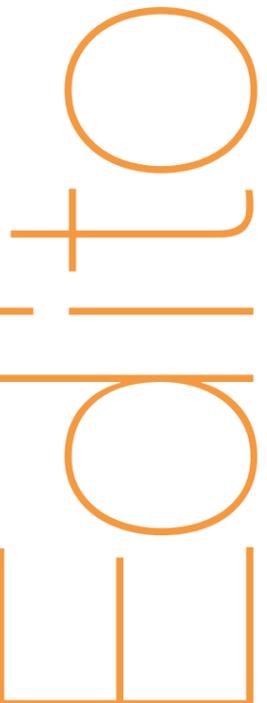


MAS 4 Mixture Guide 2024

New portfolio
for a changing
agriculture





Climate change and environmental degradation are an existential threat to all of us, on every continent. Agriculture is one of the sectors that can make a positive impact and help overcome the environmental challenges and make our food systems more sustainable. At MAS Seeds®, we have set our core purpose to contribute to this agroecological transition and to

Act Together for a Changing Agriculture.

We develop and supply seeds and services keeping 4 major agroecological objectives in mind:



1. Carbon & Soil Fertility

Adapted **cultural practices** can help reach a positive carbon balance, protect soil life and increase soil fertility.

2. Protein & Energy Autonomy

Producing **protein locally** on farm is an important part of food sovereignty. Together with renewable energy production it makes an important pillar of agroecology.

3. Water & Climate Resilience

Growing crops in water scarcity requires **adapted farming systems** enhanced by genetic tolerance.

4. Biodiversity

Crop diversification, landscape design with pollinators and using genetic tolerance is an efficient measure to reduce chemical inputs.

To support these objectives we have intensified our investments in an innovative diversified seed portfolio. And we are proud to announce the launch of a new portfolio: The MAS4 Seed Mixtures.

In this seed guide you will discover the new MAS4 brand and the new portfolio. Our local agronomist teams will be more than happy to support you in designing a sustainable crop rotation using MAS4 products.

Let's Act Together for a Changing Agriculture

Francois HARBAT



AFNOR Certification attests having assessed the contribution to sustainable development according to ISO 26000 within GROUPE COOPERATIF MAISADOUR.



ABOUT MAS4

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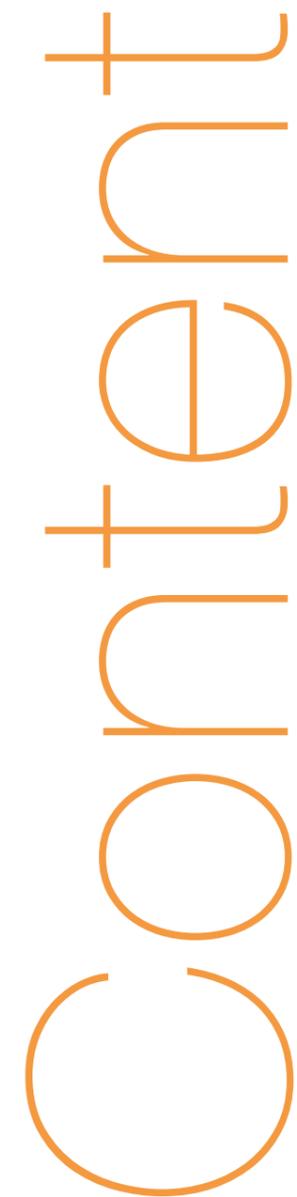
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How do we adapt our Research and Development for a changing agriculture?

In 2022, MAS Seeds® R&D division has started to reorganize and reshape its structure with an objective to align better with the company purpose “Act together for a changing agriculture”.

With this core objective in mind a new department “Product Development for Diversification & Agroecology” has been created. The objectives of this department are:

- To accelerate R&D transformation to better serve our purpose “Act for a changing Agriculture”.
- To design agroecological solutions with positive impacts on the **soil fertility and carbon balance, climate resilience, protein autonomy and biodiversity coupled with increased profits for farmers.**
- To scan, test and respond to market needs for Winter Oilseed Rape, Soybean, Alfalfa and Cover.



To face the unprecedented environmental challenges and grow towards a more sustainable agriculture, the MAS Seeds® R&D division is warmly embracing the ACT TOGETHER campaign, thus we restructured our division and aligned our short and long objectives. We will step up our efforts to create innovative products that correspond to the changing needs of farmers.

Benoit PETIARD
Head of R&D



I am more than thrilled to lead the mission to create a new R&D department and set up an innovation pipeline to develop agricultural solutions. We have already set up a new trial network which now includes agronomic approaches and are on the fast-track to enhance our team and means. I am strongly convinced that we can accelerate agroecological transition if we combine innovations in genetics and agronomy”

Colin GUILLAUME
Head of Diversification and Agroecology Product Development



The new R&D trial network for Diversification & Agroecology

Cover crop trials



Winter Oilseed Rape - Companion Plants



Alfalfa screening



Winter Oilseed Rape



Soybean trials



Our specialized production facilities for mixtures in Italy

MAS Seeds® has commercialized cover crop and fodder mixtures in the early 2000s and soon after recognized a rapidly growing social and agroecological demand in Europe. Thus, in 2016, we acquired Semfor company, specialized in **mixtures** but also cereals, and its production facilities located in San Pietro di Morubio, Italy.

Today, the production team has been expanded and the production capacity has been increase from 1500 to 6000 tons to supply both the Italian market and neighbouring countries, mixing nearly 300 varieties from about sixty species including **cover crops, soybean, alfalfa, sorghum, forage mixtures, grasses and cereals.**

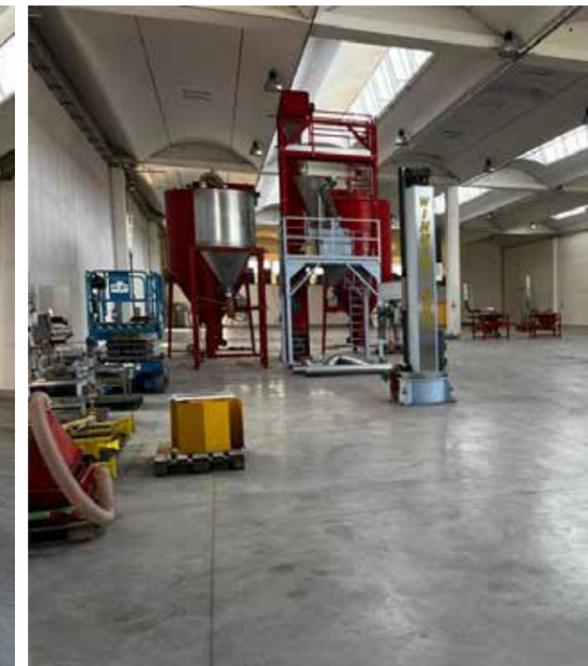
MAS Seeds® provide a **diversified seed offer adapted to a wide range of agroclimatic conditions** to promote a sustainable cultivation, to protect soils, support dairy farms' feed autonomy and respond to environmental challenges

“



Faced with the development of agroecological demand and the “greening measures” of the European Environment Agency, the experience acquired over the past years in Italy will give MAS Seeds® a head start in this very promising transition. Today we are making 11% of our global turnover from crop diversification portfolio and aiming to expand our capacities and reach new customers”

Ludovic COUSIN
Head of Sales South & East Europe



MAS Seeds® mixture production facilities located in San Pietro di Morubio, Italy

Meet the new MAS4 Seed Mixtures

We are launching a new seed mixture portfolio under the brand “MAS4” to answer the evolving needs of a changing agriculture. MAS4 Mixtures Portfolio is divided into 4 segments:

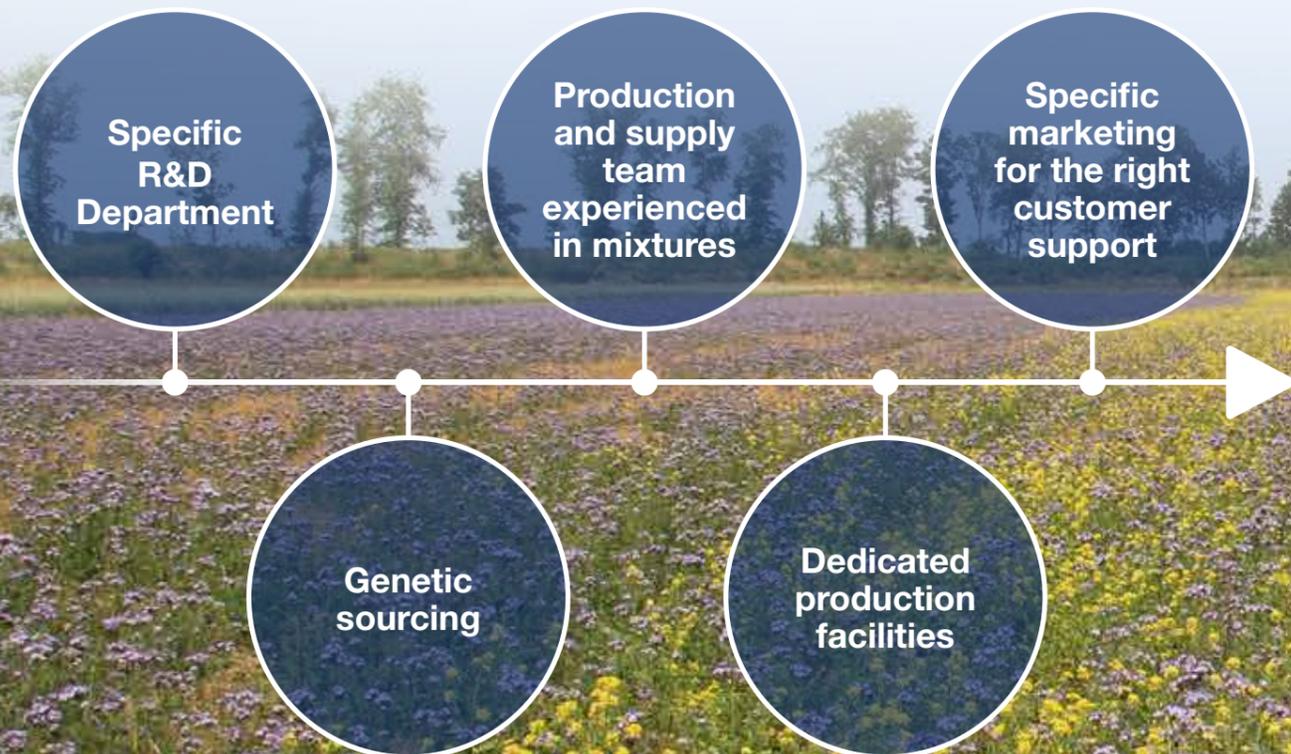


Each segment offers a product portfolio adapted to each need, country, region and regulation. MAS4 products are created and packed in our dedicated facility in Italy which is specialized in mixtures.

The MAS4 seed portfolio is created and provided by a dedicated team from research through production up to customer support.

Overall benefits of MAS4 seeds for the farmers:

- Covering soil to conserve and improve soil fertility and structure, optimise the nitrogen fertiliser usage and improve carbon balance.
- Produce protein rich feed crops to improve farm autonomy.
- Promote biodiversity, to control pest and diseases.
- Produce renewable energy and contribute to energy autonomy.



MAS Seeds® brand
All MAS Seeds® products are identified with a capital MAS in front

The segment extension
COVER, NUTRI, EXPERT
and **ENERGY**

The final use /
objective of the mixture



4 benefits: Protecting soil fertility and carbon balance, protein and energy autonomy, improving climate resilience and water management and finally increasing biodiversity

Aligned with our purpose

“Act together FOR (=4) a changing agriculture”

4 segments answering **4 major market needs:**
COVER, NUTRI, EXPERT and ENERGY

Aligned with **“4 per 1 000 initiative”** which aims to encourage carbon storage in the soils through adapted agricultural practices.



The new MAS4 Seed Mixtures



MAS4 COVER

Agroecologic cover crop mixtures

- Improve soil fertility and structure, create carbon sink
- Help control pests
- Reduce the use of synthetic fertilizers



MAS4 EXPERT

Expert mixtures for specific needs of beekeepers and vineyards

- Enhance biodiversity
- Perennial crop cover
- Pest control

MAS4 NUTRI

Fodder crop mixtures complementing silage maize

- Complement maize silage in fodder systems
- Protein autonomy
- Improve climate resilience of fodder systems



MAS4 ENERGY

Energy mixtures for biogas producers

- Produce sustainable energy
- Covers and protects soil
- Improves soil structure





MAS4 COVER portfolio includes a range of cover and intercrops. A cover crop is a non-cash crop grown primarily for the purpose of 'protecting or improving' soils between two regular crop production.

Cover crops can also be used in intercropping system, meaning it can be grown together with a cash crop at the same time on the same field. In this growing system it is essential to use synergetic crops.



Cover crops offer numerous advantages, including improved soil health, weed suppression, nutrient management, pest control, biodiversity enhancement, water quality protection, climate resilience, crop rotation support, pollinator habitat, reduced soil compaction, economic returns, erosion control, and sustainable land management. These benefits contribute to more resilient and sustainable agricultural practices.

Cover crops are composed of 4 main botanic families:

- 1. Legumes:** vetches, clovers, fava bean or alfalfa for perennial cover, fixing nitrogen in the soil.
- 2. Grasses:** Ryegrass, rye or oat for biomass or catching the nitrogen and producing carbon.
- 3. Brassicas:** Mustard or radish to help structuring the soil and for the bio-fumigation effect.
- 4. Non-legumes:** all other species, mostly phacelia and flax to improve biodiversity and pollination.



The benefits of cover crops in a long-term strategy:

- Improving **soil structure**
- Improving **soil quality**, and **carbon balance**
- Increasing **nutrient** and **organic matter** supply
- Reducing **soil erosion** rate and **nitrate leaching**
- Helping **weed, pest and disease control**



MAS4 COVER PORTFOLIO

PRODUCT	Type	Crop rotation adaptability	Speciality	Composition in % weight
MAS4 COVER NITRO P	Cover crop	Maize, Sunflower, Cereals	For early sowing and extra nitrogen production	Phacelia 10%, Crimson clover 22%, Brown mustard 8%, Common vetch 35%, Hairy vetch 25%
MAS4 COVER NITRO T	Cover crop	Maize, Cereals	For late sowing after grain maize and extra nitrogen production	Forage pea 50%, Common vetch 42%, Daikon radish 8%
MAS4 COVER SOL	Cover crop	Maize, Sunflower, Cereals	Covers and structures the soil	Phacelia 8%, Brown mustard 6%, Diploid oat 20%, Common vetch 35%, Crimson clover 22%, Daikon radish 9%
MAS4 COVER OSR START	Inter crop	Rapeseed	For sowing in association with winter oilseed rape	Berseem clover 15%, Fenugreek 50%, Lentil 35%

Benefits	SOWING PERIOD				Sowing Density	PRODUCT
	Aug.	Sept.	Oct.	Nov.		
					12-15 kg/ha	MAS4 COVER NITRO P
					30-50 kg/ha	MAS4 COVER NITRO T
					20 kg/ha	MAS4 COVER SOL
					15 kg/ha	MAS4 COVER OSR START

Biomass Nitrogen Soil structuring



NEW

MAS4 COVER NITRO P

AGRONOMIC COVER CROP BEFORE MAIZE FOR EARLY SOWING



NITROGEN FOR THE FOLLOWING CROP

thanks to its legume-rich composition

STRONG BIOMASS PRODUCTION

biomass production begins before the winter and increases after the winter thanks to the vetch in the mixture

STRUCTURES THE SOIL

the roots of the species in the mixture are very complimentary and structure different levels of the soil

MIXTURE DETAILS

Species	% weight	Nb kernels/m ² 15 kg/ha	Frost sensitivity at maturity °C	Benefits
Phacelia	10 %	84	-8	Very good establishment, protect the soil, by filling the gaps between species, good for pollinators.
Crimson clover	22 %	81	-13	Installation in autumn to protect the soil from erosion and will produce nitrogen for next crop.
Brown mustard	8 %	45	-7	Late flowering which avoid mustards to go to seed and reduce lignification. Quick installation, good soil structuration and take up the residual soil nitrogen left.
Common vetch	35 %	8	-10	Will take over from the purple vetch from winter to spring to cover the soil and produce nitrogen.
Purple vetch	25 %	8	-15	Strong development in autumn to protect the soil and produce nitrogen; easy to destroy.

NUTRIENT GAIN FOR THE NEXT CROP

	COVER CROP BIOMASS		
	3 t DM	4 t DM	5 t DM
Nitrogen (kg/ha)	45	55	70
Phosphorus (kg/ha)	15	20	25
Potassium (kg/ha)	100	135	170
Carbon (t/ha)	0,4	0,5	0,7

MIXTURE EFFECTS

Biomass:	████████████████████
Biodiversity:	████████████████████
Soil Structure:	████████████████████
Nitrogen:	████████████████████
Pollinator:	████████████████████
Ease of destruction:	████████████████████
Speed of establishment:	████████████████████

SOWING & CULTIVATION

Sowing period:	Mid-August / End-September
Seeding rate:	12-15 kg/ha = 227 gr/m ²
Sowing depth:	1-2 cm

Ideal sowing is between mid-August until end of September at 1-2 cm depth.



NEW

MAS4 COVER NITRO T

FOR AUTUMN / WINTER SOWING



EXCELLENT NITROGEN PROVIDER

thanks to more than 90% of legumes in the mixture

FAST SOIL COVER, EASY TO DESTROY

chinese radish covers the soil quickly, species in the mixture tolerates early or late sowing and mechanical destruction.

STRUCTURES THE SOIL

crucifers in the mixture penetrates well the soil and improves water infiltration

MIXTURE DETAILS

Species	% weight	Nb kernels/m ² 50 kg/ha	Frost sensitivity at maturity °C	Benefits
Forage pea	50	16	-4	Produces nitrogen, very good for late sowing.
Common vetch	42	33	-10	Will take over from the purple vetch from winter to spring to cover the soil and produce nitrogen.
Daikon radish	8	21	-8	Soil structuring effect, traps nitrogen, easy destruction, serves as guardian for twining species.

NUTRIENT GAIN FOR THE NEXT CROP

	COVER CROP BIOMASS		
	3 t DM	4 t DM	5 t DM
Nitrogen (kg/ha)	60	84	96
Phosphorus (kg/ha)	20	30	40
Potassium (kg/ha)	140	195	235
Carbon (t/ha)	0,5	0,7	0,8

MIXTURE EFFECTS

Biomass:	████████████████████
Biodiversity:	████████████████████
Soil Structure:	████████████████████
Nitrogen:	████████████████████
Pollinator:	████████████████████
Ease of destruction:	████████████████████
Speed of establishment:	████████████████████

SOWING & CULTIVATION

Sowing period:	Mid-September / Mid-November
Seeding rate:	30 -50 kg/ha = 70 gr/m ²
Sowing depth:	2 cm

Ideal sowing is between mid-September and end-October at 2 cm depth. It can be sown together with 20 kg field beans.



MAS4 COVER SOL

COVER CROP BEFORE MAIZE OR SUNFLOWER TO STRUCTURE THE SOIL



COVERS AND PROTECTS THE SOIL RAPIDLY

its rich composition covers the soil and limits salination as well as erosion.

STRUCTURES THE SOIL

complimentary types of roots in the mixture structures different levels of the soil

STRONG BIOMASS PRODUCTION

that begins before the winter and increases after the winter thanks to the vetch in the mixture

MIXTURE DETAILS

Species	% weight	Nb kernels/m ² 20 kg/ha	Frost sensitivity at maturity °C	Benefits
Phacelia	8%	90	-8	Very good establishment, protect the soil, by filling the gaps between species, good for pollinators.
Brown mustard	6%	45	-7	Late flowering which avoid mustards to go to seed and reduce lignification. Quick installation, good soil structuration and take up the residual soil nitrogen left.
Diploid oat	20%	23	-8	Covers the soil rapidly and improves the soil and carbon sink
Common vetch	35%	11	-10	Will take over from the purple vetch from winter to spring to cover the soil and produce nitrogen.
Crimson clover	22%	10	-13	Installation in autumn to protect the soil from erosion and will produce nitrogen for next crop.
Daikon radish	9%	9	-8	Structuring effect; nitrogen trapping; easy to destroy

NUTRIENT GAIN FOR THE NEXT CROP

	COVER CROP BIOMASS		
	3 t DM	4 t DM	5 t DM
Nitrogen (kg/ha)	34	42	56
Phosphorus (kg/ha)	25	30	40
Potassium (kg/ha)	140	185	235
Carbon (t/ha)	0,5	0,7	0,9

MIXTURE EFFECTS



SOWING & CULTIVATION

Sowing period:	Mid-August / Mid-October	Ideal sowing is between mid-August until end-September at 1-2cm depth. Destroy at least 1 month before the main crop.
Seeding rate:	20 kg/ha = 188 gr/m ²	
Sowing depth:	1-2 cm	



MAS4 COVER OSR START

COMPANION CROP FOR WINTER OILSEED RAPE



PEST CONTROL SOLUTION

confuses and disturbs the autumn pests by its smell, height and the composition in the field

100% LEGUMES

produces nitrogen for the rapeseed at the end of winter

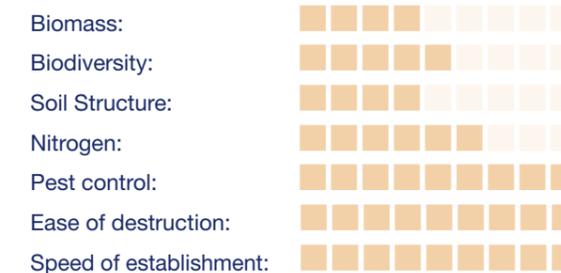
SUPPORTS SOIL STRUCTURE & LIMITS SALINATION

thanks to its complimentary root system and the lentils in the mixture

MIXTURE DETAILS

Species	% weight	Nb kernels/m ² 15 kg/ha	Frost sensitivity at maturity °C	Benefits
Berseem clover	15 %	77	-7	Aggressive from the start, clover will provide good protection against insects.
Fenugreek	50 %	49	-4	It gives off a smell that disturbs insects. Its different height and growth will create an additional horizon to protect rapeseed.
Lentil	35 %	25	-5	The purpose of the lentil is to provide protection to the soil and to produce nitrogen for rapeseed. It will not compete with rapeseed in the spring.

MIXTURE EFFECTS



SOWING & CULTIVATION

Sowing period:	August - September	It is mixed with the rapeseed and sown together. Cover crops are mostly destroyed by the frost in winter.
Seeding rate:	15 kg	
Sowing depth:	1-2 cm	





MAS4 NUTRI portfolio consist of fodder mixtures for different cultivation practices or uses. They are designed to help provide a varied fodder diet further improving daily animal intake and weight gain or milk yield for most livestock. Fodder crops are highly versatile and allow producers to fill the gaps in standard grass based feeding programs where there may otherwise be a drop in production.

SUMMER MIXTURES

It is possible to grow fodder crops after the harvest of the main crop to ensure the fodder stock. For this, it is important select the right species. MAS Seeds offers a ready-to-use mixture perfectly designed for summer sowing: MAS4 NUTRI SORGHO VIGNA. Sorghum is drought resistant and it will secure fodder production.

To improve the protein content, Sorghum is associated with a tropical bean.

AUTUMN MIXTURES

Sowing catch crops in autumn is a practice widely used in France. The objective is to produce fodder in high quantity and rich in quality. Thus MAS Seeds offers 4 different mixtures for different uses.

CEREAL MIXTURES

The sowing date of an immature cereal or a meslin is an important step. Indeed, depending on this choice, the proportions and varieties will be the keys to success in optimizing yield and harvest date. To meet this expectation MAS Seeds offers 3 cereal mixtures adapted to different sowing dates.



The benefits of farm grown fodder crops:

- Protein autonomy from unsustainable feed sources.
- Optimize feeding ratio of **fibres** and **protein**, fill the gaps in standard feeding programs.
- Manage economic and climatic risks and improve **dairy farm sustainability**.
- Ensure **complementarity with other fodder crops** like silage maize on the farm.
- Solutions adapted according to the date of sowing and the sector.
- Rotations to ensure profitability



MAS4 NUTRI PORTFOLIO

PRODUCT	COMPOSITION	DURATION IN MONTHS	USE		
			Silage	Wrapping	Hay
SUMMER MIXTURES					
MAS4 NUTRI SORGHO VIGNA	Vigna tropical bean 60 %, Fodder sorghum 40%	4 months	+++	+++	-
AUTUMN MIXTURES					
MAS4 NUTRI PROTEIN	Italian ryegrass 2N alt (Ed) 15%, Italian ryegrass 2N alt (BIG BOSS) 15%, Hairy vetch 25%, Crimson clover 20%, Squarrose clover 25%	1 year	+++	+++	-
MAS4 NUTRI LEG	Crimson clover 35%, Squarrose clover 25%, Persian clover 15%, Balansa clover 15%	1 year	(+++)	(+++)	-
MAS4 NUTRI SEIGLE	Rye 65%, Hairy vetch 25%, Crimson clover 10%	1 year	+++	+++	-
CEREAL MIXTURES					
MAS4 NUTRI METEIL G	Wheat 22%, Triticale 40%, Field bean 10%, Forage pea 20%, Common vetch 8%	1 year	+	+	-
MAS4 NUTRI METEIL P	Wheat 22%, Triticale 25%, Oat 18%, Forage pea 20%, Common vetch 15%	1 year	+++	+++	-
MAS4 NUTRI MEITEIL T	Wheat 20%, Triticale 25%, Oat 15%, Forage pea 25%, Common vetch 15%	1 year	+++	+++	-

USE	SOWING PERIOD										PRODUCT		
	Pasture	Grain	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.		Sowing rate	
SUMMER MIXTURES													
++	-											25-30 kg/ha	MAS4 NUTRI SORGHO VIGNA
AUTUMN MIXTURES													
++	-										25-30 kg/ha	MAS4 NUTRI PROTEIN	
++	-										25-30 kg/ha	MAS4 NUTRI LEG	
++	-										30-40 kg/ha	MAS4 NUTRI SEIGLE PROT	
CEREAL MIXTURES													
-	+++										140 kg/ha	MAS4 NUTRI METEIL G	
-	-										150 kg/ha	MAS4 NUTRI METEIL P	
-	-										160 kg/ha	MAS4 NUTRI MEITEIL T	

SUMMER FODDER CROP MIXTURE

4 MONTHS | SUMMER

MAS4 NUTRI SORGHO VIGNA

FODDER FOR SUMMER SOWING



- HIGH PROTEIN CONTENT**
vigna is a tropical legume and can tolerate high temperatures and associates well with sorghum
- HIGH FODDER YIELD IN SUMMER**
both species are selected to secure the biomass yield in the summer
- DOUBLE USE**
it can be used both as fodder and summer cover crop. The mixture is easily destructed by the frost in the winter

MIXTURE DETAILS

Species	% weight	Benefits
Vigna tropical bean	60	Tolerates well the high temperatures, it improves the protein content of the mixture.
Fodder sorghum (SUDAL)	40	Covers well the soil, drought tolerant, high biomass production, very good fodder for the dairy cows.

USE

Silage	Wrapping	Hay	Pasture
+++	+++	-	++

SOWING & CULTIVATION

Sowing period:	April / End-July	Ideal sowing between April and May, at a depth of 1-2 cm. For pasture use, please respect the 60 cm stage of sorghum.
Seeding rate:	25-30 kg/ha	
Sowing depth:	1-2 cm	
Duration:	4 months	



AUTUMN FODDER CROP MIXTURE

1 YEAR | AUTUMN

MAS4 NUTRI PROTEIN

HIGH PROTEIN FODDER MIXTURE TO COMPLETE SILAGE CORN

- QUICK ESTABLISHMENT AND HIGH YIELD**
mix of 2 rye grasses cover quickly the soil, the clover keeps the soil covered during winter
- HAIRY VETCH ADVANTAGE**
winter resistant hairy vetch will strongly regrow in spring and ensure protein production
- EARLY HARVEST**
species in the mixture can be harvested very early to allow maize sowing right after



MIXTURE DETAILS

Species	% weight	Nb kernels/m ² 25 kg/ha	Benefits
Italian ryegrass 2N alt (Ed)	15	172	Quick soil coverage to limit weeds development, adapted for high DM/ha yield.
Italian ryegrass 2N alt (BIG BOSS)	15	172	Yield maker and bring sugar for a better conservation and palatability of the fodder.
Hairy vetch	25	22	Twinned-stem specie that will develop in spring and secure protein content in the fodder.
Crimson clover	20	147	Annual cold resistant clover, good soil coverage in winter and development in spring.
Squarrose Clover	25	150	Very resistant to cold and productive, secure the yield.

USE

Silage	Wrapping	Hay	Pasture
+++	+++	-	++

SOWING & CULTIVATION

Sowing period:	Beginning August / End-September	Limit manure application and pay attention to herbicide residues on the field.
Seeding rate:	25-30 kg/ha	
Sowing depth:	1-2 cm	
Duration:	1 year	



1 YEAR | AUTUMN

MAS4 NUTRI LEG

ANNUAL LEGUME MIXTURE

- MIX OF 100% LEGUMES**
the combination of different annual clovers provide protein during spring harvesting
- CAN BE COMBINED WITH ITALIAN RYEGRASS**
for conserving in silage and to increase fibre content of the fodder
- LOW FERTILIZER USE**
pure legume mixture require much lower fertilizer use especially if grown with ryegrasses



MIXTURE DETAILS

Species	% weight	Nb kernels/m ² 25 kg/ha	Benefits
Crimson clover	35	171	Annual cold resistant clover, good soil coverage in winter and quick development in spring
Squarrose Clover	25	100	Very resistant to cold and high yield, late flowering, well adapted from clay to sandy soils.
Persian clover	25	356	Rapid field establishment and growth, adapted to all types of soils, can tolerate flooding, good cold resistance
Balansa clover	15	337	Good regrowth, needs less water, adapted to all types of soil, can resist short periods of flooding, good cold resistance.

USE

Silage	Wrapping	Hay	Pasture	Grain
+++*	+++*	-	++	-

SOWING & CULTIVATION

Sowing period:	Beginning August / End-September
Seeding rate:	25-30 kg/ha
Sowing depth:	1-2 cm
Duration:	1 year

***Do not silage pure.** For early sowing in August / September in association with Italian ryegrass, mix with 50% MAS4 NUTRI LEG. For later sowing, increase MAS4 NUTRI LEG portion to 60%. Reduce fertilizer input especially when grown with ryegrasses. Conventional fertilization may cause aggressive growth of the grasses and may suffocate clovers. Avoid herbicide residues from previous crop.



1 YEAR | AUTUMN

MAS4 NUTRI SEIGLE PROT

FOR A RICH AND BALANCED FODDER

- THE SOLUTION FOR RESISTANT ITALIAN RYEGRASS IN THE FIELD**
to control and avoid spreading resistant ryegrass, NUTRI SEIGLE PROT by its composition will "break" the RGI cycle
- HIGH PROTEIN AND HIGH YIELD**
the species in the mixture have been developed to enhance the protein content
- POST-HARVEST SOIL MOISTURE**
Since rye is less drying than conventional Italian Ryegrass, post-harvest recovery will be better for maize sowing



MIXTURE DETAILS

Species	% weight	Nb kernels/m ² 35 kg/ha	Benefits
Rye	65	97	Very good soil coverage, possible to sow early in September, early harvest
Hairy vetch	25	26	Very good cold tolerance, will good development after winter in spring and secure protein content in the fodder
Crimson clover	10	86	Adapted to different types of soils, good feed value

USE

Silage	Wrapping	Hay	Pasture	Grain
+++	+++	-	++	-

SOWING & CULTIVATION

Sowing period:	September – Beginning October
Seeding rate:	30-40 kg/ha
Sowing depth:	1-2 cm
Duration:	1 year

Limit the fertilizer use.





Growing fodder cereal mixtures

What is the fodder cereal mixture?

Fodder cereal mixture is the combination of one or more cereals with some legumes of often larger seeds such as peas, vetches, field beans. The cereals stay the dominant family in the ratio which gives the mixtures their name.

How are fodder cereals harvested?

Fodder cereals are often grown to harvest in silage or wrapping. It can sometimes be harvested for grain. In this case, it would be necessary to adapt the species and their ratios in the mixture.

How is the feed value of cereal mixtures?

Depending on the harvest stage, the feed value can change significantly. On early stages (25% DM), the cereal mixture will be very rich in nitrogen, if harvested later (> to 32%/DM) the energy value will be greater. The cereal mixtures contribute great amount of fibre in the feed ratio to limit the risk of acidosis. Using fodder cereals in grain will provide a balanced feed in energy and protein to feed animals.

How is the yield of cereal mixtures?

Cereal mixtures are used to secure a stock during the winter. Depending on the sowing date and the harvest date, the yield varies between 6 to 12 tons DM/ha. After the harvest, it is possible to sow maize or fodder sorghum to consolidate the livestock farmer's annual fodder stock. Thus, the cumulation of the two crops may regularly exceed 20 tons of DM/ha.

What are the other benefits of cereal mixtures:

- Improves soil structure and cover
- Optimizes of nitrogen fertilization
- Reduces weeding or fungal intervention thanks to high soil coverage
- Solution against resistant Italian Ryegrass
- Valorises accessible water during the pre-period of cereal production.
- Ideal before maize sowing compared to Italian Ryegrass
- It is possible to sowing a meadow under a cereal mixture

FODDER CEREAL

1 YEAR | CEREAL MIX

MAS4 NUTRI METEIL G

MIXTURE TO UTILISE AS GRAIN

- GRAIN USE MIXTURE**
 the varieties in the mixture allow harvesting for grain fodder
- A COMPLETE FODDER**
 it is balanced enough for direct use as rolled or ground. It will supplement well the basic ratio.
- EXCELENT IN ROTATION**
 after the harvest, a summer mixture can be sown to complete the fodder stock, for example MAS4 NUTRI SORGO VIGNA



MIXTURE DETAILS

Species	Variety	TKW	% weight	Nb kernels/m ² 140 kg/ha
Wheat	PAJERO	45 g	22	68
Beardless triticale	RUGLATT	48 g	40	117
Field bean	SCURO DI TORRE LAMA	140 g	10	10
Forage pea	ASTEROID	160 g	20	18
Common vetch	Winter type	64 g	8	18

USE

Silage	Wrapping	Hay	Pasture	Grain
+	+	-	-	+++

SOWING & CULTIVATION

Sowing period:	September - October
Seeding rate:	140 kg/ha
Sowing depth:	2 cm
Duration:	1 year

Harvest like cereal at correct maturity stage in July. It can be added as a fodder supplement to the diet.



1 YEAR | CEREAL MIX

MAS4 NUTRI METEIL P

RICH AND BALANCED MIXTURE FOR EARLY SOWING

- HIGH YIELDING EARLY MIXTURE**
in order to achieve early harvest with high yield and high fodder quality
- HIGH PROTEIN CONTENT**
legumes in the mixture increases the protein content
- ADATED TO EVEN THE MOST DIFFICULT SOILS**
it offers excellent conservation in the silo at the right harvest stage and improves fodder consumption



MIXTURE DETAILS

Species	Variety	TKW	% weight	Nb kernels/m ² 150 kg/ha
Wheat	PAJERO	45 g	22	73
Triticale	KITESURF	48 g	25	78
Oat	ETINCELLE	40 g	18	68
Forage pea	ASTEROID	16 g	20	19
Common vetch	Winter type	64 g	15	35

USE

Silage	Wrapping	Hay	Pasture	Grain
+++	+++	-	-	-

SOWING & CULTIVATION

Sowing period:	September – October
Seeding rate:	150 kg/ha
Sowing depth:	1-2 cm
Duration:	1 year

Limit the fertilizer use. It is possible to combine with a pasture mixture and sow as a pasture.



1 YEAR | CEREAL MIX

MAS4 NUTRI METEIL T

RICH AND BALANCED MIXTURE FOR LATE SOWING

- HIGH YIELDING LATE MIXTURE**
late harvest with high yield and high fodder quality
- HIGH PROTEIN CONTENT**
legumes in the mixture increases the protein content
- FROM THE FIELDS TO THE SILO**
it is adapted to all types of soil, offers excellent conservation in the silo at the right harvest stage and improves fodder consumption



MIXTURE DETAILS

Species	Variety	TKW	% weight	Nb kernels/m ² 160 kg/ha
Wheat	PAJERO	45 g	20	71
Triticale	BIKINI	48 g	25	83
Oat	ETINCELLE	40 g	15	67
Forage pea	ASTEROID	16 g	25	25
Common vetch	Winter type	64 g	15	38

USE

Silage	Wrapping	Hay	Pasture	Grain
+++	+++	-	-	-

SOWING & CULTIVATION

Sowing period:	Beginning October – November
Seeding rate:	160 kg/ha
Sowing depth:	1-2 cm
Duration:	1 year

Recommended to fertilize after winter.





The benefits of farm grown fodder crops:

- Increase **biodiversity**, provide diverse floral resources, habitat, and shelter, leading to healthier bee colonies.
- Enhance **soil health** and **reduce pesticide use**, indirectly benefiting bees.
- Control erosion, suppress weeds, **improve soil health**, and support pest management in vineyards.
- Create a **better microclimate** and enhance grape quality.

MIXTURES FOR EXPERT USE

Cover crops are also beneficial and moreover indispensable in specific agricultural production systems such as honey beekeeping or enriching vineyards. These systems require specific classes of crops in the mixture to enhance the impact on their production.

In **BEEKEEPING**, they provide extra forage, additional sources of nectar and pollen for bees, extending their foraging season. This is especially important during times when native flowering plants are scarce. They also provide diverse floral resources, habitat, and shelter, leading to healthier bee colonies. Cover crops also enhance soil health and reduce pesticide use, indirectly benefiting bees.

In **VINEYARDS**, these crops help prevent soil erosion in vineyards, particularly on sloped terrain, suppress weeds which reduces the need for herbicides and manual weed control methods, improve soil health and enhance soil fertility by fixing nitrogen from the atmosphere, which can be utilized by grapevines, and support pest management. They create a better microclimate and can contribute to better grape quality by moderating vine growth, controlling yield, and influencing grape flavour development.

Both sectors benefit from cover crops' sustainable and ecosystem-enhancing effects.



MAS4 EXPERT PORTFOLIO

PRODUCT	COMPOSITION IN % OF GRAINS	PERENITY	MAIN USE
BEEKEEPING			
MAS4 EXPERT BEE CD	Buckwheat 30%, Common vetch 20%, Alexandria clover 17%, Crimson clover 15%, Phacelia 10%, White sweet clover 8%	Annual	Beekeeping, soil cover, biodiversity
MAS4 EXPERT BEE LD	Sainfoin 26%, Incarnate clover 16%, Crimson clover 14%, Alfalfa 14%, Phacelia 12%, Alexandria clover 10%, Sweet clover 8%	Perrenial	Beekeeping, soil cover, biodiversity
VINEYARDS			
MAS4 EXPERT VIGNE+	Rye 20%, Oat 33%, Field bean 20%, Daikon radish 15%, Crimson clover 12%	6 months	Vineyards, soil cover, biodiversity
MAS4 EXPERT NEMA VIGNE	Rye 50%, Black oat 25%, Daikon radish 10%, Common vetch 15%	6 months	Vineyards, soil cover, biodiversity

SOWING PERIOD								Sowing rate	PRODUCT
Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.			
								15 kg/ha	MAS4 EXPERT BEE CD
								25-30 kg/ha	MAS4 EXPERT BEE LD
								25-30 kg/ha	MAS4 EXPERT VIGNE+
									MAS4 EXPERT NEMA VIGNE

ANNUAL | BEEKEEPING

MAS4 EXPERT BEE CD

ANNUAL COVER CROP MIXTURE FOR BEEKEEPERS

- LONG FLOWERING PERIOD**
thanks to 6 different species
- RAPID FIELD ESTABLISHMENT**
covers the soil quickly
- HABITAT AND SHELTER FOR NATURAL PEST ENEMIES**
attracts the natural enemies of aphids



MIXTURE DETAILS

Species	% weight	Nectar	Pollen	Flowering period	Benefits
Buckwheat	30	++	-	Jun.-Sep.	Quick growth, good break in the rotation, suppresses the germination of certain weeds.
Common vetch	20	++	++	Jun.-Aug.	Quick establishment and growth, good resistance against cold and diseases, produces nitrogen.
Alexandria clover	17	+++	++	May-Sep.	Resists to drought, rapid field establishment.
Crimson clover	15	+++	++	May-Jul.	Produces nitrogen, grows well in poor acid soils, structures the soil.
Phacelia	10	+++	+	May-Sep.	Rapid field establishment, long flowering period, interrupts parasites, positive impact on the soil structure.
White sweet clover	8	++	++	May-Sep.	Fixes nitrogen, adapts well to calcareous soils, deep root system, attracts natural enemies of aphids.
White sweet clover	8	++	++	May-Sep.	Fixes nitrogen, adapts well to calcareous soils, deep root system, attracts natural enemies of aphids.

SOWING & CULTIVATION

Sowing period:	Spring or end of summer
Seeding rate:	15 kg/ha – 309 kernels /m ²
Sowing depth:	1 cm
Perennity:	Annual



PERENNIAL | BEEKEEPING

MAS4 EXPERT BEE LD

PERENNIAL COVER CROP MIXTURE FOR BEEKEEPERS

- RAPID FIELD ESTABLISHMENT**
ideal for beekeeping, provides shelter
- LONG AND SPREAD OUT FLOWERING PERIOD**
from spring to autumn
- HIGH BIODIVERSITY**
combination of 7 different species



MIXTURE DETAILS

Species	% weight	Nectar	Pollen	Flowering period	Benefits
Sainfoin	26	++	-	May-Aug.	Very good covering of the soil, rapid growth, produces nitrogen, structures soil
Crimson clover	16	+++	++	Mar.-Jul.	Produces nitrogen, very good development in poor and acidic soils, structures soil.
Red clover	14	++	-	May-Jun.	Adapted to all types of soil and produces nitrogen.
Alfalfa	14	+++	-	Jul.-Sep.	Very good nectar producer, attracts bees and natural enemies of aphids
Phacelia	12	+++	+	May-Sep.	Rapid field establishment, long flowering period, interrupts parasites, positive impact on the soil structure.
Alexandria clover	10	+++	++	May-Sep.	Resists to drought, rapid field establishment
Sweet clover	8	++	++	May-Sep.	Produces nitrogen, adapted to calcareous soils, deep root penetration, attracts the natural enemies of aphids.

SOWING & CULTIVATION

Sowing period:	Beginning Spring or end of summer
Seeding rate:	25-30 kg/ha
Sowing depth:	1 cm
Perennity:	Perennial





6 MONTHS | VINEYARD

MAS4 EXPERT VIGNE+

VINEYARD COVER CROP MIXTURE

- PRODUCES NITROGEN FOR THE VINEYARD**
thanks to the bean and the clover in the mixture
- STRUCTURES AND PROTECTS THE SOIL**
with high biomass production
- NATURALLY FIGHTS NEMATODE**
thanks to the rye in the mixture



MIXTURE DETAILS

Species	% weight	Nb kernels/m ² 30 kg/ha	Benefits
Rye	20	60	Good field establishment in light soils, structures well the soil, limits erosion and plays an important role in against grapevine fanleaf virus.
Oat	33	130	Produces biomass, structures soil and develops rapidly.
Field bean	20	10	Structures soils and captures the residual nitrogen.
Daikon radish	15	54	Structures the soil and limits erosion.
Crimson clover	12	205	Produces nitrogen for the vineyard and provides winter cover.

SOWING & CULTIVATION

Sowing period:	Mid-August / Beginning October
Seeding rate:	25-30 kg/ha
Sowing depth:	1 cm
Perennity:	6 months



6 MONTHS | VINEYARD

MAS4 EXPERT NEMA VIGNE

VINEYARD COVER CROP MIXTURE WITH NATURAL NEMATODE PROTECTION

- NATURALLY FIGHTS NEMATODE**
thanks to the rye in the mixture
- PRODUCES BIOMASS AND NITROGEN FOR THE VINEYARD**
thanks to vetch in the mixture
- STRUCTURES AND PROTECTS THE SOIL**
limits erosion



MIXTURE DETAILS

Species	% weight	Nb kernels/m ² 30 kg/ha	Benefits
Rye	50	149	Good field establishment in light soils, structures well the soil, limits erosion and plays an important role in against grapevine fanleaf virus.
Black oat	25	98	Produces biomass and develops rapidly.
Daikon radish	10	36	Structures the soil and limits erosion.
Common vetch	15	17	Produces biomass and nitrogen for the vineyard.

SOWING & CULTIVATION

Sowing period:	Mid-August / Beginning October
Seeding rate:	25-30 kg/ha
Sowing depth:	2 cm
Perennity:	6 months





- Sustainable energy generation, energy autonomy
- Enhanced biodiversity, climate resilience and reduced pest pressure
- Economic viability
- Local resource utilization
- Efficient land use
- Increased biomass yield
- Improved soil health

MIXTURES FOR BIOGAS PRODUCTION

Growing mixtures for biogas production offers several advantages that contribute to efficient and sustainable energy generation. Here are the key benefits of using crop mixtures for biogas production:

Economic Viability: Crop mixtures for biogas production systems can provide economic benefits by reducing input costs, increasing overall biomass yield, and enhancing the sustainability and longevity.

Incorporating a diverse range of crops into mixtures for biogas production can lead to a more robust and resilient energy system, while also promoting sustainable agricultural practices and contributing to broader environmental and social goals.

Local Resource Utilization: Tailoring crop mixtures to local conditions and available resources supports regional agricultural development and energy production.

Optimized Land Use: Crop mixtures allow for efficient use of available land by maximizing resource utilization and reducing the risk of monoculture-related issues.

Higher Biomass Yield: Crop mixtures often exhibit higher biomass yield compared to single crops. Different plant species have varying growth rates and nutrient requirements, allowing for optimal resource utilization and increased overall biomass production.

Increased Biodiversity: Growing crop mixtures promotes biodiversity by providing habitats for a variety of plant species and associated wildlife. This contributes to ecological resilience and can have positive effects on local ecosystems.

Improved Soil Health: Crop mixtures can enhance soil structure, nutrient cycling, and organic matter content. This leads to improved soil fertility and water-holding capacity, benefitting not only the crops in the mixture but also future crops in rotation.



MAS4 ENERGY PORTFOLIO

PRODUCT	COMPOSITION IN % OF GRAINS	MAIN USE
MAS4 ENERGY SUMMER	Fodder sorghum – multi cut (SUDAL) 50%, Sunflower 18%, Crimson clover 32%	Biogas production, biodiversity, soil cover
MAS4 ENERGY WINTER	Early Triticale (BIKINI) 60%, Late Triticale (RUGLATT) 20%, Late Triticale (KITESURF) 20%	Biogas production, biodiversity, soil cover

SOWING PERIOD							PRODUCT
Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	
							MAS4 ENERGY SUMMER
							MAS4 ENERGY WINTER



NEW

MAS4 ENERGY WINTER

BIOGAS MIXTURE FOR GROWING IN WINTER



- LARGE SOWING WINDOW IN AUTUMN**
from early September up to Autumn thanks to quick growing triticale
- HIGH BIOMASS PRODUCTION**
coupled with high methane production
- 100% CEREAL BLEND**
allowing easy weeding if needed

MIXTURE DETAILS

Species	Variety	% Weight	Nr. kernels/m ² 120kg/ha	Benefits
Early Triticale	BIKINI	60	150	High yield potential and methane production. Brings earliness.
Late Triticale	RUGLATT	20	50	Good yield potential, secures soil coverage to avoid natural salination.
Late Triticale	KITESURF	20	50	Late variety like RUGLAT, it will complement and secure the potential of the mixture.

SOWING & CULTIVATION

Sowing period:	Mid-September – End-October
Seeding rate:	120 kg/ha
Sowing depth:	1-2 cm
Duration:	1 year

Harvest at grain milk stage, latest 1 month before sowing maize.



NEW

MAS4 ENERGY SUMMER

BIOGAS MIXTURE FOR GROWING IN SUMMER



- LARGE SOWING WINDOW IN SPRING / SUMMER**
3 species that can be sown from late spring to early August
- HIGH BIOMASS & METHANE**
thanks to the varieties selected in the mixture
- POST-HARVEST SOIL COVER**
after the harvest clover continues growing and provides winter cover to protect the soil and produce nitrogen. It can also be used as a fodder

MIXTURE DETAILS

Species	% Weight	Nr. kernels/m ² 30 kg/ha	Benefits
Fodder sorghum – multi cut (SUDAL)	50	50	Very good soil cover, resistant to drought, high biomass production with high methane yield
Sunflower	18	10	Adapted to limited growing conditions, with good biomass and methane yield potential. It is the indicator for harvest time.
Crimson clover	32	235	Provides post-harvest soil cover and produces nitrogen.

SOWING & CULTIVATION

Sowing period:	End May – Mid July
Seeding rate:	25-30 kg/ha
Sowing depth:	1-2 cm
Duration:	1 year

Harvest 30 days after the first flowering of sunflower.



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