

Genetical and cytological studies on some crosses between wheat and

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The present investigation was carried out through the five successive seasons 1988/1989, 1989/1990, 1990/1991, 1991/1992 and / 1993 to investigate the following points: i) crossability of wheat with rye, ii) To Synthesize primary triticale, iii) to study the chromosomal instability of the studied materials and, iv) to evaluate the studied materials on the basis of C-banding technique. The materials used for this study were 11 hexaploid wheat varieties, 4 tetraploid durum wheat varieties, and 2 diploid rye varieties. Plants were grown and crossed under field conditions. For each cross combination, the number of florets pollinated and seed set was recorded 18 days post pollination. The developed seeds were recovered and embryos were rescued and cultured on artificial media to produce haploid plants, then treated with 0.05% colchicine + 1.5% DMSO for 5 hours. The obtained results could be summarized as follows: i) crossability of wheat with rye: Wheat varieties exhibit significant differences with respect to their crossability with rye, furthermore the same wheat varieties show different crossability percentages with the same rye variety. Seed set for hexaploid wheat varieties ranged from 2.3% to 15% in the case of rye Prolific whereas it ranged from 1.6% to 11.1% for rye Imperial. The variety Giza 163 displays the highest seed set with both rye varieties i.e. 15% with Prolific and 11.1% with Imperial. However the variety Sakba 69 gave the lowest seed set percentage with both rye varieties i.e. 2.3% with Prolific and 1.6% with Imperial. Tetraploid wheat varieties show lower seed set percentage than the hexaploid wheat varieties. Seed set percentages ranged from 2% to 3.3% for rye Prolific and from 1.2% to 6% with rye Imperial. The variety Suhag 1 exhibits the highest seed set percentage 6% with rye Imperial, since the variety Beni-Suef 1 shows the lowest seed set percentage 1.2% with rye Imperial. These data indicate that the genotype of the variety Giza 163 could be K1K1Kr2kr2 whereas the rest of wheat genotypes could be K1K1Kr2Kr2. ii) Cytological studies: a) Mitotic instability: It has been observed that there is a wide variation in number of seeds having well-differentiated embryos. The cross Suhag 1 X Prolific displays the lowest percentage 30%, while the cross Suhag 3 X Imperial shows the highest percentage 59%. With respect to haploid plants, the different crosses show clear differences in percentage of resulted haploid plants. These percentages ranged from 53% to 71%. Similarly, the different crosses exhibit clear differences in their response to colchicine treatment, the percentages of successfully doubled plants ranged from 50% to 80%. The crosses also show different numbers of hybrid seeds or obtained from doubled plants, the cross Beni-Suef 1 X Imperial exhibits the highest seed number, 11.5 seeds/plant. On the other hand, the cross Suhag 3 X Prolific gave the lowest number 4.5 seeds/plant. b) Aneuploidy: i) Mitotic instability: The different crosses display different degrees of chromosomal instability as expressed by the percentage of aneuploids. The percentages ranged from 17.1% to 31.7%. The majority of these plants are hypoploids (2n, 2n-1, 2n-2, 2n-3, 2n-4, 2n-5, 2n-6, 2n-7, 2n-8, 2n-9, 2n-10, 2n-11, 2n-12, 2n-13, 2n-14, 2n-15, 2n-16, 2n-17, 2n-18, 2n-19, 2n-20, 2n-21, 2n-22, 2n-23, 2n-24, 2n-25, 2n-26, 2n-27, 2n-28, 2n-29, 2n-30, 2n-31, 2n-32, 2n-33, 2n-34, 2n-35, 2n-36, 2n-37, 2n-38, 2n-39, 2n-40, 2n-41, 2n-42, 2n-43, 2n-44, 2n-45, 2n-46, 2n-47, 2n-48, 2n-49, 2n-50, 2n-51, 2n-52, 2n-53, 2n-54, 2n-55, 2n-56, 2n-57, 2n-58, 2n-59, 2n-60, 2n-61, 2n-62, 2n-63, 2n-64, 2n-65, 2n-66, 2n-67, 2n-68, 2n-69, 2n-70, 2n-71, 2n-72, 2n-73, 2n-74, 2n-75, 2n-76, 2n-77, 2n-78, 2n-79, 2n-80, 2n-81, 2n-82, 2n-83, 2n-84, 2n-85, 2n-86, 2n-87, 2n-88, 2n-89, 2n-90, 2n-91, 2n-92, 2n-93, 2n-94, 2n-95, 2n-96, 2n-97, 2n-98, 2n-99, 2n-100, 2n-101, 2n-102, 2n-103, 2n-104, 2n-105, 2n-106, 2n-107, 2n-108, 2n-109, 2n-110, 2n-111, 2n-112, 2n-113, 2n-114, 2n-115, 2n-116, 2n-117, 2n-118, 2n-119, 2n-120, 2n-121, 2n-122, 2n-123, 2n-124, 2n-125, 2n-126, 2n-127, 2n-128, 2n-129, 2n-130, 2n-131, 2n-132, 2n-133, 2n-134, 2n-135, 2n-136, 2n-137, 2n-138, 2n-139, 2n-140, 2n-141, 2n-142, 2n-143, 2n-144, 2n-145, 2n-146, 2n-147, 2n-148, 2n-149, 2n-150, 2n-151, 2n-152, 2n-153, 2n-154, 2n-155, 2n-156, 2n-157, 2n-158, 2n-159, 2n-160, 2n-161, 2n-162, 2n-163, 2n-164, 2n-165, 2n-166, 2n-167, 2n-168, 2n-169, 2n-170, 2n-171, 2n-172, 2n-173, 2n-174, 2n-175, 2n-176, 2n-177, 2n-178, 2n-179, 2n-180, 2n-181, 2n-182, 2n-183, 2n-184, 2n-185, 2n-186, 2n-187, 2n-188, 2n-189, 2n-190, 2n-191, 2n-192, 2n-193, 2n-194, 2n-195, 2n-196, 2n-197, 2n-198, 2n-199, 2n-200, 2n-201, 2n-202, 2n-203, 2n-204, 2n-205, 2n-206, 2n-207, 2n-208, 2n-209, 2n-210, 2n-211, 2n-212, 2n-213, 2n-214, 2n-215, 2n-216, 2n-217, 2n-218, 2n-219, 2n-220, 2n-221, 2n-222, 2n-223, 2n-224, 2n-225, 2n-226, 2n-227, 2n-228, 2n-229, 2n-230, 2n-231, 2n-232, 2n-233, 2n-234, 2n-235, 2n-236, 2n-237, 2n-238, 2n-239, 2n-240, 2n-241, 2n-242, 2n-243, 2n-244, 2n-245, 2n-246, 2n-247, 2n-248, 2n-249, 2n-250, 2n-251, 2n-252, 2n-253, 2n-254, 2n-255, 2n-256, 2n-257, 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2n-508, 2n-509, 2n-510, 2n-511, 2n-512, 2n-513, 2n-514, 2n-515, 2n-516, 2n-517, 2n-518, 2n-519, 2n-520, 2n-521, 2n-522, 2n-523, 2n-524, 2n-525, 2n-526, 2n-527, 2n-528, 2n-529, 2n-530, 2n-531, 2n-532, 2n-533, 2n-534, 2n-535, 2n-536, 2n-537, 2n-538, 2n-539, 2n-540, 2n-541, 2n-542, 2n-543, 2n-544, 2n-545, 2n-546, 2n-547, 2n-548, 2n-549, 2n-550, 2n-551, 2n-552, 2n-553, 2n-554, 2n-555, 2n-556, 2n-557, 2n-558, 2n-559, 2n-560, 2n-561, 2n-562, 2n-563, 2n-564, 2n-565, 2n-566, 2n-567, 2n-568, 2n-569, 2n-570, 2n-571, 2n-572, 2n-573, 2n-574, 2n-575, 2n-576, 2n-577, 2n-578, 2n-579, 2n-580, 2n-581, 2n-582, 2n-583, 2n-584, 2n-585, 2n-586, 2n-587, 2n-588, 2n-589, 2n-590, 2n-591, 2n-592, 2n-593, 2n-594, 2n-595, 2n-596, 2n-597, 2n-598, 2n-599, 2n-600, 2n-601, 2n-602, 2n-603, 2n-604, 2n-605, 2n-606, 2n-607, 2n-608, 2n-609, 2n-610, 2n-611, 2n-612, 2n-613, 2n-614, 2n-615, 2n-616, 2n-617, 2n-618, 2n-619, 2n-620, 2n-621, 2n-622, 2n-623, 2n-624, 2n-625, 2n-626, 2n-627, 2n-628, 2n-629, 2n-630, 2n-631, 2n-632, 2n-633, 2n-634, 2n-635, 2n-636, 2n-637, 2n-638, 2n-639, 2n-640, 2n-641, 2n-642, 2n-643, 2n-644, 2n-645, 2n-646, 2n-647, 2n-648, 2n-649, 2n-650, 2n-651, 2n-652, 2n-653, 2n-654, 2n-655, 2n-656, 2n-657, 2n-658, 2n-659, 2n-660, 2n-661, 2n-662, 2n-663, 2n-664, 2n-665, 2n-666, 2n-667, 2n-668, 2n-669, 2n-670, 2n-671, 2n-672, 2n-673, 2n-674, 2n-675, 2n-676, 2n-677, 2n-678, 2n-679, 2n-680, 2n-681, 2n-682, 2n-683, 2n-684, 2n-685, 2n-686, 2n-687, 2n-688, 2n-689, 2n-690, 2n-691, 2n-692, 2n-693, 2n-694, 2n-695, 2n-696, 2n-697, 2n-698, 2n-699, 2n-700, 2n-701, 2n-702, 2n-703, 2n-704, 2n-705, 2n-706, 2n-707, 2n-708, 2n-709, 2n-710, 2n-711, 2n-712, 2n-713, 2n-714, 2n-715, 2n-716, 2n-717, 2n-718, 2n-719, 2n-720, 2n-721, 2n-722, 2n-723, 2n-724, 2n-725, 2n-726, 2n-727, 2n-728, 2n-729, 2n-730, 2n-731, 2n-732, 2n-733, 2n-734, 2n-735, 2n-736, 2n-737, 2n-738, 2n-739, 2n-740, 2n-741, 2n-742, 2n-743, 2n-744, 2n-745, 2n-746, 2n-747, 2n-748, 2n-749, 2n-750, 2n-751, 2n-752, 2n-753, 2n-754, 2n-755, 2n-756, 2n-757, 2n-758, 2n-759, 2n-760, 2n-761, 2n-762, 2n-763, 2n-764, 2n-765, 2n-766, 2n-767, 2n-768, 2n-769, 2n-770, 2n-771, 2n-772, 2n-773, 2n-774, 2n-775, 2n-776, 2n-777, 2n-778, 2n-779, 2n-780, 2n-781, 2n-782, 2n-783, 2n-784, 2n-785, 2n-786, 2n-787, 2n-788, 2n-789, 2n-790, 2n-791, 2n-792, 2n-793, 2n-794, 2n-795, 2n-796, 2n-797, 2n-798, 2n-799, 2n-800, 2n-801, 2n-802, 2n-803, 2n-804, 2n-805, 2n-806, 2n-807, 2n-808, 2n-809, 2n-810, 2n-811, 2n-812, 2n-813, 2n-814, 2n-815, 2n-816, 2n-817, 2n-818, 2n-819, 2n-820, 2n-821, 2n-822, 2n-823, 2n-824, 2n-825, 2n-826, 2n-827, 2n-828, 2n-829, 2n-830, 2n-831, 2n-832, 2n-833, 2n-834, 2n-835, 2n-836, 2n-837, 2n-838, 2n-839, 2n-840, 2n-841, 2n-842, 2n-843, 2n-844, 2n-845, 2n-846, 2n-847, 2n-848, 2n-849, 2n-850, 2n-851, 2n-852, 2n-853, 2n-854, 2n-855, 2n-856, 2n-857, 2n-858, 2n-859, 2n-860, 2n-861, 2n-862, 2n-863, 2n-864, 2n-865, 2n-866, 2n-867, 2n-868, 2n-869, 2n-870, 2n-871, 2n-872, 2n-873, 2n-874, 2n-875, 2n-876, 2n-877, 2n-878, 2n-879, 2n-880, 2n-881, 2n-882, 2n-883, 2n-884, 2n-885, 2n-886, 2n-887, 2n-888, 2n-889, 2n-890, 2n-891, 2n-892, 2n-893, 2n-894, 2n-895, 2n-896, 2n-897, 2n-898, 2n-899, 2n-900, 2n-901, 2n-902, 2n-903, 2n-904, 2n-905, 2n-906, 2n-907, 2n-908, 2n-909, 2n-910, 2n-911, 2n-912, 2n-913, 2n-914, 2n-915, 2n-916, 2n-917, 2n-918, 2n-919, 2n-920, 2n-921, 2n-922, 2n-923, 2n-924, 2n-925, 2n-926, 2n-927, 2n-928, 2n-929, 2n-930, 2n-931, 2n-932, 2n-933, 2n-934, 2n-935, 2n-936, 2n-937, 2n-938, 2n-939, 2n-940, 2n-941, 2n-942, 2n-943, 2n-944, 2n-945, 2n-946, 2n-947, 2n-948, 2n-949, 2n-950, 2n-951, 2n-952, 2n-953, 2n-954, 2n-955, 2n-956, 2n-957, 2n-958, 2n-959, 2n-960, 2n-961, 2n-962, 2n-963, 2n-964, 2n-965, 2n-966, 2n-967, 2n-968, 2n-969, 2n-970, 2n-971, 2n-972, 2n-973, 2n-974, 2n-975, 2n-976, 2n-977, 2n-978, 2n-979, 2n-980, 2n-981, 2n-982, 2n-983, 2n-984, 2n-985, 2n-986, 2n-987, 2n-988, 2n-989, 2n-990, 2n-991, 2n-992, 2n-993, 2n-994, 2n-995, 2n-996, 2n-997, 2n-998, 2n-999, 2n-1000, 2n-1001, 2n-1002, 2n-1003, 2n-1004, 2n-1005, 2n-1006, 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bridges • as very 1- in the parental materials • since it • as on in triticale materials. Also the frequencies of abnormal nuclei) ..., are very 1- in the parental materials • > here as they ..., are very =-” in triticale materials • XV)- e-tJalM'i ag t; technique : The present technique enables to identifying easily different chromosomes in different genotypes • In general, rye has large telomeres and wheat chromosomes have centromeric (interstitial) heterochromatic bands. Although, there are some variations in banding pattern of the two chromosomes 8 and 9 belonged to the same pair, particularly in rye varieties. However, differences in banding patterns could be observed between tetraploid wheat varieties, Suha 91 and Beni-suef1. In general, The seven pairs of rye chromosomes were present in all triticale lines and accurately distinguished.