2.8	3.0	3.2
1277	PI	370983	Switzerland	4.3	3.2	4.7	4.3
1278	PI	370994	Switzerland	3.3	3.0	4.5	3.7
1279	PI	371017	Switzerland	4.3	3.2	3.5	3.5
1280	PI	371056	Switzerland	3.5	3.0	2.8	3.0
1281	PI	371069	Switzerland	3.8	3.7	3.2	3.3
1282	PI	371079	Switzerland	3.8	2.7	3.0	3.2
1283	PI	371100	Switzerland	3.8	3.0	3.5	3.2
1284	PI	371102	Switzerland	3.7	2.8	3.0	3.5
1285	PI	371105	Switzerland	3.8	3.0	3.2	3.8
1286	PI	371111	Switzerland	3.8	3.2	3.3	3.5
1287	PI	371149	Switzerland	2.8	2.5	2.8	3.3
1288	PI	371156	Switzerland	3.3	2.7	3.0	3.2
1289	PI	371163	Switzerland	3.7	3.0	3.3	3.7

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1290	PI	371172	Switzerland	3.7	3.0	3.0	3.0
1291	PI	371196	Switzerland	3.5	3.2	3.3	3.5
1292	PI	371217	Switzerland	3.8	3.5	4.2	4.0
1293	PI	371245	Switzerland	3.2	2.7	3.7	2.8
1294	PI	371248	Switzerland	2.4	2.2	2.7	3.0
1295	PI	371275	Switzerland	2.9	3.2	3.3	3.5
1296	PI	371298	Switzerland	3.4	3.3	2.8	3.7
1297	PI	371320	Switzerland	2.1	3.0	2.5	2.8
1298	PI	371323	Switzerland	2.7	3.3	3.5	3.8
1299	PI	371327	Switzerland	2.5	3.2	2.8	2.7
1300	PI	371335	Switzerland	4.0	3.2	3.2	4.0
1301	PI	371338	Switzerland	3.8	3.3	3.3	3.2
1302	PI	371377	Switzerland	3.8	2.8	2.7	3.2
1303	PI	371384	Switzerland	2.6	3.2	3.2	2.2
1304	PI	371390	Switzerland	3.5	2.7	3.2	3.5
1305	PI	371392	Switzerland	3.7	3.2	3.7	3.7
1306	PI	371441	Switzerland	3.5	3.2	3.3	3.3
1307	PI	371477	Switzerland	3.0	3.0	2.8	2.7
1308	PI	371490	Switzerland	3.1	3.3	3.0	3.2
1309	PI	371496	Switzerland	3.5	3.3	3.5	3.8
1310	PI	371817	Jordan	3.0	2.7	2.3	2.8
1311	PI	371818	Jordan	3.0	3.0	1.5	1.5
1312	PI	371819	Jordan	3.9	3.2	3.3	3.3
1313	PI	372076	Armenia	3.0	3.0	2.2	2.3
1314	PI	372077	Armenia	2.3	2.8	2.3	2.8
1315	PI	372081	Lithuania	2.9	2.7	3.5	3.5
1316	PI	372084	Estonia	3.8	3.3	3.0	3.2
1317	PI	372085	Belarus	2.8	2.2	3.5	3.2
1318	PI	372087	Ukraine	2.9	2.0	3.5	3.5
1319	PI	372089	Uzbekistan	3.8	3.3	2.8	2.5
1320	PI	372090	Kyrgyzstan	2.5	2.7	2.8	2.2
1321	PI	372091	Armenia	3.3	2.8	3.3	3.2
1322	PI	372101	Azerbaijan	3.1	3.3	3.5	3.5
1323	PI	372102	Belarus	3.4	3.0	2.3	2.5
1324	PI	374413	Macedonia	3.1	2.7	3.2	2.2

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1325	PI	374419	Bosnia and Herzegovina	3.5	3.2	2.8	3.2
1326	PI	374420	Bosnia and Herzegovina	4.2	3.2	3.7	3.8
1327	PI	374421	Bosnia and Herzegovina	2.4	2.5	4.0	4.0
1328	PI	374422	Bosnia and Herzegovina	3.3	2.7	2.7	3.2
1329	PI	374423	Bosnia and Herzegovina	3.5	3.3	2.7	3.0
1330	PI	374424	Bosnia and Herzegovina	3.7	3.0	3.8	3.5
1331	PI	374429	Serbia	3.8	3.2	3.7	3.5
1332	PI	374437	Serbia	3.4	3.3	2.8	3.2
1333	PI	374439	Bosnia and Herzegovina	3.0	2.5	3.3	3.0
1334	PI	378216	Macedonia	3.4	3.5	2.8	3.3
1335	PI	378218	Serbia	4.0	3.5	2.7	3.0
1336	PI	378224	Serbia	3.5	3.2	2.8	3.0
1337	PI	382182	Ethiopia	3.8	3.5	3.8	3.8
1338	PI	382275	Ethiopia	3.4	3.0	2.3	2.3
1339	PI	382296	Ethiopia	3.0	2.8	2.7	2.7
1340	PI	382343	Ethiopia	3.8	3.2	3.5	3.0
1341	PI	382437	Ethiopia	3.5	3.7	2.8	3.0
1342	PI	382506	Ethiopia	3.3	3.3	2.7	2.7
1343	PI	382798	Ethiopia	3.8	3.0	3.3	3.3
1344	PI	382839	Ethiopia	4.2	4.0	3.5	3.8
1345	PI	382860	Ethiopia	3.2	3.0	3.8	4.3
1346	PI	382911	Ethiopia	3.8	3.3	3.3	3.2
1347	PI	382982	Ethiopia	4.0	3.7	3.3	3.3
1348	PI	383031	Ethiopia	3.7	2.8	2.8	3.5
1349	PI	383136	Ethiopia	3.3	2.7	2.8	3.3
1350	PI	384986	Denmark	3.5	2.5	3.3	3.5
1351	PI	386406	Eritrea	3.0	3.0	2.0	2.0
1352	PI	386407	Eritrea	3.1	2.7	2.2	1.8
1353	PI	386462	Ethiopia	4.2	3.2	3.0	3.8
1354	PI	386524	Ethiopia	4.2	3.5	3.2	3.5
1355	PI	386526	Ethiopia	2.8	2.7	2.7	2.8
1356	PI	386559	Ethiopia	2.8	2.8	2.0	2.5
1357	PI	386601	Ethiopia	4.3	3.7	3.0	3.5
1358	PI	386650	Ethiopia	3.7	3.3	3.2	3.0
1359	PI	386723	Ethiopia	3.3	3.2	2.8	2.9

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1360	PI	386759	Ethiopia	2.7	3.3	2.8	2.8
1361	PI	386838	Ethiopia	3.8	4.0	3.3	3.3
1362	PI	386844	Ethiopia	3.5	3.3	3.3	3.2
1363	PI	386940	Ethiopia	3.5	3.3	3.2	3.0
1364	PI	386993	Ethiopia	3.0	3.0	2.7	2.3
1365	PI	387098	Ethiopia	3.5	2.8	3.0	3.1
1366	PI	387202	Eritrea	2.8	3.0	3.0	3.0
1367	PI	388645	Ukraine	3.6	3.7	2.3	2.5
1368	PI	390281	Macedonia	3.3	3.0	3.2	2.4
1369	PI	390302	Macedonia	2.4	2.3	2.0	2.5
1370	PI	390319	Macedonia	3.0	3.0	2.5	2.4
1371	PI	390323	Macedonia	2.2	3.2	3.0	3.5
1372	PI	390468	Ecuador	3.4	2.5	2.0	1.8
1373	PI	392407	South Africa	3.5	3.3	3.3	3.0
1374	PI	392418	South Africa	3.3	3.0	3.2	3.5
1375	PI	392423	South Africa	3.8	3.0	4.0	4.0
1376	PI	392427	South Africa	4.0	2.8	3.7	3.4
1377	PI	392435	South Africa	3.0	3.2	2.8	2.8
1378	PI	392448	South Africa	3.2	2.7	4.0	3.9
1379	PI	392451	South Africa	2.5	3.3	3.3	2.5
1380	PI	392455	South Africa	4.3	3.5	3.8	4.1
1381	PI	392458	South Africa	4.5	3.5	3.5	3.6
1382	PI	392461	South Africa	4.3	3.7	3.7	3.8
1383	PI	392464	South Africa	2.6	3.0	2.7	3.0
1384	PI	392469	South Africa	3.8	2.2	2.8	3.3
1385	PI	392470	South Africa	2.3	2.8	2.7	2.9
1386	PI	392471	South Africa	2.7	2.7	2.5	2.9
1387	PI	392478	South Africa	4.0	3.2	2.8	3.4
1388	PI	392481	South Africa	3.2	3.2	2.7	2.1
1389	PI	392484	South Africa	3.6	3.2	3.0	3.0
1390	PI	392487	South Africa	3.8	2.5	3.0	2.9
1391	PI	392491	South Africa	3.9	3.2	3.3	3.3
1392	PI	392492	South Africa	3.6	3.0	3.3	3.5
1393	PI	392493	South Africa	3.9	3.7	3.8	3.5
1394	PI	392499	South Africa	3.8	3.0	3.2	3.9

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1395	PI	392501	South Africa	3.8	2.5	3.5	3.3
1396	PI	392504	South Africa	3.4	3.7	2.3	2.3
1397	PI	392512	South Africa	2.9	3.0	2.8	2.2
1398	PI	392515	South Africa	4.3	3.3	3.7	4.1
1399	PI	392520	South Africa	3.2	3.5	3.0	2.5
1400	PI	392521	South Africa	3.1	3.0	2.3	2.5
1401	PI	392524	South Africa	4.0	3.3	2.5	3.0
1402	PI	393995	Finland	3.7	3.0	2.7	2.4
1403	PI	399482	Netherlands	4.2	3.8	4.0	3.8
1404	PI	399484	Germany	3.8	3.2	3.3	3.5
1405	PI	399491	Netherlands	3.3	2.5	3.7	3.3
1406	PI	399492	Germany	3.7	2.8	2.8	2.6
1407	PI	399503	Austria	4.3	3.3	3.5	3.8
1408	PI	399504	Germany	4.0	2.5	3.2	3.7
1409	PI	399505	Germany	3.3	3.3	2.5	2.9
1410	PI	401939	Colombia	3.2	3.0	2.3	2.4
1411	PI	401952	Colombia	3.7	2.7	2.3	2.5
1412	PI	401954	Colombia	2.8	2.5	1.8	1.9
1413	PI	401963	Colombia	3.2	3.0	2.5	2.3
1414	PI	401964	Colombia	3.8	3.3	3.3	3.3
1415	PI	401973	Colombia	3.0	2.3	1.5	1.8
1416	PI	401999	Colombia	2.8	2.0	1.3	1.6
1417	PI	402001	Colombia	4.0	3.3	2.8	3.3
1418	PI	402016	Colombia	3.7	3.0	2.8	3.0
1419	PI	402017	Colombia	3.4	2.7	2.5	2.0
1420	PI	402037	Colombia	2.9	2.2	1.2	1.0
1421	PI	402055	Colombia	3.2	3.3	3.2	3.5
1422	PI	402078	Colombia	3.8	3.2	1.8	3.0
1423	PI	402098	Colombia	2.2	1.8	1.3	1.1
1424	PI	402101	Colombia	4.2	3.3	2.7	3.7
1425	PI	402127	Colombia	3.0	3.0	2.7	2.9
1426	PI	402152	Colombia	3.0	3.0	2.2	2.7
1427	PI	402153	Colombia	3.3	3.0	2.5	2.4
1428	PI	402164	Colombia	3.5	3.0	2.8	2.8
1429	PI	402168	Colombia	2.3	2.7	2.3	2.5

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1430	PI	402217	Colombia	3.2	3.2	3.0	3.5
1431	PI	402247	Colombia	4.0	3.3	2.7	2.8
1432	PI	402264	Colombia	3.3	3.5	1.7	2.0
1433	PI	402322	Colombia	3.2	3.2	3.0	2.9
1434	PI	402335	Colombia	3.0	2.8	2.0	2.0
1435	PI	402352	Colombia	3.0	3.0	2.0	2.5
1436	PI	402354	Colombia	3.5	3.3	2.5	2.0
1437	PI	402364	Colombia	3.0	3.0	2.3	2.4
1438	PI	402379	Colombia	4.0	3.0	3.2	3.8
1439	PI	402401	Colombia	3.8	3.3	3.3	3.0
1440	PI	402416	Colombia	3.3	3.0	2.3	2.8
1441	PI	402445	Colombia	3.0	2.7	2.0	1.8
1442	PI	402468	Colombia	3.3	3.0	2.3	2.2
1443	PI	403980	Nepal	3.8	3.7	3.2	3.3
1444	PI	403983	Nepal	2.8	2.8	3.0	2.5
1445	PI	403984	Nepal	3.7	3.7	2.7	3.3
1446	PI	404204	Ukraine	2.8	3.5	3.2	3.7
1447	PI	404205	Belarus	3.0	2.7	3.2	3.2
1448	PI	405744	Macedonia	3.2	3.2	2.5	2.0
1449	PI	405766	Macedonia	3.0	3.0	2.5	2.5
1450	PI	405780	Macedonia	2.5	3.3	2.7	3.5
1451	PI	405792	Macedonia	3.2	3.3	3.5	3.1
1452	PI	405802	Macedonia	2.8	3.3	2.3	3.1
1453	PI	410422	Ukraine	3.2	2.2	3.0	3.0
1454	PI	410437	Libya	3.2	2.0	2.3	2.9
1455	PI	410444	Pakistan	4.3	3.0	2.7	3.2
1456	PI	410451	Pakistan	4.3	3.2	2.2	1.8
1457	PI	410456	Pakistan	4.0	2.7	2.5	2.7
1458	PI	410464	Pakistan	3.8	2.0	3.3	3.3
1459	PI	410465	Pakistan	4.0	3.3	3.0	2.8
1460	PI	410471	Pakistan	3.7	2.3	3.3	3.0
1461	PI	410475	Pakistan	4.0	3.5	2.7	3.7
1462	PI	410478	Pakistan	3.7	3.0	2.8	3.5
1463	PI	410481	Pakistan	3.8	2.7	3.2	3.4
1464	PI	410483	Pakistan	4.1	2.3	2.8	3.0

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1465	PI	410507	Pakistan	3.8	2.3	2.8	3.1
1466	PI	410509	Pakistan	3.5	2.8	1.8	2.0
1467	PI	410516	Pakistan	3.7	2.8	2.2	2.7
1468	PI	410520	Pakistan	3.2	2.3	2.8	2.8
1469	PI	410522	Pakistan	3.7	3.0	3.3	3.4
1470	PI	410525	Pakistan	3.7	3.3	1.2	1.5
1471	PI	410865	Netherlands	3.8	3.2	3.3	4.2
1472	PI	411030	Turkey	3.3	3.3	3.3	4.2
1473	PI	412945	South Africa	3.0	2.3	2.5	2.0
1474	PI	412946	South Africa	3.2	2.5	3.3	3.1
1475	PI	414082	Bolivia	4.3	3.5	2.3	3.2
1476	PI	414083	Bolivia	4.0	3.3	2.2	3.3
1477	PI	414084	Bolivia	4.5	3.5	3.5	3.8
1478	PI	414085	Bolivia	3.7	3.0	2.0	2.0
1479	PI	414405	Tajikistan	2.7	3.2	2.3	2.8
1480	PI	414409	Belarus	3.3	3.0	3.8	3.5
1481	PI	415012	Mexico	2.7	2.7	1.5	2.3
1482	PI	415014	Mexico	3.8	3.2	3.0	3.2
1483	PI	415314	Macedonia	3.5	3.2	1.8	2.9
1484	PI	415331	Macedonia	2.7	3.0	2.0	2.4
1485	PI	415348	Macedonia	2.0	2.8	1.8	1.7
1486	PI	415349	Macedonia	2.8	3.0	2.7	3.3
1487	PI	415365	Macedonia	3.0	2.8	2.0	2.8
1488	PI	420452	Macedonia	3.3	3.0	3.0	3.0
1489	PI	420453	Macedonia	3.5	3.8	2.5	3.1
1490	PI	420454	Macedonia	3.0	2.8	2.5	2.9
1491	PI	420459	Macedonia	3.8	3.2	2.3	3.1
1492	PI	420462	Macedonia	2.5	3.7	2.2	3.3
1493	PI	420463	Macedonia	4.0	3.2	3.5	3.8
1494	PI	420468	Macedonia	2.2	2.8	2.5	2.8
1495	PI	420482	Macedonia	2.7	2.5	3.3	3.4
1496	PI	420500	Macedonia	2.7	2.7	3.0	3.3
1497	PI	420511	Macedonia	2.5	2.3	3.0	2.7
1498	PI	420922	Jordan	2.2	2.5	3.0	2.7
1499	PI	420923	Jordan	2.5	1.5	2.5	2.8

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1500	PI	422225	Yemen	3.0	2.7	2.2	2.5
1501	PI	422226	Yemen	3.3	2.5	2.5	3.0
1502	PI	422229	Yemen	4.2	3.7	3.7	4.0
1503	PI	422230	Yemen	3.3	2.8	2.2	2.0
1504	PI	422232	Yemen	3.0	2.2	1.3	2.0
1505	PI	422233	Yemen	3.5	2.8	2.3	2.6
1506	PI	422571	Belgium	2.5	3.0	2.7	2.3
1507	PI	422573	Belgium	4.5	3.5	3.8	4.0
1508	PI	423621	Israel	3.5	2.7	3.7	4.0
1509	PI	428394	Syria	3.0	3.2	2.0	2.7
1510	PI	428411	Mexico	3.7	3.0	2.8	2.6
1511	PI	428413	France	4.5	3.0	4.0	3.4
1512	PI	428491	Netherlands	3.2	2.3	3.2	3.5
1513	PI	428497	France	2.8	2.5	3.5	3.5
1514	PI	428499	Sweden	2.8	2.3	4.2	4.0
1515	PI	428624	Slovakia	3.7	3.0	3.8	3.8
1516	PI	428630	Czechoslovakia	4.0	3.0	3.3	3.4
1517	PI	428632	Slovakia	3.3	3.0	3.3	3.1
1518	PI	428633	Czechoslovakia	4.0	2.3	3.7	3.9
1519	PI	428634	Czechoslovakia	3.8	3.0	4.3	4.2
1520	PI	428635	Czechoslovakia	2.8	2.3	2.8	3.0
1521	PI	428680	Estonia	4.0	3.8	3.0	3.5
1522	PI	429311	Yemen	3.7	2.3	2.5	3.0
1523	PI	429312	Yemen	3.0	3.3	2.0	2.2
1524	PI	429313	Yemen	4.0	2.7	2.3	2.8
1525	PI	429314	Yemen	4.0	3.3	2.0	3.0
1526	PI	429360	Iran	4.2	3.2	4.0	3.9
1527	PI	429504	Nepal	3.2	2.7	2.8	3.3
1528	PI	429510	Nepal	3.2	2.7	1.3	2.1
1529	PI	429521	Nepal	2.8	2.5	1.5	2.1
1530	PI	429526	Nepal	4.0	2.8	2.2	3.0
1531	PI	429533	Nepal	2.8	2.8	2.5	2.8
1532	PI	429546	Nepal	4.0	3.3	2.5	3.1
1533	PI	429594	Nepal	3.2	2.3	1.7	2.5
1534	PI	429883	India	3.7	2.7	3.0	3.3

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1535	PI	429995	India	3.0	3.0	2.3	3.0
1536	PI	430743	Yemen	3.8	3.2	3.5	3.5
1537	PI	430744	Yemen	4.0	2.8	3.5	3.8
1538	PI	430745	Yemen	4.2	3.2	3.3	3.8
1539	PI	430746	Yemen	3.3	3.0	2.2	2.7
1540	PI	434738	Canada	4.2	3.0	3.3	3.8
1541	PI	434741	Canada	3.8	3.7	3.0	3.3
1542	PI	434760	Canada	3.5	3.2	2.8	3.2
1543	PI	434794	Canada	3.3	2.8	2.7	2.6
1544	PI	434795	Canada	3.3	3.0	3.0	2.8
1545	PI	434814	Canada	3.2	2.8	2.3	3.8
1546	PI	434815	Canada	3.7	2.8	2.8	3.0
1547	PI	434852	Canada	3.0	2.2	1.2	2.4
1548	PI	434871	Algeria	3.0	3.3	3.0	2.8
1549	PI	436135	Chile	3.8	3.3	3.5	3.7
1550	PI	436136	Chile	2.7	2.3	2.2	2.7
1551	PI	436138	Chile	4.0	3.2	3.7	3.7
1552	PI	436140	Chile	4.0	3.2	3.7	4.0
1553	PI	436143	Chile	4.3	3.5	3.3	4.0
1554	PI	436144	Chile	3.7	3.5	2.0	2.3
1555	PI	436145	Chile	4.3	3.7	3.5	4.3
1556	PI	436146	Chile	4.0	3.7	3.3	4.2
1557	PI	436148	Chile	2.8	3.0	1.8	1.8
1558	PI	436149	Chile	4.3	3.5	3.0	3.7
1559	PI	436150	Chile	4.3	3.3	3.0	4.3
1560	PI	436151	Chile	2.8	3.2	1.8	2.0
1561	PI	436153	Chile	4.0	3.8	3.8	4.0
1562	PI	436154	Chile	3.3	2.8	2.2	2.1
1563	PI	436155	Chile	3.7	2.5	4.3	3.9
1564	PI	436156	Chile	3.8	3.2	4.2	4.7
1565	PI	436157	Chile	3.2	3.0	3.3	4.0
1566	PI	436159	Chile	3.0	2.2	2.2	1.8
1567	PI	436160	Chile	2.7	2.5	2.3	1.2
1568	PI	438585	Guatemala	2.8	2.5	2.0	2.3
1569	PI	447013	United Kingdom	3.7	2.7	2.7	3.0

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1570	PI	447051	Spain	3.3	2.8	3.3	3.9
1571	PI	447054	Spain	3.3	2.8	3.7	3.4
1572	PI	447100	Spain	3.3	2.8	1.8	2.2
1573	PI	447105	Spain	3.3	3.2	2.0	2.3
1574	PI	447121	Spain	4.2	3.3	2.8	2.7
1575	PI	447137	Spain	4.5	3.3	3.5	3.7
1576	PI	447138	Spain	4.0	3.7	3.0	3.3
1577	PI	447146	Spain	3.8	3.7	3.2	3.7
1578	PI	447181	Spain	2.8	3.0	1.7	2.2
1579	PI	447191	Spain	2.7	2.8	3.2	2.9
1580	PI	447207	Spain	3.3	3.7	2.7	3.0
1581	PI	447212	Spain	4.0	3.7	3.3	3.0
1582	PI	447232	Spain	4.0	3.2	3.5	3.4
1583	PI	447251	Spain	4.0	3.8	3.3	3.7
1584	PI	447260	Spain	2.3	2.5	1.3	1.8
1585	PI	449279	Spain	3.5	3.0	3.3	3.0
1586	PI	452311	United Kingdom	3.3	2.5	3.0	2.9
1587	PI	452324	United Kingdom	3.0	2.2	2.0	2.1
1588	PI	452336	United Kingdom	3.3	2.3	3.3	3.3
1589	PI	452341	United Kingdom	2.9	3.0	2.5	2.3
1590	PI	452342	United Kingdom	3.4	2.8	2.7	2.4
1591	PI	452343	United Kingdom	2.8	2.5	2.7	3.2
1592	PI	452363	United Kingdom	3.1	2.9	3.0	3.1
1593	PI	452384	United Kingdom	3.0	3.2	1.8	1.7
1594	PI	452414	United Kingdom	3.2	2.7	3.0	3.0
1595	PI	466726	Sweden	3.0	3.3	3.8	4.0
1596	PI	466734	Mexico	2.6	2.5	2.3	2.3
1597	PI	467352	Norway	3.5	2.8	2.5	3.3
1598	PI	467354	Norway	3.6	2.8	3.8	3.9
1599	PI	467358	Norway	3.5	3.2	3.2	3.7
1600	PI	467359	Norway	4.0	3.5	3.8	3.8
1601	PI	467360	Norway	3.8	3.4	3.2	3.5
1602	PI	467361	Norway	3.3	3.3	3.7	4.0
1603	PI	467362	Norway	3.8	3.5	3.8	3.8
1604	PI	467363	Norway	3.7	3.3	3.3	3.5

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1605	PI	467364	Norway	3.7	3.0	3.2	4.0
1606	PI	467365	Mexico	3.6	3.5	3.8	3.6
1607	PI	467366	Mexico	2.0	2.3	1.0	1.3
1608	PI	467371	France	4.0	3.0	3.2	3.5
1609	PI	467372	France	4.0	3.3	2.8	3.5
1610	PI	467375	France	3.7	2.8	2.2	3.2
1611	PI	467382	France	3.7	3.2	3.3	4.2
1612	PI	467391	Japan	1.7	2.7	2.2	1.8
1613	PI	467408	Japan	3.1	2.8	2.5	2.8
1614	PI	467411	Finland	3.2	3.0	2.3	3.0
1615	PI	467412	Austria	3.3	2.6	3.0	3.4
1616	PI	467413	Czechoslovakia	3.4	3.1	3.0	3.4
1617	PI	467416	Czechoslovakia	3.0	2.9	3.5	3.6
1618	PI	467418	Czechoslovakia	3.6	3.0	3.0	2.9
1619	PI	467419	Czechoslovakia	2.7	3.0	2.5	2.7
1620	PI	467420	Czechoslovakia	3.5	3.5	3.2	2.9
1621	PI	467422	Czechoslovakia	3.5	3.5	3.0	3.3
1622	PI	467424	Slovakia	3.9	3.0	3.2	3.0
1623	PI	467428	Czechoslovakia	3.1	3.1	3.2	3.5
1624	PI	467438	Poland	3.1	2.9	4.3	3.5
1625	PI	467440	Poland	3.3	2.8	3.3	3.8
1626	PI	467443	Poland	3.5	2.8	2.7	3.2
1627	PI	467450	Poland	3.8	4.0	3.8	3.5
1628	PI	467454	Hungary	3.8	3.5	3.2	3.6
1629	PI	467460	Greece	3.0	3.0	2.8	2.7
1630	PI	467463	Greece	3.4	3.3	3.2	3.1
1631	PI	467467	Austria	3.8	3.5	3.3	3.4
1632	PI	467471	Austria	3.8	3.3	3.5	3.5
1633	PI	467477	Austria	3.1	2.9	3.2	3.1
1634	PI	467486	Austria	3.7	3.0	3.2	3.5
1635	PI	467519	Germany	3.2	2.8	3.0	3.4
1636	PI	467551	Austria	3.2	3.2	3.0	3.3
1637	PI	467587	Germany	3.3	3.3	3.7	3.8
1638	PI	467624	Finland	3.5	3.4	3.2	3.0
1639	PI	467625	Finland	3.3	2.9	3.3	2.9

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1640	PI	467637	Russian Federation	3.6	3.9	4.3	4.1
1641	PI	467657	United Kingdom	3.9	3.4	3.7	3.6
1642	PI	467663	Ireland	2.7	2.7	3.5	3.3
1643	PI	467684	Portugal	3.7	3.3	3.8	3.8
1644	PI	467686	Portugal	3.7	3.5	3.8	4.0
1645	PI	467687	Portugal	3.7	3.7	4.2	4.3
1646	PI	467689	Portugal	2.8	3.2	3.5	2.5
1647	PI	467691	Portugal	3.2	3.2	2.8	2.7
1648	PI	467692	Portugal	2.5	2.3	1.3	1.0
1649	PI	467693	Portugal	2.8	2.7	2.3	2.8
1650	PI	467729	Norway	3.8	2.3	4.0	4.0
1651	PI	467731	Norway	2.2	2.2	3.2	4.0
1652	PI	467732	Norway	3.9	2.9	3.2	3.4
1653	PI	467733	Norway	3.5	3.5	3.7	3.9
1654	PI	467735	Mexico	3.4	3.0	2.7	2.8
1655	PI	467737	Mexico	2.7	2.7	1.5	1.0
1656	PI	467738	Mexico	3.5	3.3	2.5	3.0
1657	PI	467739	Mexico	3.5	3.7	2.2	2.3
1658	PI	467740	Mexico	3.7	3.2	3.0	3.5
1659	PI	467743	Mexico	2.7	2.7	2.2	2.5
1660	PI	467749	Netherlands	2.5	2.2	2.8	3.2
1661	PI	467758	Japan	3.4	2.9	2.5	3.1
1662	PI	467764	India	2.7	2.3	1.8	2.0
1663	PI	467786	Netherlands	4.5	3.3	4.3	3.8
1664	PI	467789	Netherlands	3.3	3.5	3.5	4.2
1665	PI	467790	Denmark	3.5	3.5	3.2	3.4
1666	PI	467797	Greece	3.5	3.3	2.5	3.0
1667	PI	467808	Austria	3.7	2.8	3.5	3.7
1668	PI	467811	Austria	3.7	2.8	3.7	4.0
1669	PI	467814	Croatia	3.3	3.5	3.3	3.2
1670	PI	467815	Finland	3.4	3.4	2.7	2.9
1671	PI	467831	Poland	3.8	3.2	2.7	3.0
1672	PI	467834	Poland	3.8	3.3	3.2	3.7
1673	PI	467836	Poland	3.5	3.3	3.3	4.2
1674	PI	467839	Poland	3.0	2.8	4.0	4.0

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1675	PI	467840	Poland	3.0	3.2	3.7	3.8
1676	PI	467842	Brazil	3.4	3.6	2.7	2.8
1677	PI	467843	Brazil	3.3	3.5	3.7	3.8
1678	PI	467844	Brazil	3.3	3.3	2.7	2.5
1679	PI	467845	Brazil	3.5	2.9	2.5	2.8
1680	PI	467846	Brazil	2.8	3.3	2.7	3.0
1681	PI	467847	Brazil	4.0	3.4	3.0	3.4
1682	PI	467848	Brazil	3.4	3.0	2.8	3.6
1683	PI	467849	Brazil	3.0	3.1	2.7	2.9
1684	PI	467851	Brazil	3.7	3.3	2.5	3.2
1685	PI	473574	Canada	4.2	3.7	3.8	3.7
1686	PI	477765	Bolivia	2.7	3.0	1.5	1.5
1687	PI	477770	Peru	2.7	2.7	1.7	2.0
1688	PI	477775	Peru	3.1	2.6	2.2	2.6
1689	PI	477781	Peru	3.4	3.0	2.8	2.6
1690	PI	477792	Peru	3.7	3.2	2.5	3.0
1691	PI	477796	Peru	2.8	3.0	2.7	2.3
1692	PI	477836	Peru	2.8	3.1	2.7	3.5
1693	PI	477841	Peru	2.8	3.0	1.8	2.0
1694	PI	477844	Peru	2.0	2.1	1.2	1.8
1695	PI	477846	Bolivia	2.5	2.3	2.2	2.9
1696	PI	477847	Bolivia	2.2	3.0	1.5	2.2
1697	PI	477849	Bolivia	2.9	2.8	2.3	2.8
1698	PI	477852	Peru	2.3	2.5	1.5	1.5
1699	PI	477857	Bolivia	2.2	2.5	1.8	1.7
1700	PI	477858	Bolivia	2.3	2.7	2.0	1.8
1701	PI	477859	Bolivia	2.8	2.4	2.5	2.9
1702	PI	477860	Bolivia	2.8	2.5	2.0	2.6
1703	PI	478429	Bolivia	3.7	3.2	2.2	2.3
1704	PI	478430	Bolivia	3.4	2.9	2.5	2.9
1705	PI	478431	Bolivia	3.0	2.7	1.5	1.2
1706	PI	483048	Australia	2.0	1.3	2.8	2.7
1707	PI	485524	United Kingdom	3.5	2.3	2.8	3.3
1708	PI	485530	United Kingdom	3.5	3.0	3.2	3.9
1709	PI	485536	United Kingdom	3.8	3.2	4.0	4.0

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1710	PI	486152	Zimbabwe	4.0	3.1	3.3	3.5
1711	PI	490393	Mali	3.8	4.2	3.5	3.8
1712	PI	490394	Mali	3.8	3.5	3.5	3.5
1713	PI	494099	United States	3.8	3.0	3.8	3.8
1714	PI	498431	New Zealand	3.3	3.3	3.5	3.5
1715	PI	498432	New Zealand	3.7	2.8	3.2	3.3
1716	PI	498433	New Zealand	3.3	2.8	3.8	4.0
1717	PI	498434	New Zealand	3.3	2.3	3.2	3.3
1718	PI	498435	New Zealand	3.3	3.0	2.8	3.2
1719	PI	498436	New Zealand	3.7	3.0	3.7	4.0
1720	PI	498437	New Zealand	3.5	3.2	3.3	3.5
1721	PI	498438	New Zealand	3.3	3.5	3.0	3.7
1722	PI	498439	New Zealand	3.8	3.5	3.3	3.5
1723	PI	498440	New Zealand	3.4	2.8	3.7	4.1
1724	PI	506293	United Kingdom	3.0	2.8	3.3	3.7
1725	PI	506295	United Kingdom	3.0	2.8	4.0	4.3
1726	PI	506299	United Kingdom	3.3	3.0	3.2	3.7
1727	PI	506302	United Kingdom	3.2	3.3	3.0	3.7
1728	PI	510559	Peru	4.0	3.3	3.3	3.0
1729	PI	510565	Peru	2.2	2.0	1.3	1.7
1730	PI	513186	Pakistan	2.0	2.5	1.8	2.5
1731	PI	513205	Pakistan	1.0	2.8	1.7	1.8
1732	PI	513226	Pakistan	2.8	2.7	1.7	1.5
1733	PI	513231	Pakistan	2.8	2.8	2.0	2.2
1734	PI	516592	Morocco	3.8	3.7	3.0	3.0
1735	PI	525185	Finland	3.8	3.4	3.7	3.9
1736	PI	525187	Finland	3.7	3.2	3.8	4.2
1737	PI	525189	Finland	4.0	3.2	4.0	3.8
1738	PI	525199	France	3.2	3.3	2.8	2.7
1739	PI	531878	Egypt	3.3	3.0	3.3	2.7
1740	PI	531889	Egypt	2.9	3.0	3.3	3.1
1741	PI	531890	Egypt	2.3	2.3	3.0	2.7
1742	PI	531896	Egypt	2.2	2.8	2.2	2.5
1743	PI	531901	Egypt	3.2	2.7	3.0	3.5

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1744	PI	531905	Egypt	3.0	3.2	2.3	2.8
1745	PI	531908	Egypt	3.7	3.2	3.2	3.5
1746	PI	531913	Egypt	2.8	2.8	3.2	3.3
1747	PI	531917	Egypt	2.5	2.8	2.2	3.0
1748	PI	531937	Egypt	4.0	3.3	3.0	3.3
1749	PI	531968	Egypt	3.2	2.8	2.7	3.0
1750	PI	531971	Egypt	3.2	2.8	2.7	3.3
1751	PI	531980	Egypt	2.2	2.7	1.7	2.5
1752	PI	531984	Egypt	2.2	2.0	2.0	2.5
1753	PI	531986	Egypt	2.8	2.7	3.2	3.5
1754	PI	531991	Egypt	2.0	2.0	3.3	3.2
1755	PI	532000	Egypt	2.3	2.3	3.5	3.5
1756	PI	532013	Egypt	3.0	2.8	2.7	3.0
1757	PI	532024	Egypt	2.0	3.3	2.7	2.8
1758	PI	532035	Egypt	2.7	2.3	2.0	2.8
1759	PI	539120	Sweden	3.8	3.5	4.2	3.8
1760	PI	548107	Hungary	3.8	3.7	3.3	4.2
1761	PI	548707	Albania	3.3	3.3	2.8	3.0
1762	PI	548724	Afghanistan	3.0	3.7	2.0	2.7
1763	PI	548757	Greece	3.2	3.7	2.2	3.2
1764	PI	548758	Yemen	3.5	3.2	3.0	3.2
1765	PI	548760	Syria	2.2	1.5	2.8	3.3
1766	PI	548761	Israel	2.2	1.0	4.0	4.0
1767	PI	559494	Nepal	3.2	3.0	3.2	3.3
1768	PI	564456	Bulgaria	3.0	2.8	1.8	2.5
1769	PI	564461	Bulgaria	3.7	3.3	2.8	3.3
1770	PI	564468	Bulgaria	3.8	3.7	2.7	3.2
1771	PI	564470	Bulgaria	3.0	2.8	3.0	2.3
1772	PI	564477	Bulgaria	3.5	3.5	1.5	3.2
1773	PI	564478	Hungary	3.7	3.7	3.3	4.3
1774	PI	564487	Germany	4.0	2.8	3.8	4.2
1775	PI	564499	Bolivia	4.3	3.0	3.8	4.0
1776	PI	564500	Bolivia	3.5	3.2	3.0	3.2
1777	PI	564501	Bolivia	3.5	3.0	3.2	3.7

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1778	PI	564502	Bolivia	3.7	3.2	3.8	3.7
1779	PI	564503	Bolivia	2.8	2.8	2.2	2.3
1780	PI	564596	Bhutan	3.2	3.0	2.8	2.8
1781	PI	564597	Bhutan	3.0	2.7	2.8	3.2
1782	PI	564598	Bhutan	2.5	2.8	1.7	2.3
1783	PI	564602	Egypt	2.7	2.5	1.8	2.2
1784	PI	564627	Pakistan	3.2	2.5	1.8	1.8
1785	PI	564637	Syria	2.8	2.8	2.8	3.0
1786	PI	564646	Oman	3.5	3.0	2.8	2.2
1787	PI	564647	Oman	3.2	3.0	2.7	2.7
1788	PI	564648	Oman	3.0	3.0	2.3	3.0
1789	PI	564649	Oman	3.7	2.8	2.3	1.8
1790	PI	564666	Oman	3.3	2.7	3.7	3.5
1791	PI	564670	Oman	3.5	3.3	2.7	2.2
1792	PI	564671	Oman	3.7	2.7	2.7	2.2
1793	PI	564672	Oman	2.8	2.7	2.0	2.8
1794	PI	565550	China	3.2	3.7	2.7	2.8
1795	PI	565577	China	3.3	3.3	1.7	2.5
1796	PI	565731	China	2.8	2.8	2.0	2.3
1797	PI	565752	China	3.2	2.3	1.8	2.0
1798	PI	565786	China	3.5	3.2	2.3	2.2
1799	PI	565805	China	3.5	3.0	2.2	2.0
1800	PI	565826	China	3.7	2.3	1.8	1.7
1801	PI	565916	China	4.0	3.0	3.3	3.0
1802	PI	566061	China	3.2	3.2	3.8	3.8
1803	PI	566112	China	3.8	3.2	2.8	3.0
1804	PI	566140	China	2.5	3.0	1.5	1.2
1805	PI	566497	China	2.8	2.3	1.5	2.3
1806	PI	566574	China	3.8	3.0	3.0	3.2
1807	PI	572573	Israel	3.2	3.0	2.5	2.5
1808	PI	572588	China	3.2	2.5	2.7	2.3
1809	PI	572604	India	3.0	2.7	2.7	3.3
1810	PI	573588	Belarus	3.8	3.2	3.0	3.5
1811	PI	573591	Ukraine	2.7	2.8	2.0	2.3

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1812	PI	573594	Lithuania	4.0	3.2	3.7	3.8
1813	PI	573598	Ukraine	3.7	3.2	3.8	3.8
1814	PI	573608	Lithuania	3.5	2.8	3.5	3.7
1815	PI	573610	Armenia	2.3	2.7	3.0	2.7
1816	PI	573611	Cameroon	4.0	2.7	3.2	3.5
1817	PI	573615	Mongolia	3.2	1.7	2.3	2.3
1818	PI	573616	Tajikistan	4.0	3.7	2.8	3.3
1819	PI	573617	Latvia	4.2	3.0	3.3	3.8
1820	PI	573618	Mongolia	3.2	2.0	2.3	2.7
1821	PI	573659	Georgia	1.3	2.0	3.0	3.3
1822	PI	573660	Georgia	3.7	2.7	3.3	3.8
1823	PI	573661	Georgia	3.2	3.0	3.2	3.2
1824	PI	573662	Georgia	3.1	1.4	3.0	4.0
1825	PI	573663	Georgia	2.5	1.7	2.8	2.8
1826	PI	573668	Georgia	3.2	2.5	3.7	3.7
1827	PI	573672	Georgia	1.7	1.8	2.0	2.2
1828	PI	573675	Georgia	2.3	2.0	3.3	3.3
1829	PI	573682	Georgia	2.2	2.2	2.8	3.2
1830	PI	573687	Georgia	3.3	2.3	3.5	2.7
1831	PI	573695	Georgia	2.8	2.7	3.2	2.3
1832	PI	573701	Georgia	3.7	3.3	3.8	3.8
1833	PI	573702	Georgia	3.8	3.7	2.7	2.8
1834	PI	573703	Georgia	3.3	3.3	3.2	3.2
1835	PI	573706	Georgia	3.7	2.8	2.8	3.7
1836	PI	573757	Kazakhstan	2.7	2.5	3.3	3.2
1837	PI	573760	Nepal	2.7	2.8	1.8	2.8
1838	PI	573786	Nepal	2.8	3.2	2.0	2.8
1839	PI	573802	Nepal	3.2	2.0	1.5	2.0
1840	PI	573864	Nepal	3.5	3.3	3.7	3.2
1841	PI	573878	Nepal	2.7	3.2	3.5	2.8
1842	PI	573985	Nepal	3.0	3.2	3.3	3.2
1843	PI	574003	Nepal	2.8	3.2	3.7	3.2
1844	PI	574039	Nepal	2.8	3.3	3.5	3.3
1845	PI	574089	Nepal	2.8	3.7	3.0	2.8

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1846	PI	574091	Nepal	2.7	3.0	2.3	2.5
1847	PI	574094	Nepal	2.3	2.5	1.7	2.5
1848	PI	574302	China	3.8	2.8	3.0	3.2
1849	PI	574343	Saudi Arabia	3.0	2.8	1.5	2.0
1850	PI	584766	Australia	3.8	3.2	2.8	2.5
1851	PI	584786	Iraq	3.0	2.5	1.7	2.3
1852	PI	584803	Sweden	3.8	2.7	3.5	3.3
1853	PI	584807	Denmark	3.2	3.2	2.8	3.0
1854	PI	584855	France	3.0	3.3	2.7	3.0
1855	PI	584867	France	3.5	3.3	2.8	2.7
1856	PI	584886	France	3.2	3.2	2.0	2.3
1857	PI	584904	France	2.8	2.8	2.0	1.8
1858	PI	584939	China	2.7	2.2	3.0	2.7
1859	PI	584954	China	3.8	2.2	3.5	3.2
1860	PI	584962	China	3.5	2.2	2.7	3.0
1861	PI	584963	China	2.8	2.5	1.5	1.8
1862	PI	584971	China	3.3	3.5	1.3	1.7
1863	PI	584973	China	4.0	3.2	3.2	3.3
1864	PI	584974	China	2.7	3.0	1.5	1.8
1865	PI	584977	China	2.3	3.2	1.8	1.2
1866	PI	584978	China	2.7	1.7	1.5	1.7
1867	PI	584979	China	3.0	2.3	1.5	1.8
1868	PI	586961	Egypt	2.7	2.2	1.3	2.2
1869	PI	591876	Georgia	3.5	3.0	2.8	2.7
1870	PI	591926	Australia	2.5	3.2	3.7	3.0
1871	PI	591928	Australia	3.3	3.0	3.2	3.2
1872	PI	591958	Indonesia	2.3	3.3	2.5	2.3
1873	PI	592167	United Kingdom	4.3	3.5	3.3	3.5
1874	PI	592169	United Kingdom	3.2	2.5	3.8	3.7
1875	PI	592170	United Kingdom	3.5	3.3	3.3	3.7
1876	PI	592172	United Kingdom	3.3	2.8	3.8	3.8
1877	PI	592173	United Kingdom	2.7	2.5	2.7	2.8
1878	PI	592188	United Kingdom	3.7	3.0	3.5	3.2
1879	PI	592196	United Kingdom	3.2	3.2	3.7	3.3

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1880	PI	592240	United Kingdom	4.5	3.8	3.7	3.5
1881	PI	592250	United Kingdom	3.3	3.3	4.0	3.8
1882	PI	592261	United Kingdom	3.7	3.7	3.5	3.7
1883	PI	592263	United Kingdom	3.5	3.3	3.2	3.0
1884	PI	592264	United Kingdom	3.7	3.0	3.7	3.3
1885	PI	592267	United Kingdom	3.8	3.2	4.2	3.3
1886	PI	592271	United Kingdom	4.0	3.2	3.3	3.3
1887	PI	592275	United Kingdom	2.8	2.8	3.0	2.7
1888	PI	592276	United Kingdom	2.8	3.0	2.8	3.2
1889	PI	592277	United Kingdom	3.7	3.2	3.0	2.2
1890	PI	592282	United Kingdom	2.8	1.7	3.3	3.3
1891	PI	592797	Canada	2.5	3.0	1.8	1.5
1892	PI	595789	United States	2.8	2.2	3.1	3.0
1893	PI	599621	Czech Republic	3.0	2.7	3.4	3.0
1894	PI	599622	Czech Republic	4.3	2.8	4.0	4.0
1895	PI	599625	Czech Republic	3.0	3.3	3.8	3.3
1896	PI	599627	Czech Republic	3.4	2.8	2.8	3.0
1897	PI	599628	Slovakia	3.8	3.3	2.2	3.3
1898	PI	599633	Czech Republic	3.8	3.3	2.7	3.2
1899	PI	599637	Czech Republic	3.8	3.0	3.5	3.5
1900	PI	599640	Czech Republic	3.4	2.7	3.0	3.2
1901	PI	599649	Czech Republic	3.3	2.7	3.5	3.5
1902	PI	599650	Czech Republic	2.5	2.3	2.5	2.8
1903	PI	599656	China	3.5	2.8	3.4	3.2
1904	PI	599659	Nepal	3.5	2.5	3.3	3.5
1905	PI	601065	United States	2.7	2.7	2.2	2.2
1906	PI	604775	United Kingdom	3.5	3.3	2.8	3.3
1907	PI	605472	United States	4.0	3.3	3.5	3.3
1908	PI	605699	Canada	3.0	2.8	2.7	3.0
1909	PI	606305	Saudi Arabia	3.7	2.0	2.3	2.8
1910	PI	606311	Saudi Arabia	3.3	3.3	3.0	3.0
1911	PI	608667	United States	3.2	3.7	3.5	3.3
1912	PI	608763	United States	3.2	3.2	3.2	3.3
1913	PI	610229	China	2.2	1.3	1.3	1.7

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1914	PI	610230	China	3.3	2.5	1.5	1.8
1915	PI	610233	China	2.8	2.3	1.3	1.2
1916	PI	611139	Canada	2.9	2.0	2.6	2.3
1917	PI	611472	Hungary	3.3	3.2	3.3	2.7
1918	PI	611473	Hungary	3.3	2.3	3.1	3.5
1919	PI	611480	Korea, North	3.8	3.0	2.0	3.0
1920	PI	611493	China	3.2	3.3	2.3	2.2
1921	PI	611502	Russian Federation	3.3	3.0	2.6	3.3
1922	PI	611503	Georgia	3.2	3.0	3.7	3.2
1923	PI	611511	Ukraine	3.3	3.2	3.0	3.3
1924	PI	611512	Russian Federation	3.7	3.2	3.3	3.5
1925	PI	611513	Ukraine	3.3	2.8	3.0	3.2
1926	PI	611526	Ukraine	3.0	2.3	2.3	3.0
1927	PI	611527	Ukraine	4.3	3.3	3.8	3.5
1928	PI	611534	Belarus	3.0	2.7	3.2	3.0
1929	PI	611536	Estonia	3.2	2.7	2.8	3.2
1930	PI	611544	Ukraine	2.8	3.5	4.2	4.3
1931	PI	611548	Ukraine	3.7	3.2	3.8	3.3
1932	PI	611555	Russian Federation	3.5	3.2	2.8	3.3
1933	PI	611562	Russian Federation	2.7	2.5	2.5	3.0
1934	PI	611576	Ukraine	3.2	2.7	2.8	2.7
1935	PI	611579	Russian Federation	3.6	3.3	3.9	3.8
1936	PI	611592	Tajikistan	3.8	3.8	2.0	2.0
1937	PI	611599	Russian Federation	3.2	2.8	2.2	2.5
1938	PI	614939	Czech Republic	3.8	3.0	2.8	2.5
1939	PI	620640	Canada	2.3	2.0	1.8	2.3
1940	PI	629116	United States	3.5	3.0	3.0	2.8
1941	PI	632274	United States	2.7	2.7	2.2	2.5
1942	PI	636056	Hungary	2.7	3.0	2.0	2.0
1943	PI	636057	Hungary	3.0	3.3	2.8	2.8
1944	PI	636060	Hungary	3.8	3.0	3.1	3.0
1945	PI	636084	China	3.3	2.7	2.2	2.3
1946	PI	636097	China	2.8	2.7	2.1	2.8
1947	PI	637845	United States	3.8	3.3	3.8	3.5

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1948	PI	639299	Kazakhstan	3.0	3.5	2.8	2.5
1949	PI	639300	Kazakhstan	2.8	3.5	2.3	2.3
1950	PI	639344	Tajikistan	3.5	2.7	2.6	3.0
1951	PI	639345	Tajikistan	3.7	3.8	2.8	2.2
1952	PI	639346	Tajikistan	3.5	3.0	2.6	2.7
1953	PI	639357	Tajikistan	2.8	3.2	2.6	3.2
1954	PI	639999	United States	3.5	2.8	2.6	2.8
1955	PI	640006	United States	2.9	2.7	2.6	2.5
1956	PI	640008	United States	2.8	2.8	2.9	2.7
1957	PI	640028	United States	2.9	2.7	3.1	3.7
1958	PI	640034	United States	3.4	3.0	2.8	3.0
1959	PI	640068	United States	3.6	3.0	2.8	3.0
1960	PI	640069	United States	3.4	3.0	2.9	3.2
1961	PI	640077	United States	2.6	3.0	2.5	2.3
1962	PI	640079	United States	2.3	3.2	2.3	2.0
1963	PI	640095	United States	3.1	3.0	2.4	2.3
1964	PI	640096	United States	3.6	3.2	2.9	3.0
1965	PI	640100	United States	3.8	3.0	2.5	3.2
1966	PI	640117	United States	3.6	3.2	2.3	2.7
1967	PI	640132	United States	3.5	3.2	2.1	2.0
1968	PI	640149	United States	3.1	3.0	1.9	2.0
1969	PI	640153	United States	2.3	2.0	2.3	2.5
1970	PI	640154	United States	2.6	2.5	2.9	3.2
1971	PI	640159	United States	3.1	2.5	3.0	3.2
1972	PI	640161	United States	3.8	3.0	3.5	3.2
1973	PI	640166	United States	3.4	3.0	3.1	3.5
1974	PI	640167	United States	2.5	2.8	2.9	3.2
1975	PI	640170	United States	2.8	2.7	2.8	2.7
1976	PI	640174	United States	2.4	2.8	2.9	3.2
1977	PI	640176	United States	3.3	2.7	2.8	3.3
1978	PI	640177	United States	3.0	3.0	3.0	2.8
1979	PI	640183	United States	3.6	3.3	3.8	3.8
1980	PI	640187	United States	3.8	3.2	3.5	3.8
1981	PI	640201	United States	3.5	3.5	2.9	3.3
1982	PI	640203	United States	3.9	3.3	2.8	3.0

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
1983	PI	640207	United States	3.4	2.8	2.9	2.8
1984	PI	640214	United States	2.1	2.0	2.4	2.8
1985	PI	640220	United States	3.3	3.2	3.1	3.3
1986	PI	640222	United States	2.8	2.8	2.5	2.5
1987	PI	640226	United States	3.8	3.3	3.4	3.0
1988	PI	640227	United States	2.0	2.5	2.5	2.8
1989	PI	640234	United States	3.2	3.0	2.5	2.7
1990	PI	640236	United States	3.4	3.2	2.8	3.2
1991	PI	640250	United States	3.4	3.2	3.4	3.7
1992	PI	640259	United States	3.6	2.7	2.9	3.0
1993	PI	640265	United States	3.5	3.5	3.0	2.8
1994	PI	640272	United States	2.6	2.7	2.4	2.7
1995	PI	640273	United States	3.1	2.8	2.9	3.0
1996	PI	640286	United States	2.8	3.2	2.8	2.7
1997	PI	640292	United States	3.0	2.2	2.3	2.5
1998	PI	640295	United States	3.0	2.3	2.4	2.7
1999	PI	640298	United States	2.8	3.3	2.8	2.8
2000	PI	640315	United States	3.3	2.2	1.9	2.2
2001	PI	640321	United States	3.8	3.3	2.1	2.6
2002	PI	640336	United States	3.3	3.3	2.8	3.0
2003	PI	640339	United States	2.8	2.3	2.4	3.0
2004	PI	640340	United States	3.7	3.5	3.0	3.1
2005	PI	640342	United States	3.3	3.3	3.5	3.6
2006	PI	640343	United States	3.0	2.8	3.0	3.3
2007	PI	640346	United States	3.7	3.2	2.6	2.8
2008	PI	640358	United States	4.0	4.2	2.8	3.0
2009	PI	640359	United States	3.3	2.8	2.4	2.4
2010	PI	640361	United States	2.5	2.8	1.9	1.8
2011	PI	640366	United States	2.7	1.8	2.9	2.8
2012	PI	640375	United States	2.0	2.2	2.1	2.5
2013	PI	640376	United States	3.7	3.2	2.8	2.8
2014	PI	640379	United States	3.7	3.2	3.6	3.4
2015	PI	640382	United States	2.0	1.2	1.4	1.0
2016	PI	640384	United States	3.7	3.2	2.8	3.1
2017	PI	640385	United States	4.2	3.3	3.0	3.5

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
2018	PI	640390	United States	2.7	3.3	1.5	1.6
2019	PI	640391	United States	2.8	3.5	2.1	2.4
2020	PI	640395	United States	2.5	1.8	2.0	2.4
2021	PI	640400	United States	2.7	2.8	2.8	2.9
2022	PI	640408	United States	3.3	3.0	3.3	3.3
2023	PI	640416	United States	3.8	3.3	3.4	3.3
2024	PI	643210	United States	2.7	3.5	3.3	3.1
2025	PI	643211	United States	2.8	3.0	2.4	3.0
2026	PI	643212	United States	3.0	2.5	2.3	2.6
2027	PI	643215	United States	3.7	3.3	2.0	2.5
2028	PI	643226	United States	3.3	2.5	3.1	3.1
2029	PI	643227	United States	4.0	3.3	3.8	4.3
2030	PI	643228	United States	4.0	3.7	3.0	3.2
2031	PI	643231	United States	2.7	3.2	2.3	2.8
2032	PI	643232	United States	3.5	2.7	3.2	3.8
2033	PI	643242	United States	3.0	2.5	2.4	2.9
2034	PI	643244	United States	2.5	3.5	2.3	2.2
2035	PI	643247	United States	3.2	3.0	2.6	3.1
2036	PI	643257	United States	3.2	3.0	3.4	3.1
2037	PI	643260	United States	3.3	3.3	2.7	2.8
2038	PI	643267	United States	3.3	3.0	2.8	3.0
2039	PI	643271	United States	3.5	3.2	2.6	3.0
2040	PI	643272	United States	3.0	3.3	2.9	3.3
2041	PI	643274	United States	3.5	3.3	2.8	3.0
2042	PI	643283	United States	1.8	2.7	2.5	3.0
2043	PI	643288	United States	3.2	3.2	3.1	3.3
2044	PI	643292	United States	3.2	3.5	3.3	3.1
2045	PI	643294	United States	3.0	3.0	3.3	3.3
2046	PI	643307	United States	2.8	3.2	2.5	3.0
2047	PI	643310	United States	2.2	2.7	1.2	1.7
2048	PI	643314	United States	2.8	3.0	2.2	2.7
2049	PI	643322	United States	2.3	2.7	2.5	1.9
2050	PI	643323	United States	3.3	3.0	2.9	2.6
2051	PI	643336	United States	3.8	3.2	3.3	3.3
2052	PI	643339	United States	2.8	2.7	2.0	2.3

S. N.	ACP	ACNO	Country of origin	FGO	SG1	NZKF2	DEN 2.6
2053	PI	643361	United States	3.3	3.2	2.5	2.5
2054	PI	643362	United States	3.2	3.0	2.0	1.8
2055	PI	643364	United States	2.8	3.2	1.8	2.3
2056	PI	643368	United States	3.2	3.0	2.5	2.5
2057	PI	643369	United States	3.8	2.7	3.1	2.9
2058	PI	643370	United States	3.0	3.0	3.6	3.3
2059	PI	643376	United States	2.8	2.5	3.0	2.8
2060	PI	643377	United States	2.5	2.8	2.6	2.4
2061	PI	643383	United States	2.3	2.8	2.3	2.1
2062	PI	643391	United States	3.2	2.3	2.8	2.9