

有機稲作の普及拡大における課題と挑戦

CHALLENGES TO THE WIDESPREAD ADOPTION OF ORGANIC RICE CULTIVATION

岩石真嗣¹・鈴木晃¹・蟹江秀則¹・長浜吉昭¹・榊原健太朗²・黒田達男²

公益財団法人 自然農法国際研究開発センター 1知多草木農場・2農業試験場

IWAISHI SHINJI・AKIRA SUZUKI・HIDENORI KANIE

YOSHIAKI NAGAHAMA・KENTARO SAKAKIBARA・TATSUO KURODA

International Nature Farming Research Center

1ChitakusakiFarm 2Agricultural Experiment Station

日本の有機農業の普及水準

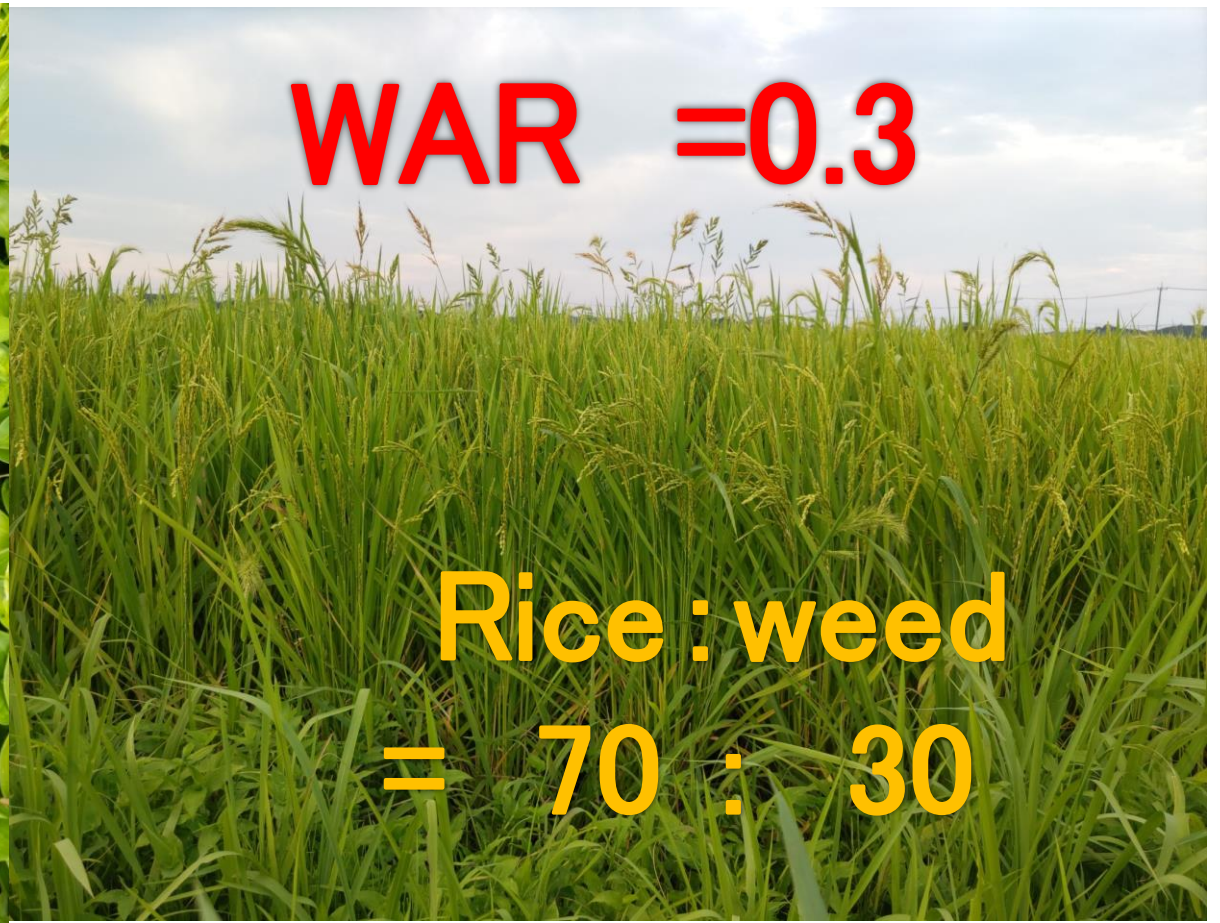
Organic cultivation area or farmers ratio in Japan

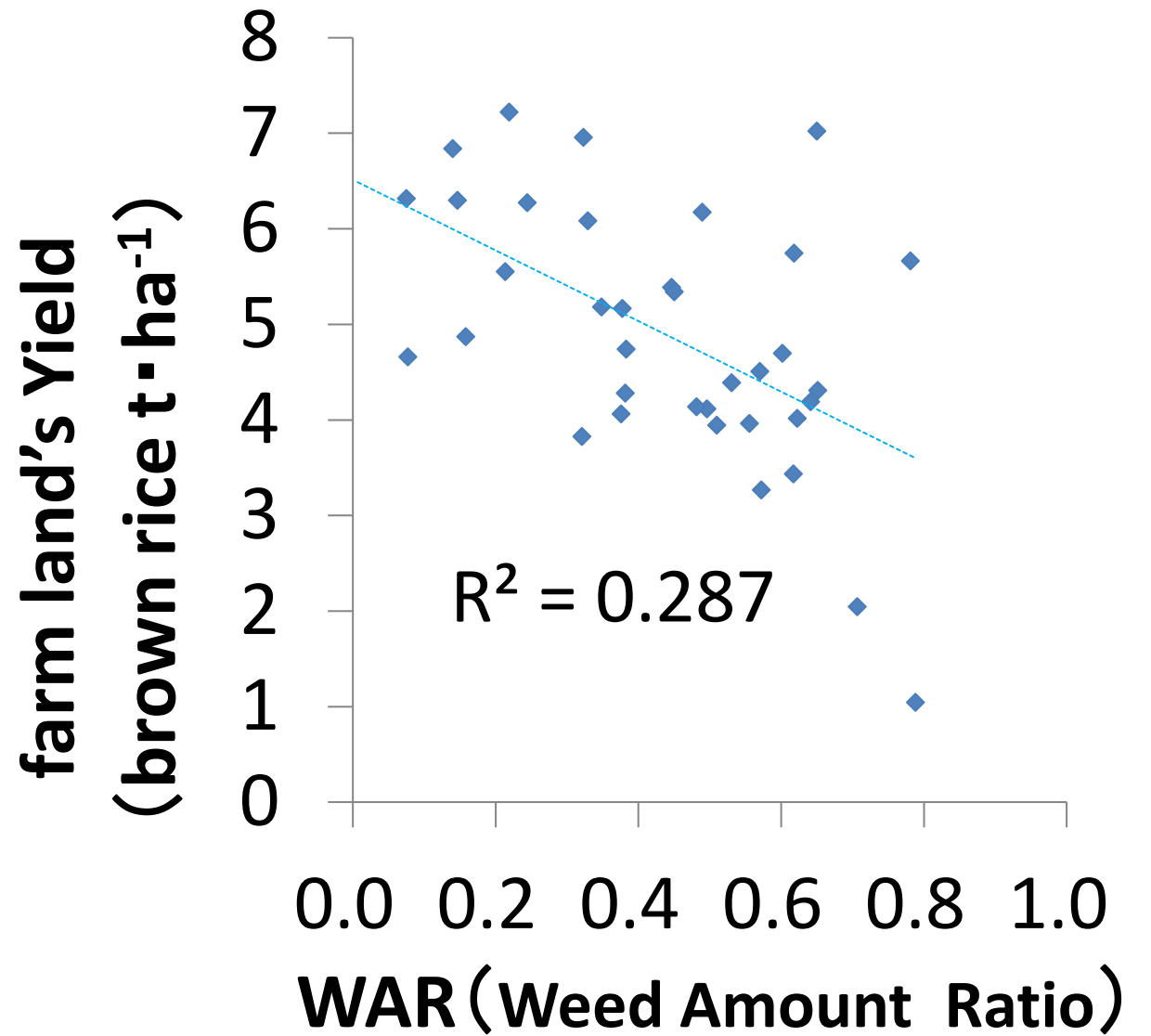
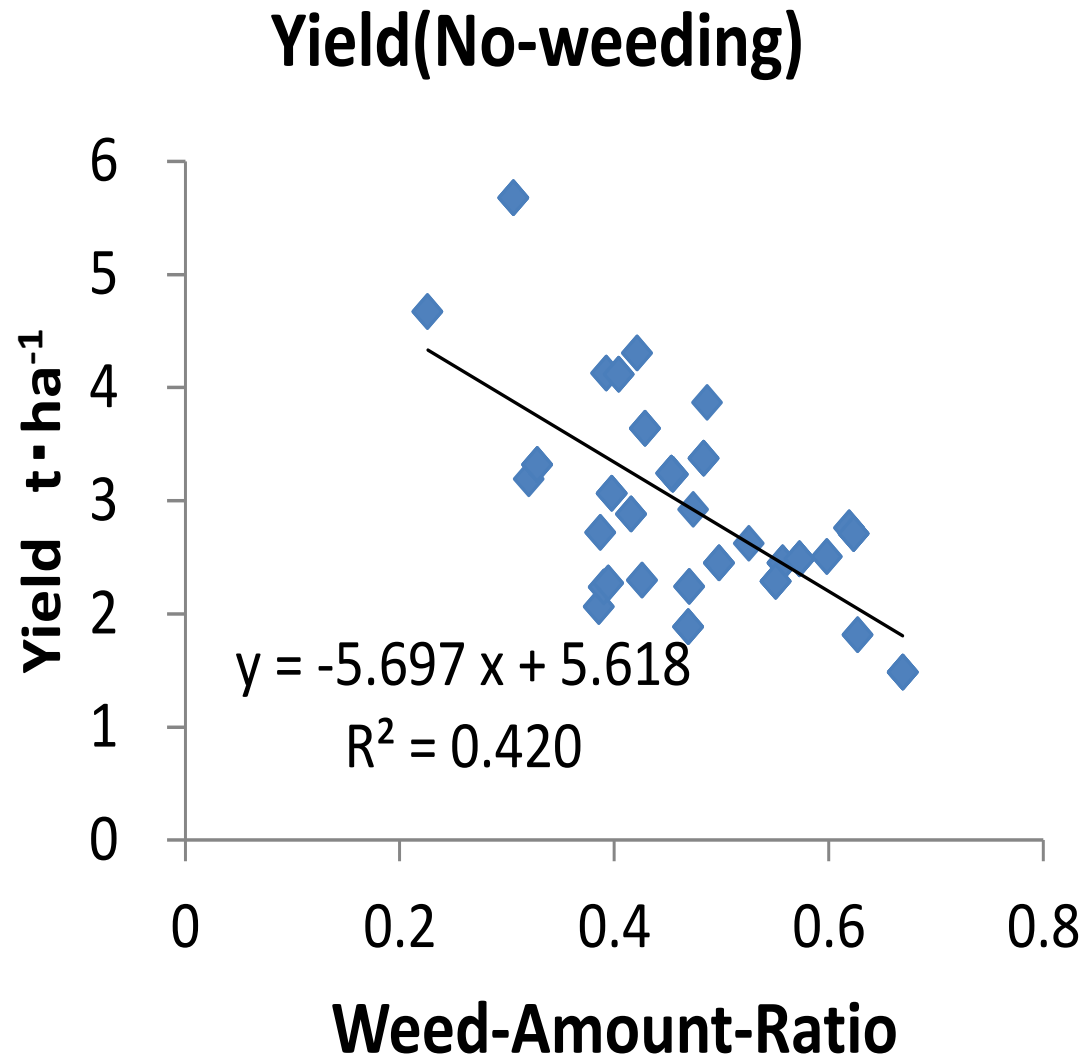
5%

Generally reason is unable to weed control without chemicals

Weed Amount Ratio = Weed weight ÷ (Weed & Rice weight)

- WAR ; 雑草重量群落比。作物—雑草関係を変動させる要因を消去して、作物と雑草の量的力関係を直接示しうる指標として重要である。(Weed Science Society of Japan)





If rice roots are damaged, weeds are easy to grow

It is important not make a field where you must do weeding.



**Rice : weed
= 85 : 15
WAR 15%**



The plot where rice straw was applied on the soil surface after transplantation

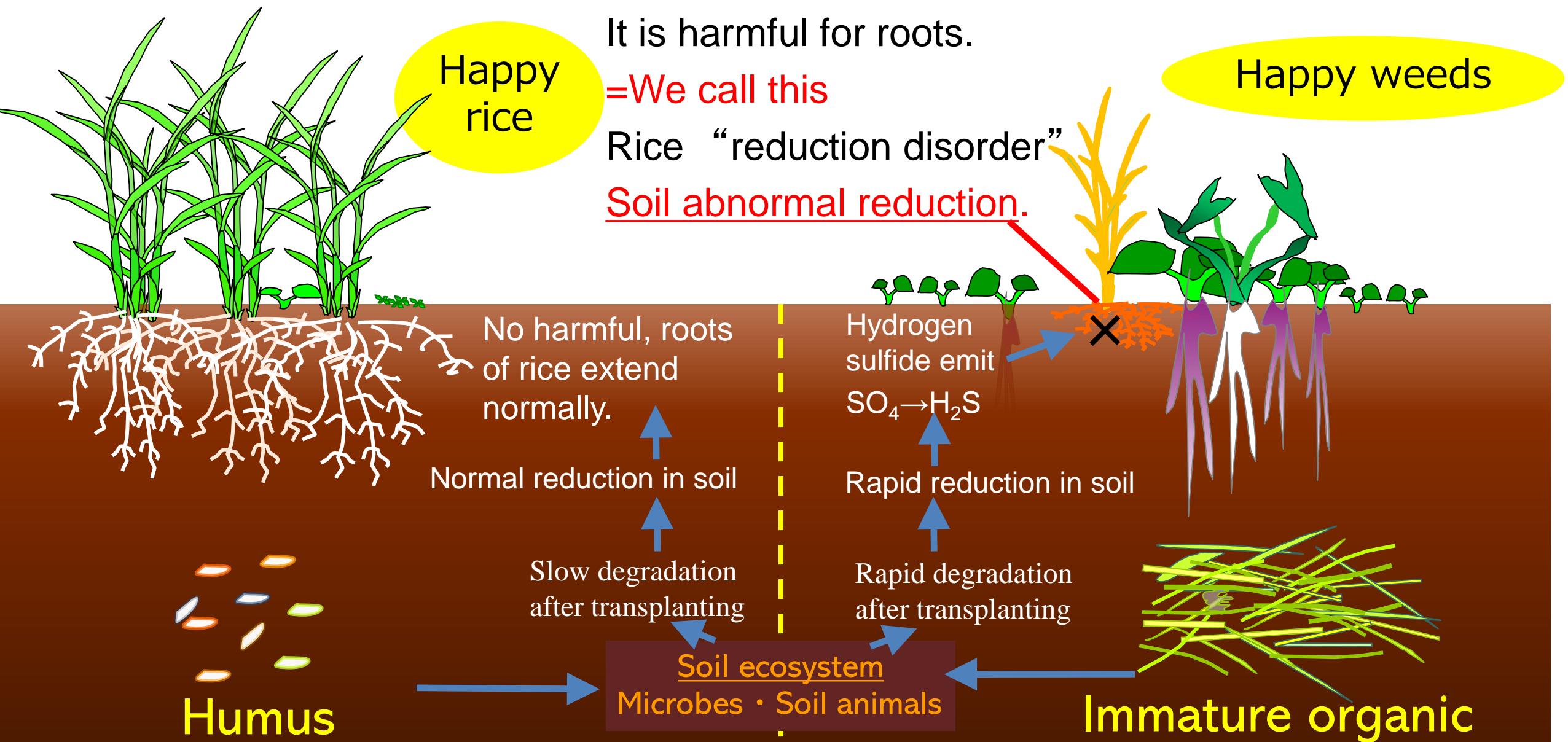


**Rice : weed
= 40 : 60
WAR 60%**

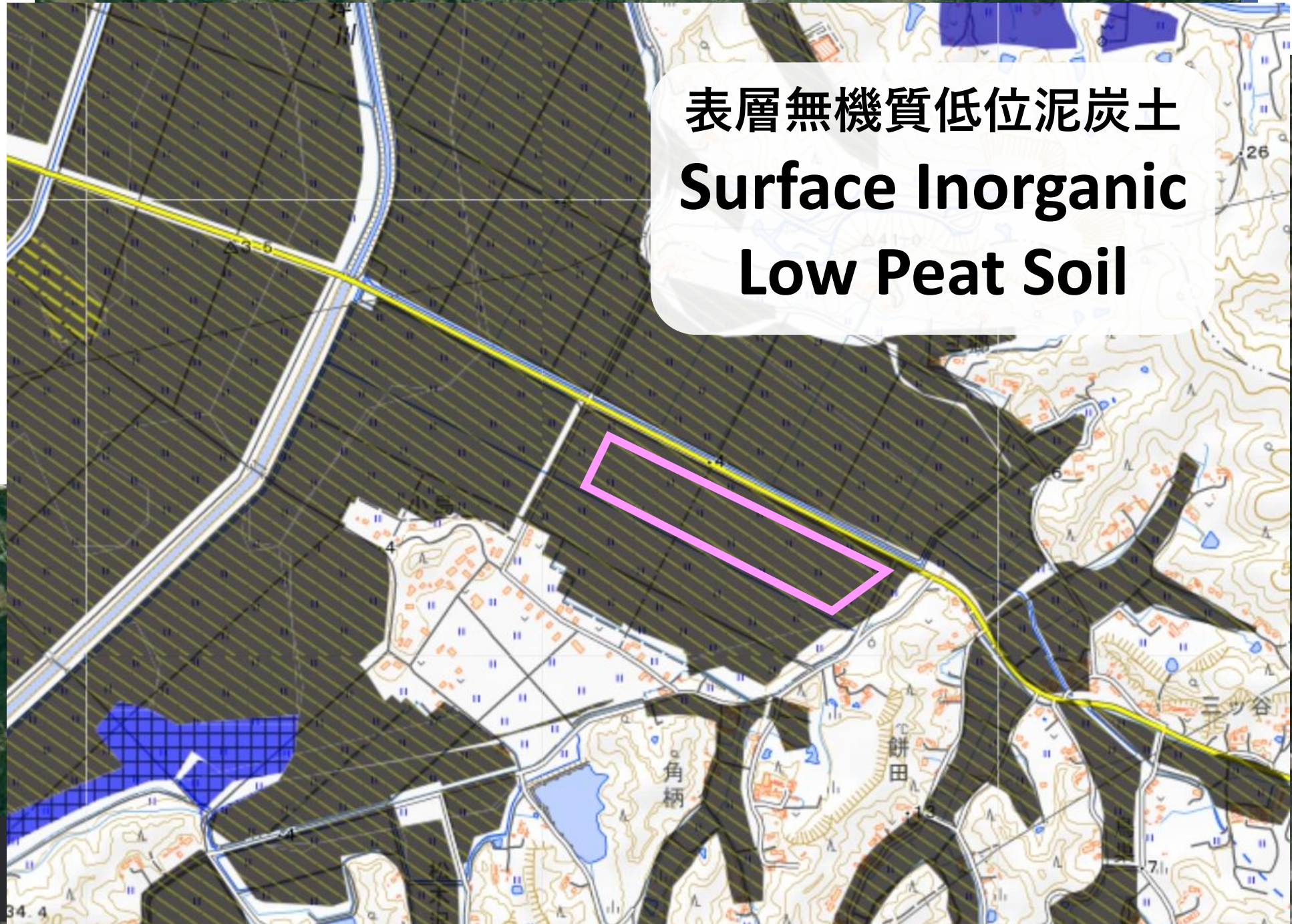
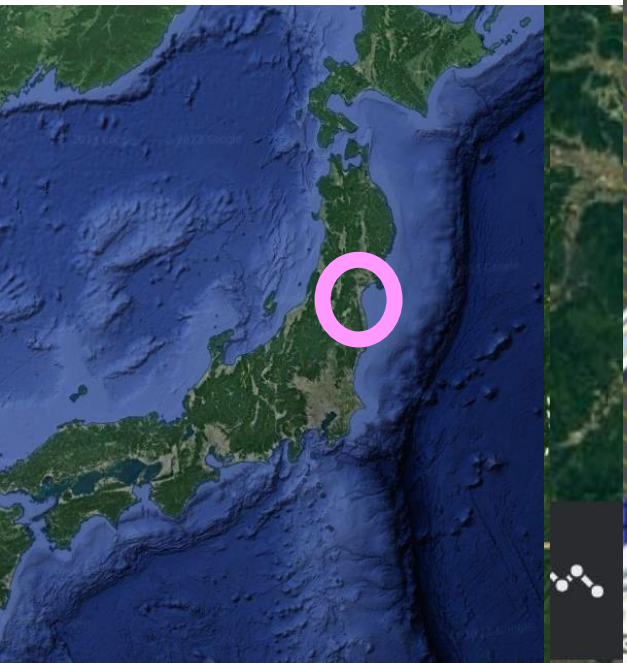


The plot where rice straw was incorporated into soil immediately before transplanting.

Influence of inappropriately used organic matter



Field trip
Visit to Abe
Yoichi's Farm
Nigo, Misato
Town, Miyagi
Prefecture
(Osaki area)



表層無機質低位泥炭土
**Surface Inorganic
Low Peat Soil**



1割畑転ダイズ作.
稲わら畜舎へ搬出.

Ingenuity unique to Organic agriculture
Convert 10% of paddy fields to soybeans.
Harvested rice straw is used for cattle feed.



耕うん前に弾丸暗渠
土壌水分を下げ耕うん.



入水1週間前にアップ
カットローター仕上げ

➤ Install mole drains in before winter tillage

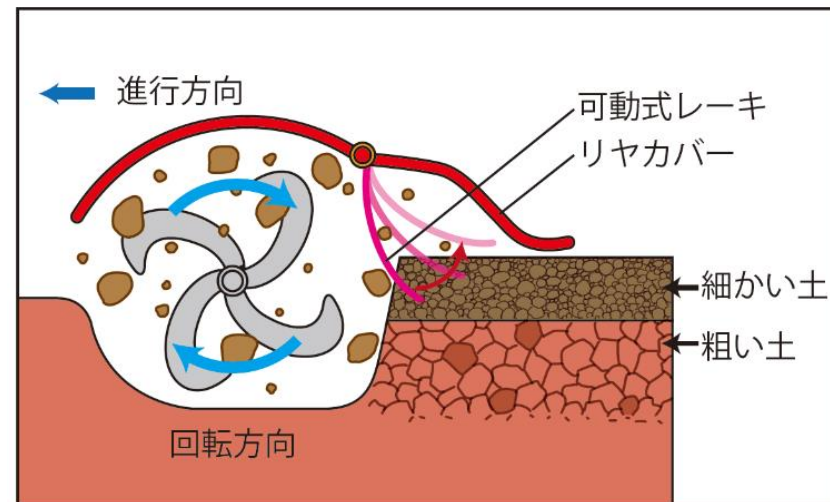


➤ Up-cut rotary tiller finish 1 week before irrigation,
once puddling before rice plant

ぬかる田は30-40年かけて山砂を反当40-60t客土

➤ Add more mountain sand to the wet paddy field
(peat soil).4-6,000 tons/ha/30-40 years

■アップカットロータリの二層耕起





transplanting seedling

66.6hectare Organic Paddy
Rice Fields(OPRF)
15,000 nursery boxes

Over 15 °C Green house
Heat retention by heating

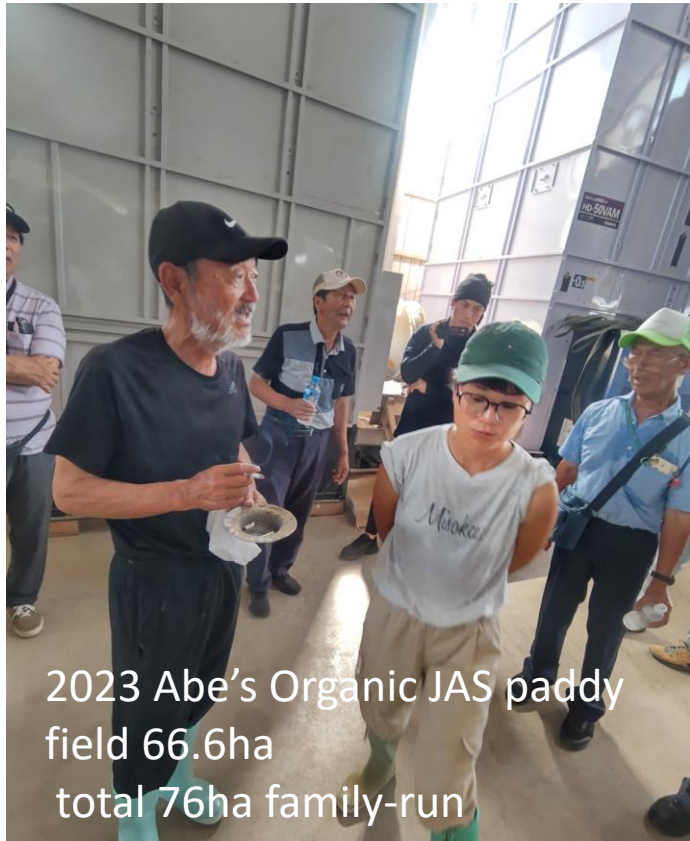


Raising seedlings
Lay flat germination
covered with sun sheet

Japanese-style organic rice production is characterized by the process of plowing through weeds and planting medium-sized seedlings.

66.6ha有機JAS水田。平箱15,000枚（箱140g播種、220枚/ha）育苗。ビニールハウス内暖房15°C設定、太陽シート被覆平置き出芽。3月25日から2日半で播種、除覆7~9日目。ブルーシートプール育苗。5月2日から田植機8条1台で通常1日6ha田植え。

Organic rice cultivation promoted by Yoichi Abe Farm



2023 Abe's Organic JAS paddy field 66.6ha
total 76ha family-run

宮城県美里町

安部陽一さん2023年度
有機JAS水田 66.6ha
全76ha 家族経営



キュウホー
Q-hoe



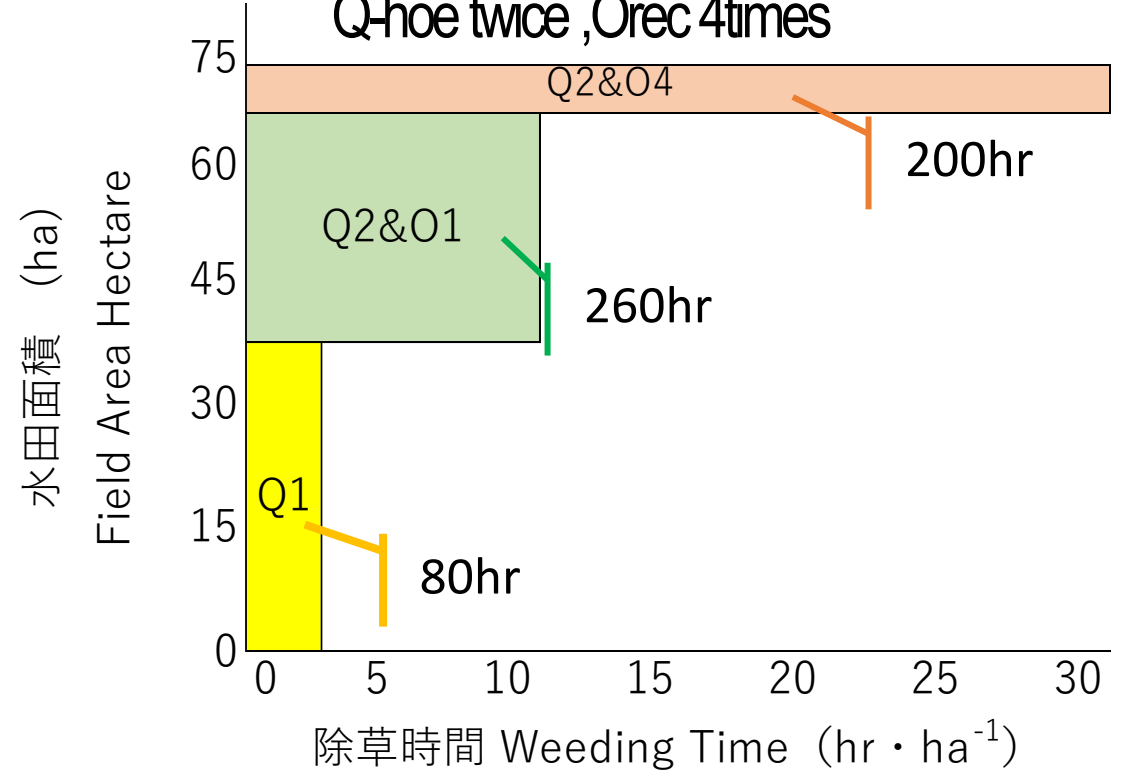
オーレック
OREC



和同
WADO

- Spring tillage of 5 cm depth with up-cut rotary tiller
- Right after rice-planting, weeding by using weeding machine

Q-hoe twice ,Orec 4times



66.6ha OPRF Mr.Abe's ride-on Weedier2023

長期湛水・複数回代かき
Long-term flooding,
multiple puddling
長野県木島平村



長期湛水・複数回代かき除草 無落水田植え

Long-term flooding, multiple puddling
Weeding by deep water shallow plowing



Weeding by deep water
shallow plowing
Nagano kijimadaira
深水代掻き除草

宮城県登米市 及川正喜さん

Flooded rice planting
Mr.Oikawa Masaki's OPRF



<Application materials>

- Rice bran, EM Bokashi
- photosynthetic bacterial solution
- Lactic acid bacteria liquid
- Yeast liquid, Biono-Organic
- Equitan-Organic, Wood Vinegar

【使用資材】

- ・米糠
- ・米糠 EM ボカシ
- ・EM 活性液
- ・光合成細菌培養液
- ・バイオノ有機
- ・エキタン有機
- ・木酢液 (育苗)
- ・天日塩
- ・(藁、籾殻の鋤き込み)





Horizontal tillage & same depth. Forming the “Torotsuchi layer” Falling water tillage ensures uniform tillage depth.

Mr.Oikawa Masaki's OPRF

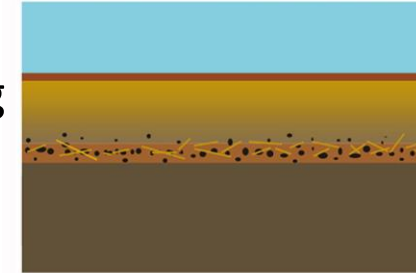
Long period flooding , multiple plowing , and healthy seedling

Falling water tillage ensures uniform tillage depth.



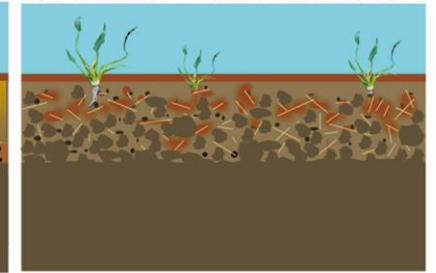
抑草型土壌のイメージ

鋤床の上に有機物や種子が乗り、作土、トロ層で覆われる



出草型土壌のイメージ

種子やせっかく出来たトロ層がゴロ土の間に入り込む



参考写真 6/30 No.20



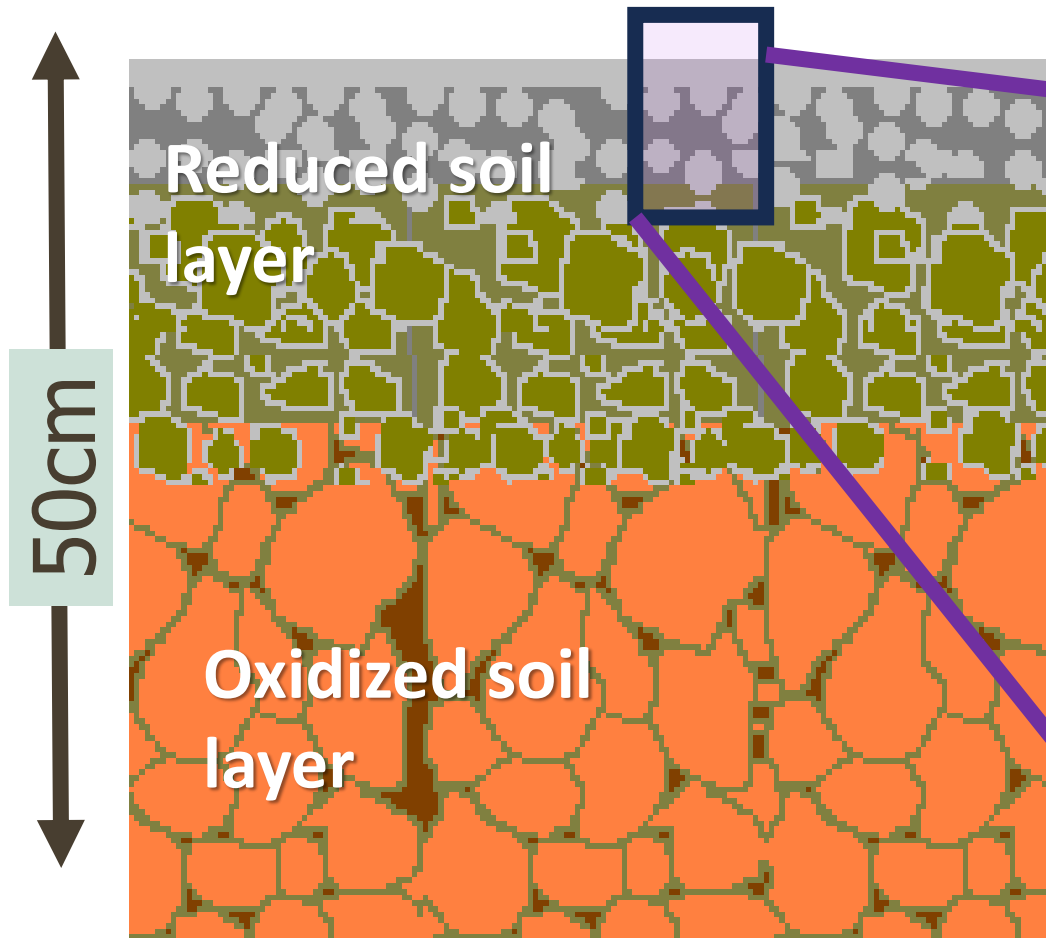
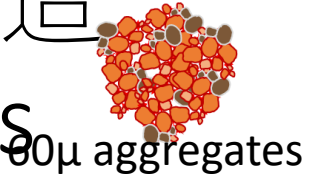
2014年 長期湛水複数回代播き実験

有用微生物群 (EM) 活性液による除草 (抑草) 実験

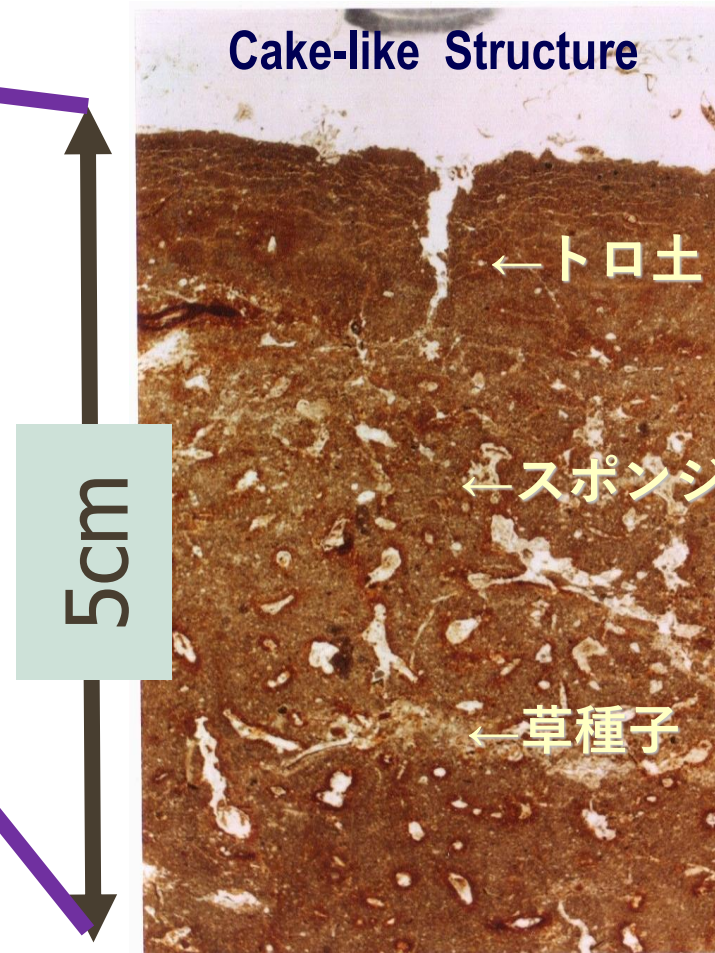


土づくり継続で雑草なくなる。肥沃水田は無肥料栽培も可能

水田雑草が生えにくい地表面の土壌団粒構造 paddy field soil structure that suppressed weeds



Soil layer structure in cm units

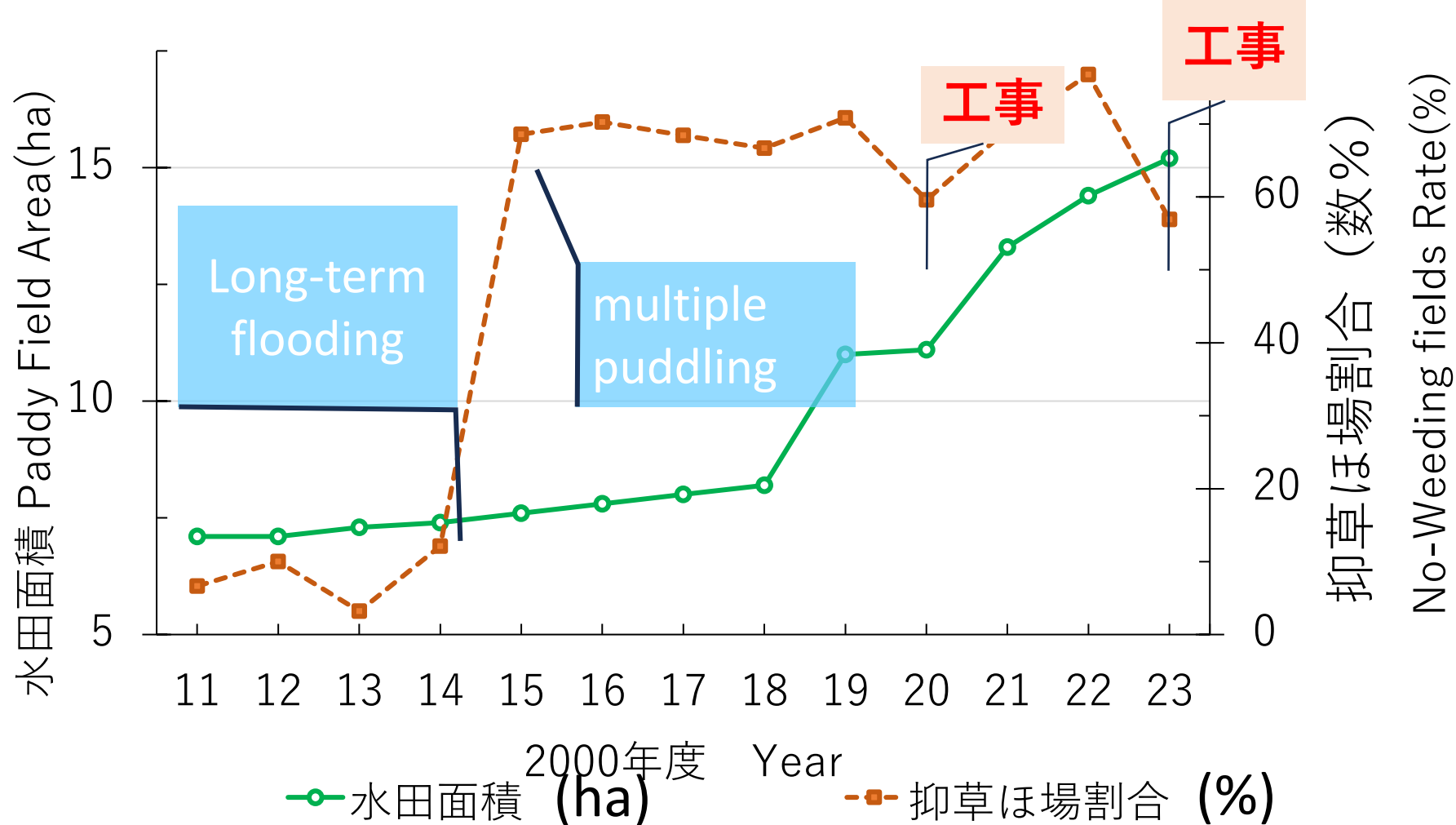


Microstructure, cake-like structure

- “TOROTSUCHI” layer
- Strong reduction,
- Foaming by microbial fermentation
- Aquatic earthworm hardens
- Weed seeds deeply buried

無除草 (No-Weeding) ほ場が6-7割

Farmers focus on growing healthy rice and supporting biodiversity control

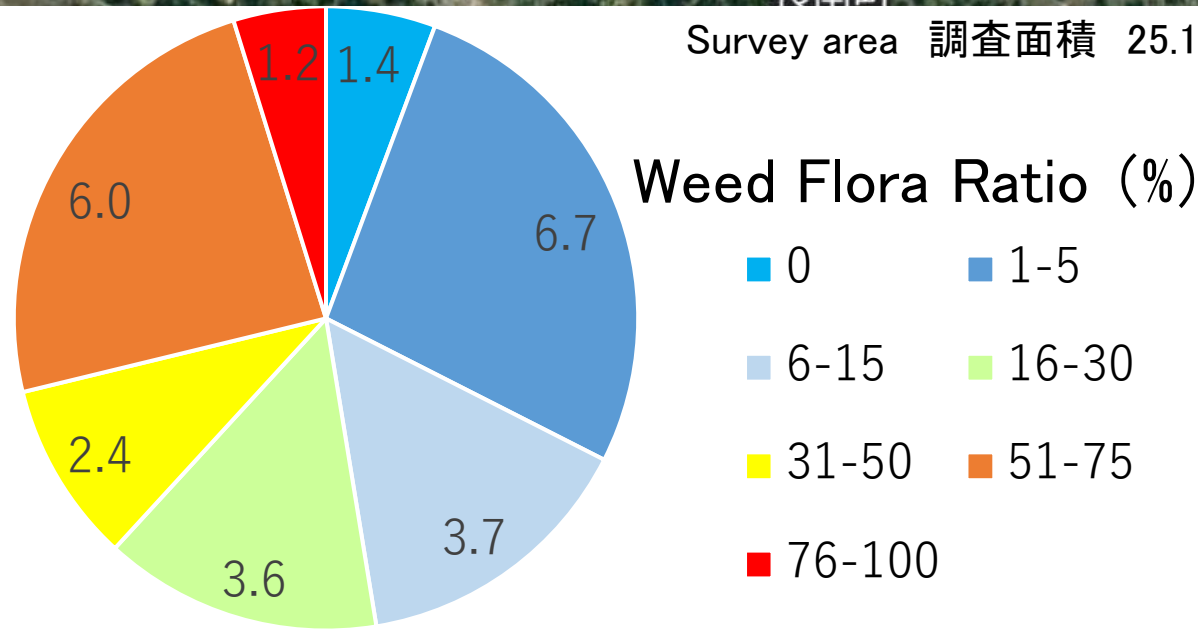


及川正喜さんの雑草対策

宮城県登米市

Weed Management by Mr.Oikawa Masaki's OPRF

長南町
Survey area 調査面積 25.1ha



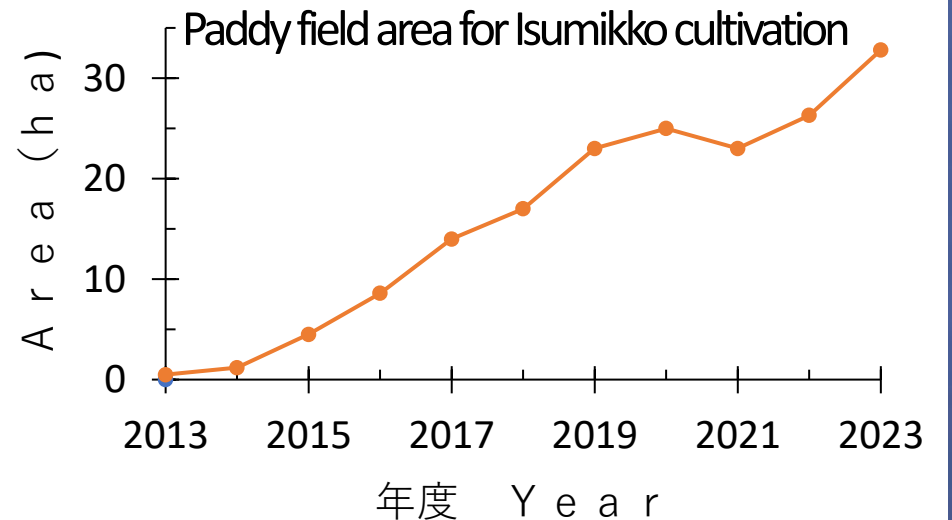
Incidence of weeds in organic rice fields in Isumi City (weed coverage rate)

千葉県いすみ市
房総半島に位置する
人口37,000人のまち
2015年に有機米を学
校給食に導入
2018年に学校全量有
機米給食

御宿町

いすみ市

いすみ市有機米生産面積(1,797ha)



Isumi City, Chiba Prefecture A town of 37,000 people located on the Boso Peninsula
Introduced organic rice into school lunches in 2015. For all school lunches in 2018,
Organic rice area in 2023 is 2% of city paddy fields

雑草を減らすより稲の生命力を高める手助け

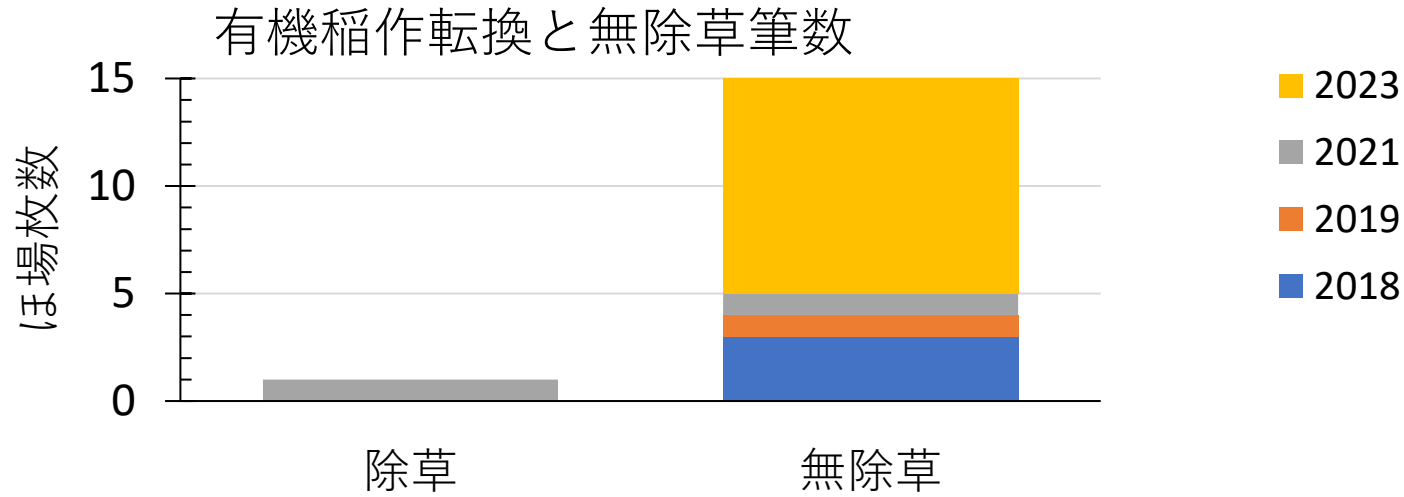
Farmers focus on growing healthy rice and supporting biodiversity in the field reduce or eliminates the need for weed control



ISUMI-city' s farmers. Ingenuity unique to agriculture that does not rely on herbicides.

Hiroshi Kataoka , Odaka, Isumi City いすみ市小高 片岡廣さん

Organic rice production of 3.1 ha (16 fields), cultivated land area of 8.8 ha (64 fields)



Mr. Kataoka's organic paddies that do not require weeding

Cultivation is carried out four times from autumn to spring before flooding, and the soil is cultivated at a constant depth using rotary tillage.

Initial autumn plowing is started when the soil is dry and hard. Winter plowing is carried out at high speed.

Although the weed problem has been resolved, it is the challenge of Kataoka faces in increasing scale meeting market preferences for small packages of processed rice which he is unable to do.



Change the way we think – changes what we see – Focusing is about supporting living plant and ecosystems

まとめ CONCLUSION

- 統合的な耕種防除 **Holistic weed management**
- 施肥不要の育土 **Creating soil —Fertile and well-watered paddy fields**
- 除草不要の田づくり **Creating paddy fields —shallow plowing and deep ridges**
- 自然法則に従い風土に適合させる
Adhering to nature and climate in accordance with the laws of nature
- 水稻を主役とした水田生態系（お米社会）に誘導
True Healthy soil state makes Pests & Weeds Harmless

Lead it to Healthy Agricultural Ecosystem