Supplementary table 1. List of released and prospective cultivars of spring wheat growing in Kazakhstan

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Cultivar name** | **Cultivar status in Kazakhstan** | **Year of release** | **Region of growth in Kazakhstan (used in Fig. 2)** | **Country of originator** | **Cluster in Fig 1.** |
| **WKZ1** | Avangard | released | 2005 | Eastern | KZb | IV |
| **WKZ2** | Akmola 2 | released | 1998 | Northern | KZ | IV |
| **WKZ3** | Aktyube 39 | released | 2008 | Western | KZ | IV |
| **WKZ4** | Aktyubinka | prospective | n/aa | n/a | KZ | IV |
| **WKZ5** | Almaken | released | 2011 | Southern | KZ | III |
| **WKZ6** | Altay | released | 2006 | Eastern | KZ | IV |
| **WKZ7** | Altayskaya 110 | prospective | n/a | n/a | RFc | IV |
| **WKZ8** | Altayskaya 325 | released | 2006 | Eastern | RF | IV |
| **WKZ9** | Altayskaya 98 | prospective | n/a | n/a | KZ | IV |
| **WKZ10** | Altayskaya stepnaya | prospective | n/a | n/a | RF | IV |
| **WKZ11** | Albidum 188 | prospective | n/a | n/a | RF | IV |
| **WKZ12** | Arai | released | 1999 | Southern | KZ | I |
| **WKZ13** | Astana | released | 2004 | Northern | KZ | IV |
| **WKZ14** | Astana 2 | released | 2008 | Northeastern | KZ | IV |
| **WKZ15** | Baiterek | released | 2008 | Eastern | KZ | IV |
| **WKZ16** | Vera | released | 1985 | Eastern | RF | III |
| **WKZ17** | Volgouralskaya | released | 2003 | Western | RF | IV |
| **WKZ18** | Darina | prospective | n/a | n/a | KZ | IV |
| **WKZ19** | Dauyl | prospective | n/a | n/a | KZ | IV |
| **WKZ20** | Ertys 7 | released | 2011 | Northeastern | KZ | IV |
| **WKZ21** | Ertys-97 | released | 2003 | Northeastern | KZ | IV |
| **WKZ22** | Zhenis | released | 2006 | Southern | KZ | III |
| **WKZ23** | Zaulbinka | prospective | n/a | n/a | KZ | IV |
| **WKZ24** | Kazakhstankaya 15 | released | 1993 | Northeastern | KZ | III |
| **WKZ25** | Kazakhstankaya 25 | released | 1997 | Northern | KZ | IV |
| **WKZ26** | Kazakhstankaya 4 | released | 1980 | Southern | KZ | I |
| **WKZ27** | Kazakhstankaya rannespelaya | released | 1991 | Center | KZ | III |
| **WKZ28** | Karabalykskaya 2 | prospective | n/a | n/a | KZ | I |
| **WKZ29** | Karabalykskaya 25 | prospective | n/a | n/a | KZ | IV |
| **WKZ30** | Karabalykskaya 3 | prospective | n/a | n/a | KZ | III |
| **WKZ31** | Karabalykskaya 9 | prospective | n/a | n/a | KZ | III |
| **WKZ32** | Karabalykskaya 90 | released | 1995 | Northern | KZ | II |
| **WKZ33** | Karabalykskaya 92 | released | 1997 | Eastern | KZ | IV |
| **WKZ34** | Karagandinskaya 22 | released | 2004 | Central | KZ | IV |
| **WKZ35** | Karagandinskaya 25 | prospective | n/a | n/a | KZ | IV |
| **WKZ36** | Karagandinskaya 29 | prospective | n/a | n/a | KZ | IV |
| **WKZ37** | Omskaya 28 | prospective | n/a | Northern | RF | IV |
| **WKZ38** | Kazragandinskaya 70 | released | 1992 | Central | KZ | IV |
| **WKZ39** | Kenzhegali | prospective | n/a | n/a | KZ | IV |
| **WKZ40** | Oral | prospective | n/a | n/a | KZ | IV |
| **WKZ41** | Kutulukskaya | released | 1982 | Eastern | RF | IV |
| **WKZ42** | Lyubava | released | 2003 | Northern | KZ | II |
| **WKZ43** | Lutescens 32 | released | 1996 | Northeastern | KZ | II |
| **WKZ44** | Lutescens 5 | prospective | n/a | n/a | KZ | IV |
| **WKZ45** | Lutescens 521 | released | 1993 | Eastern | RF | I |
| **WKZ46** | Lutescens 90 | released | 1996 | Northern | KZ | IV |
| **WKZ47** | Lyazzat | released | 2011 | Eastern | KZ | IV |
| **WKZ48** | Miras | released | 2002 | Southern | KZ | III |
| **WKZ49** | Nadezhda | released | 2004 | Southern | KZ | III |
| **WKZ50** | Nargiz | released | 2011 | Eastern | KZ | IV |
| **WKZ51** | Niva 2 | prospective | n/a | n/a | RF | III |
| **WKZ52** | Omskaya 18 | released | 1991 | Northeastern | RF | IV |
| **WKZ53** | Omskaya 19 | released | 1989 | Northern | RF | III |
| **WKZ54** | Omskaya 20 | released | 1996 | Northern | RF | IV |
| **WKZ55** | Omskaya 24 | released | 2004 | Northern | RF | IV |
| **WKZ57** | Omskaya 29 | released | 2002 | Northern | RF | II |
| **WKZ58** | Omskaya 30 | released | 2002 | Northern | RF | II |
| **WKZ59** | Omskaya 35 | released | 2008 | Northern | RF | II |
| **WKZ60** | Omskaya 36 | released | 2009 | Northern | RF | II |
| **WKZ61** | Orenburgskaya 10 | prospective | n/a | n/a | RF | II |
| **WKZ62** | Pavlodarskaya 93 | released | 1999 | Northeastern | KZ | IV |
| **WKZ63** | Karagandinskaya 30 | prospective | n/a | n/a | KZ | II |
| **WKZ64** | Pamyati Azieva | released | 2004 | Northeastern | RF | IV |
| **WKZ66** | Rosinka 3 | released | 2004 | Northern | RF | IV |
| **WKZ67** | Samad | prospective | n/a | n/a | KZ | outgroup |
| **WKZ68** | Samgau | released | 2012 | Northeastern | KZ | III |
| **WKZ69** | Saratovskaya29 | released | 1957 | Northeastern | RF | IV |
| **WKZ70** | Saratovskaya42 | released | 1974 | Western | RF | III |
| **WKZ71** | Saratovskaya55 | released | 1990 | Western | RF | IV |
| **WKZ72** | Saratovskaya56 | prospective | n/a | n/a | RF | IV |
| **WKZ73** | Saratovskaya58 | released | 1993 | Eastern | RF | II |
| **WKZ74** | Saratovskaya60 | released | 2007 | Western | RF | IV |
| **WKZ75** | Saratovskaya66 | prospective | n/a | n/a | RF | IV |
| **WKZ76** | Saratovskaya Yugo-Vostochanya | prospective | n/a | n/a | RF | II |
| **WKZ77** | Severyanka | released | 2011 | Northern | KZ | II |
| **WKZ78** | Seke | released | 2008 | Central | KZ | IV |
| **WKZ79** | Nargiz | prospective | n/a | Eastern | KZ | IV |
| **WKZ80** | Stepnaya 1 | prospective | n/a | n/a | KZ | IV |
| **WKZ81** | Ulbinka 25 | released | 1989 | Eastern | KZ | IV |
| **WKZ82** | Tselina 50 | released | 2010 | Central | KZ | IV |
| **WKZ83** | Tselinnaya 24 | released | 1993 | Northern | KZ | IV |
| **WKZ84** | Tselinnaya 26 | released | 1986 | Eastern | KZ | IV |
| **WKZ85** | Tselinnaya 3С | released | 1996 | Northern | KZ | IV |
| **WKZ86** | Tselinnaya Юб. | released | 1988 | Northern | KZ | IV |
| **WKZ87** | Shortandinskaya 2007 | released | 2012 | Western | KZ | IV |
| **WKZ88** | Shortandinskaya 95 uluchshennaya | released | 2006 | Northern | KZ | IV |
| **WKZ89** | Эритроспермум 35 | released | 1991 | Central | KZ | IV |
| **WKZ90** | Yugo-Vostochnaya 2 | released | 2007 | Western | RF | IV |
| **WKZ91** | Yugo-Vostochnaya 3 | prospective | n/a | n/a | RF | II |
| **WKZ92** | Kazakhstan 20 | prospective | n/a | n/a | KZ | IV |

a, information is not available

b, Kazakhstan

c, Russian Federation