

MUSTARD SPECIES AS NEW INVASIVE WEEDS

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INTRODUCTION

THE FIRST SPECIES THAT COMES TO MIND WHEN YOU THINK OF INVASIVE, EXOTIC SPECIES IN THE INTERMOUNTAIN AREA IS CHEATGRASS (*BROMUS TECTORUM*). MILLIONS OF HECTARES OF FORMERLY BIG SAGEBRUSH/BUNCHGRASS RANGELANDS HAVE BEEN CONVERTED TO CHEATGRASS. OFTEN THESE AREAS ARE REFERRED TO AS “CHEATGRASS MONOCULTURES”.

IF YOU LOOK CLOSELY AT THESE COMMUNITIES YOU WILL FIND THAT AT LEAST 40 EXOTIC SPECIES SHARE IN THIS SUPPOSED MONO-CULTURE IN TIME AND SPACE.

CLASSIFICATION OF SERAL STAGES

THE EXOTIC INVASIVE SPECIES THAT PLAY ROLES IN CHEATGRASS COMMUNITIES CAN BE CLASSIFIED BY SERAL STATUS:

1. PIONEER SECONDARY SUCCESSION SPECIES THAT CAN NOT COMPETE WITH CHEATGRASS.

EXAMPLES:
RUSSIAN THISTLE *SALSOLA TARGUS*
BARBWIRE RUSSIAN THISTLE *S. PAULSENII*
HALOGETON *H. GLOMERATUS*
ANNUAL KOCHIA *KOCHIA SCOPARIA*

2. SECOND STAGE INVASIVE SPECIES THAT REPLACE THE PIONEER HENOPOD SPECIES. THIS IS OFTEN TERMED THE “MUSTARD” STAGE OF SUCCESSION.

EXAMPLES:
TUMBLE MUSTARD *SISYMBRIUM ALTISSIMUM*
SHIELD CRESS *LEPIDIUM PERFOLIATUM*

3. THIRD LEVEL OF SUCCESSION OCCURS WHERE SPECIES SHARE IN THE MUSTARD STAGE AND ALSO IN CHEATGRASS DOMINATED COMMUNITIES.

EXAMPLES:
TUMBLE MUSTARD *SISYMBRIUM ALTISSIMUM*
PRICKLY LETTUCE *LACTUCA SERRIOLA*
RED STEM FILAREE *ERODIUM CICUTARIUM*

4. CHEATGRASS DOMINANCE

5. SPECIES THAT SHARE SPACE IN CHEATGRASS DOMINATED SITES, BUT ARE SEPARATED IN TIME.

EXAMPLE:
BUR BUTTERCUP *RANUNCULUS TESTICULATUS*

6. ANNUAL SPECIES THAT EXCLUDE CHEATGRASS.

EXAMPLE:
MEDUSAHEAD *TAENIATHERUM CAPUT-MEDUSAE*

7. BIENNIAL SPECIES THAT SUPPRESS EXOTIC GRASSES, BUT DO NOT EXCLUDE EXOTIC ANNUAL GRASSES.

EXAMPLES:
DYER'S WOAD *ISATIS TINCTORIA*
MEDITERRANEAN SAGE *SALVIA AETHIOPIS*
WILSON WEED *BRASSICA ELONGATA SSP. INTEGRIFOLIA*

8. PERENNIAL EXOTIC SPECIES THAT NEARLY COMPLETELY SUPPRESS CHEATGRASS.

EXAMPLES:
RUSSIAN KNAWEED *ACROPTILON REPENS*
HOARY CRESS *CARDARIA DRABA*
PERENNIAL PEPPERWEED *LEPIDIUM LATIFOLIUM*

THIS IS NOT MEANT TO BE AN ALL ENCOMPASSING LIST OF SERAL STAGES OR SPECIES, BUT PROVIDES EXAMPLES OF THE SPECIES COMPOSITION AND TENURE OF THE CHEATGRASS COMMUNITY CONTINUUMS.

ROLE OF NEW EXOTIC WEED INTRODUCTIONS

NEW SPECIES IN THE CHEATGRASS CONTINUUM CAN INTRODUCE COMPLETELY NEW STEPS IN THE SERAL CONTINUUM. BUR BUTTERCUP IS AN EXAMPLE. THEY ALSO CAN EXTEND THE BREATH OF ADAPTATION OF A GIVEN STAGE. THE SUCCESSIVE IN TIME INTRODUCTION OF RUSSIAN THISTLE, HALOGETON, BARBWIRE RUSSIAN THISTLE, AND ANNUAL KOCHIA AT THE PIONEER STAGE OF SECONDARY SUCCESSION ILLUSTRATES THIS ROLE OF NEW INVADERS. THEIR SUM CONSTITUTES ADDITIVE EXPLOITATION OF THE POTENTIAL OF THE DISTURBED SITE IN EXCESS OF THAT PRODUCED BY MONO-CULTURES OF ANY ONE SPECIES.

THE ROLE OF NEW MUSTARD SPECIES

FOR REASONS THAT ARE UNKNOWN WE HAVE SEEN A LARGE INCREASE IN THE NUMBER OF SPECIES FROM THE MUSTARD FAMILY THAT OCCUR IN CHEATGRASS DOMINATED COMMUNITIES IN THE INTERMOUNTAIN AREA. SOME OF THESE SPECIES ARE RECENT INTRODUCTIONS. OTHER SPECIES HAVE BEEN RECOGNIZED AS EXOTICS IN WESTERN NORTH AMERICA FOR A CENTURY, BUT ONLY RECENTLY HAVE THEY BECOME WIDELY DISTRIBUTED ON SAGEBRUSH RANGELANDS.

APPARENTLY, THESE NEW MUSTARD SPECIES ALL FIT IN THE SERAL STAGE JUST BELOW CHEATGRASS DOMINANCE. THIS IS IMPORTANT IN IMPLEMENTING CHEATGRASS CONTROL AND RESTORATION SEEDING OF DESIRABLE PERENNIAL SPECIES, BECAUSE CONTROL OF CHEATGRASS RELEASES THESE MUSTARD FAMILY SPECIES. THIS HAS LONG BEEN RECOGNIZED WITH TUMBLE MUSTARD AND THE NEW INCREASE IN THE RANGE OF COMPETITION OFFERED BY THESE BROADLEAF, EXOTIC, INVASIVE ANNUALS.

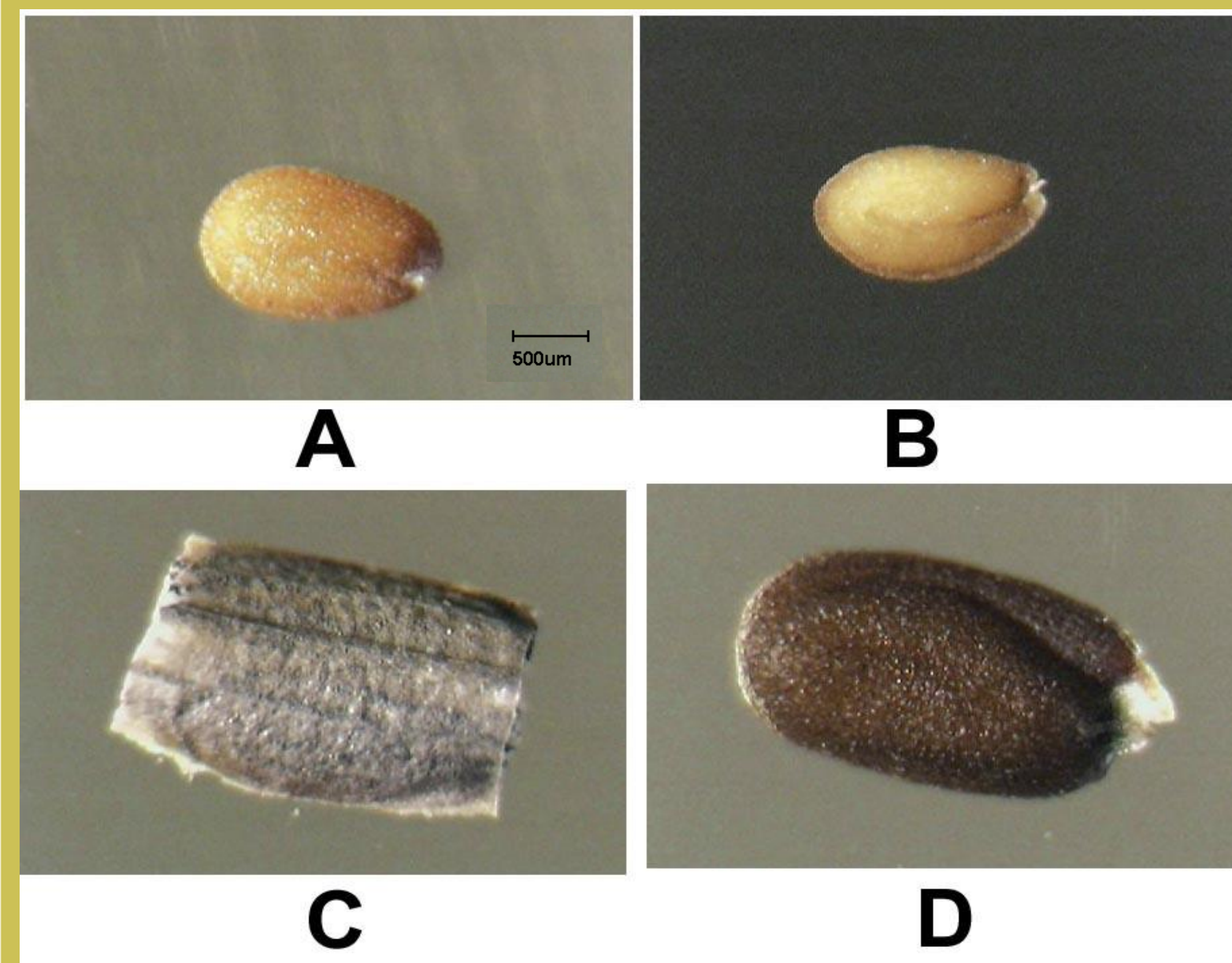


FIGURE 1. SEEDS OF SMALL SEEDED FALSE FLAX (A), DESERT ALYSSUM (B), AFRICAN MUSTARD (C), AND HARE'S EAR MUSTARD (D). NOTE THE SEED OF AFRICAN MUSTARD IS ENCLOSED IN A PERSISTENT PORTION OF THE POD.

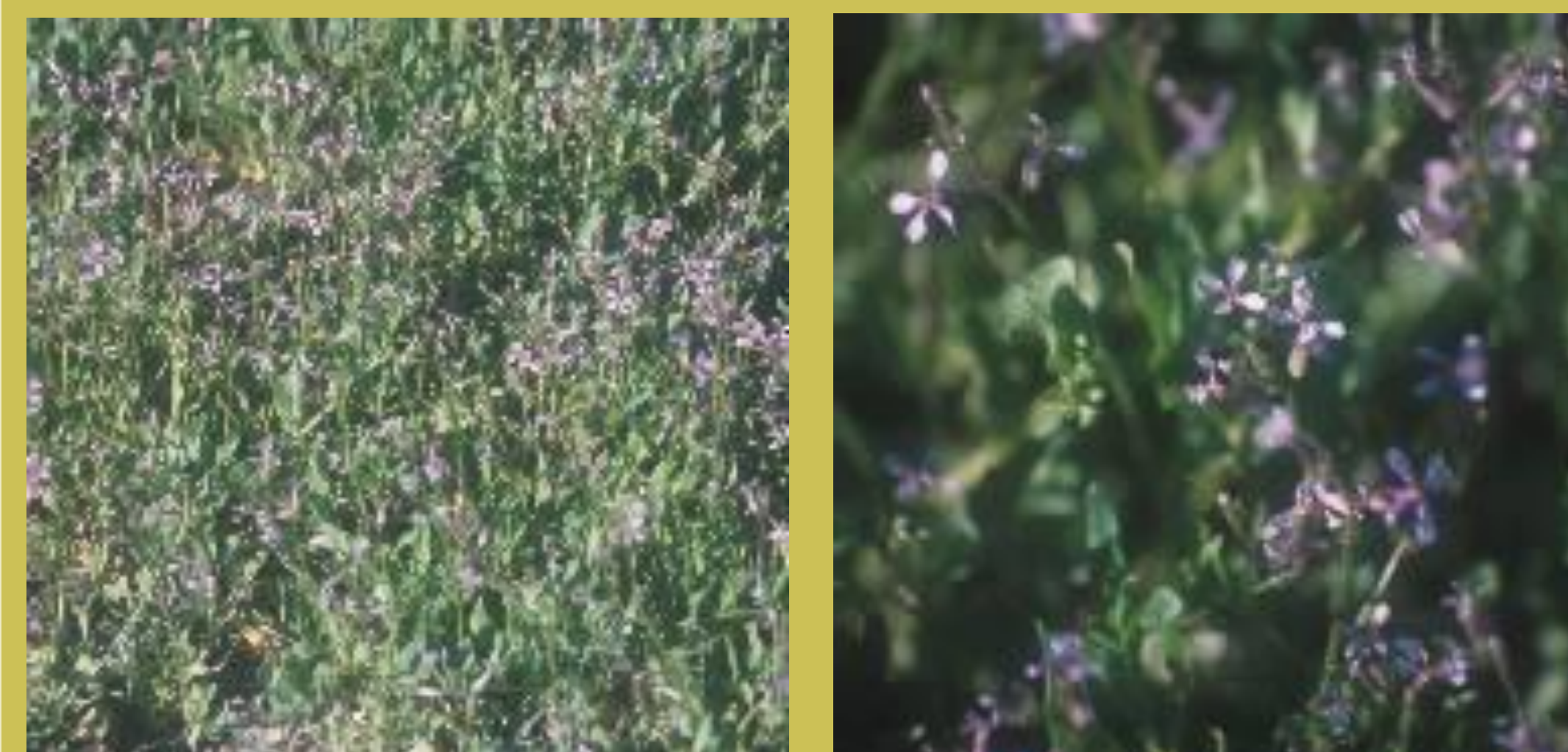


FIGURE 2. A DENSE STAND OF AFRICAN MUSTARD SHOWING THE TYPICAL 4-PART MUSTARD FLOWER WITH BLUE PETALS.



FIGURE 3. INDIVIDUAL AFRICAN MUSTARD PLANT SHOWING TYPICAL COARSE, BRANCHED STEMS AND FLAT TOPPED CANOPY.



FIGURE 4. PODS OF AFRICAN MUSTARD DISTRIBUTED ON A HARVESTER ANT MOUND. THE ANTS SEEM TO HIGHLY PREFER THE SEEDS AND MAY BE A DISTRIBUTION FACTOR IN THE RAPID SPREAD OF THE SPECIES.



FIGURE 5. AFRICAN MUSTARD SEEDLINGS. VERY DIFFICULT TO DISTINGUISH FROM THOSE OF TUMBLE MUSTARD.

LIST OF NEW MUSTARD FAMILY SPECIES

HARE'S EAR MUSTARD	<i>CONRINGIA ORIENTALIS</i>
SMALL SEEDED FALSE FLAX	<i>CAMELINA MICROCARPA</i>
DESERT ALYSSUM	<i>ALYSSUM DESERTORUM</i>
AFRICAN MUSTARD	<i>MALCOLMIA AFRICANA</i>

HARE'S EAR MUSTARD IS RELATIVELY UNCOMMON IN THE GREAT BASIN ALTHOUGH IT IS FOUND INFESTED WITH MEDUSAHEAD. HARE'S EAR MUSTARD CAN BE FOUND AS THE DOMINANT OF EXTENSIVE STANDS ON CLAY SOILS UNDER VERY ARID CONDITIONS.

DESERT ALYSSUM MAY BE THE MOST WIDELY DISTRIBUTED OF THESE ANNUALS IN THE GREAT BASIN. IT IS EASILY OVERLOOKED BECAUSE OF ITS EARLY MATURITY AND DIMINUTIVE SIZE.

AFRICAN MUSTARD IS WELL ADAPTED TO THE SILT LOAM SOILS OF THE CHEATGRASS BELT ACROSS NORTHERN NEVADA. IT CAN BE THE LANDSCAPE DOMINANT SPECIES DURING DRIER YEARS.

THE SEEDS OF THESE FOUR SPECIES ARE SHOWN IN FIGURE 1. ALL OF THESE SPECIES HAVE MUCILAGINOUS SEED COATS.

AFRICAN MUSTARD

AFRICAN MUSTARD IS NOT DIFFICULT TO RECOGNIZE. IT HAS STARTLINGLY BLUE (DESCRIBED IN FLORAS AS ROSE-VIOLET) FLOWERS (FIGURE 2) THAT CAN COLOR AN ENTIRE HILLSIDE OR EVEN A VALLEY. IN FLOWER, THE PLANTS HAVE AN UNPLEASANT ODOR WHICH MANY PEOPLE FIND OBNOXIOUS. TO COWBOYS IT IS THE “STINKING BLUE MUSTARD.”

IN COMPARISON TO TUMBLE MUSTARD THE 6-INCH TALL PLANTS ARE SMALL. THE CANOPIES ARE SPREADING (FIGURE 3), SO A DENSE STAND APPEARS MAT-LIKE. IT MATURES EARLIER THAN TUMBLE MUSTARD, OFTEN AT THE SAME TIME AS CHEATGRASS.

THE LINEAR POD IS RESTRICTED BETWEEN THE ONE ROW OF SEEDS. THE POD BREAKS INTO SECTIONS AROUND EACH SEED (FIGURE 1). HARVESTER ANTS HIGHLY PREFER THESE SEEDS AND ANT NEST ARE OFTEN COVERED WITH THE SECTIONS OF PODS (FIGURE 4).

NORTHERN NEVADA HAD 3 YEARS OF EXTREME DROUGHT DURING THE LATE 1980S. CHEATGRASS WAS VIRTUALLY ABSENT FROM VAST LOWER ELEVATIONS DURING THIS DROUGHT. WHEN THE DROUGHT ENDED AFRICAN MUSTARD SUDDENLY WAS RECOGNIZED AS BEING WIDELY DISTRIBUTED IN AREAS WHERE IT WAS PREVIOUSLY UNKNOWN.

OBVIOUSLY, INVASION OF EXOTIC SPECIES ON SAGEBRUSH/BUNCHGRASS RANGELANDS IS STILL IN PROGRESS AND AT THE CURRENT TIME THE ADDITION OF SPECIES OF THE MUSTARD FAMILY IS VERY APPARENT.